25% within a decade. "The worse thing about Caltech has been the low numbers [of women]," says faculty chair Marianne Bronner-Fraser, a biologist who was chosen this summer as the first woman to hold that elected position. The number of women in each Caltech division (department) outside the humanities varies from 18% in biology to 5% in engineering.

Women wanted. Sargent panel sets high target.

Caltech president David Baltimore cautiously embraced the target, which he estimates will require some 40% of new hires over the next decade to be women. "It's not an unattainable goal, but it will be very difficult to achieve," he says. With faculty growth unlikely, he says that the shift will have to come primarily through replacements. The committee also called for a fund-raising campaign to bolster the number of women faculty members and to attract more women students.

The survey, which included all women and a sample of men, found that more than half the women say they have encountered gender bias, and 30% recalled "adverse interactions" with their chairs over gender issues. Women are three times as likely as men to be dissatisfied with their visibility at Caltech, and less than half expressed satisfaction with their jobs, compared with 73% of men. Tenure decisions are another sticking point: "As many as 70% of women who have successfully attained tenure have at least reservations about the process," the report notes, compared with just 19% of men.

The small numbers of women made it hard to determine the reason for a disparity in salaries between men and women, says Sargent. It also forced the committee to abandon attempts to investigate differences in lab space—a key metric in the MIT report.

The report also urges Caltech to hire women as senior administrators, and Baltimore says he is committed to making changes in the male-dominated upper tier as positions come open. None of the six current division chairs is a woman, although last month biologist Barbara Wold—who also served on the Sargent panel—was named director of the Beckman Institute, a biology and chemistry research facility on campus.

–ANDREW LAWLER

CREDIT: (TOP) CALIFORNIA INSTITUTE OF TECHNOLOGY; SOURCE: *FROM SCARCITY TO VISIBILITY*, NATIONAL RESEARCH COUNCIL (2001)

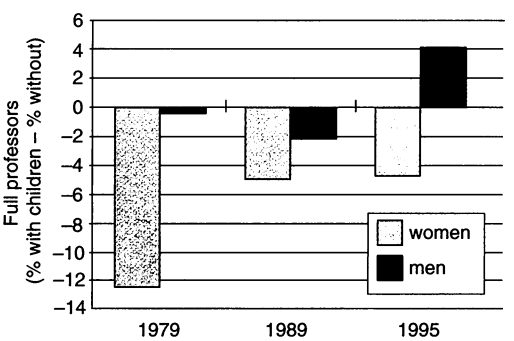
WOMEN IN SCIENCE

Men Still Have Edge in U.S. Science Careers

Having children improves a man's chances of becoming a full professor but hinders a woman's progress in academia. That's one of many provocative findings from a National Research Council (NRC) panel that has been exploring gender differences in the careers of U.S. scientists and engineers.

Issued last month, the panel's 340-page report* eschews the usual analysis of existing studies with policy recommendations. Instead, the panel did its own research on gender differences in the scientific workforce, mining four versions of two ongoing federal surveys. Its conclusion—that men retain an edge that cannot be explained by any objective criteria—may be disturbing to those who think that discrimination is a thing of the past.

"There's clear evidence that women have been treated unfairly," says panel chair J. Scott Long, a sociologist at Indiana University, Bloomington, and a scholar in the field of women's studies. "It's also clear that marriage and family issues are major factors that need to be addressed." Although the five-member panel was not asked to make recommendations, its report suggests that employers consider policies to help "promising employees with young families." It also calls on top research universities to revise graduate school admissions practices to attract and retain more women. "I think every university should do the type of review" carried out by the Massachusetts Institute of Technology and Caltech (see previous story), says Long, "to see if there are current policies that are discriminatory or past practices that need to be addressed."



The family effect. Married women with children are less likely to be full professors than those without. The opposite is now true for men.

Among the panel's findings:

- Tenure is becoming more elusive for women than for men. Comparing data in the 1995 and 1999 surveys, the panel discovered that the share of academics in tenure-track positions dropped from 70% to 55% for women and from 82% to 72% for men.
- Male graduate students are more likely than women to get jobs as research assistants; the difference ranges up to 9% in mathematics, although the gap is narrowing for all disciplines except those in the physical sciences.
- The salary gender gap is widening among more senior academics. Tenure-track men who earned their Ph.D.s in 1979 earned 10% more than women from that class, compared with a 6% difference for those with degrees from 1975.

"Women certainly represent a growing percentage of the scientific workforce," Long notes—from 7% in 1973 to 22% in 1999. "But they're finding a tougher job market, especially in academia."

–JEFFREY MERVIS

* *From Scarcity to Visibility: Gender Differences in the Careers of Doctoral Scientists and Engineers* (www.nap.edu/catalog/5363.html)

SWISS BIOTECH

Government Shoots Down GM Plant Trials

ALLSCHWIL, SWITZERLAND—In a blow to Swiss biotechnology, the government has rejected a high-profile application to conduct field trials of genetically modified (GM) wheat. The decision, now being appealed, has caused widespread consternation among Swiss scientists, who argue that it amounts to a de facto moratorium on field tests of any transgenic plant. Five members of the federal biosafety commission have resigned in protest, including its president, Riccardo Wittek. "If I were working in plants," Wittek says, "I would leave the country."

In November 2000, Christof Sautter of the Institute for Plant Sciences at the Swiss Federal Institute of Technology (ETH) in Zürich sought permission to sow, on a small outdoor

plot, wheat seeds engineered to resist the stinking smut fungus. Smuts and bunts—a related pest—devastated European wheat in the 18th century and continue to plague crops in many developing countries. The diseases are hard to detect and are spread mainly through planting infected seeds.

Sautter modified two Swiss spring wheat lines to express a viral gene, *KP4*, that encodes a protein that inhibits fungal growth. In greenhouse experiments, the transgenic plants proved 30% less susceptible than controls to infection with stinking smut. In 1998, Sautter was ready to take the next step: petition the Swiss Agency for the Environment, Forests, and Landscape (BUWAL) to grow the transgenic plants on a plot "twice the size of a double bed," he says.

Waiting for Godot? Christof Sautter displays his dormant 8-square-meter plot with safety measures, including a tent to prevent pollen from escaping.

But Sautter hesitated, worried about the outcome of a national referendum that would ban transgenic research (*Science*, 12 June 1998, p. 1685). The referendum was defeated, but the climate remained uncertain as parliament launched a debate—which is still going on—about how to legislate gene technology. According to Wilhelm Gruissem, director of ETH's plant biotechnology laboratory, BUWAL representatives requested an "informal" meeting at the Bern train station in December 2000 to discourage him and Sautter from submitting their field trial petition. BUWAL by then had already rejected two applications from other teams and appeared to be tipping its hand to the ETH duo: Gruissem claims they were told that their experiment would be "politically inopportune." BUWAL spokesperson Andreas Stuber confirms that the meeting took place but insists that its purpose was constructive.

Sautter and Gruissem went ahead with their application on 19 January, after which BUWAL requested additional greenhouse tests. They got a boost on 5 September when the biosafety commission ruled that the experiment posed no "appreciable" risk to people or the environment. But at a press conference on 20 November, Philippe Roch, director of BUWAL and former head of the Swiss World Wildlife Fund, announced that the department had rejected the application. Roch argued that it was impossible to assess the experiment's risks because too little is known about the KP4 protein and because the transgenic wheat contains a foreign antibiotic resistance gene. Although this gene is dormant and not known to pose a risk, Swiss legislators are moving to outlaw trials of plants that contain it anyway.

Gruissem rejects Buwal's rationale, arguing that the field trial would have been "the perfect risk-assessment experiment." The proposal included such restrictive safety measures—wire mesh to keep out field mice, for example, and a tent cover to prevent pollen from escaping—that members of the biosafety commission, Wittek recalls, joked whether it could still be called an open field trial.

ETH announced on 29 November that it will appeal the ruling to the Department of Environment, Transport, Energy, and Communications. In the meantime, Sautter's continued funding from the Swiss National Science Foundation stipulates that he must obtain approval by February for field trials of his wheat. Failing that, he says, he could pack up and go to the United States, although he says he would prefer to remain in Switzerland to argue the case for GM field trials.

Beat Keller, a plant biologist at the University of Zürich who coordinates the Swiss National Science Foundation program on wheat, sees the decision as a culmination of nonscientific approaches to the regulation of GM plants. "It is so obviously wrong," he says. And it is not likely to be righted anytime soon: Wittek says there are no other field-trial applications pending or in sight.

–GISELLE WEISS

Giselle Weiss is a writer in Allschwil.

FUNCTIONAL GENOMICS

Pathogen Researchers Get Help From TIGR

Immunologist Pam Baker is getting the backup she needs. As a professor at Bates College, a small undergraduate institution in Lewiston, Maine, Baker doesn't have easy access to the advanced gene research tools that could help her understand how the bacteria *Porphyromonas gingivalis* helps spark gum disease. So she was pleased when The Institute for Genomic Research (TIGR) in Rockville, Maryland, recently offered to provide her with the specialized glass microarrays that can document how *P. gingi-*

ScienceScope

Pluto Power NASA says it doesn't have the money, and the White House insists it won't back the mission, but Congress is getting its way—for now. The space agency last week chose a team led by Alan Stern of the Southwest Research Institute in Boulder, Colorado, and the Applied Research Laboratory (APL) in Laurel, Maryland, to start designing a spacecraft for a 2006 flight to Pluto.

The push to go to the solar system's farthest planet comes from Congress, which allocated $30 million for the flyby in the recently approved 2002 NASA budget. Underlining the importance of politics, APL director Richard Roca praised the work of "avid space science supporters, such as Senator Barbara Mikulski [D–MD]," who leads the Senate subcommittee that oversees NASA's budget. But the Administration continues to insist that there's just not enough money for a launch, presaging another showdown next year.

No New Toys Geophysicists hoping to unveil parts of "the most complete, highest resolution, digital topographic map of Earth" at next week's meeting of the American Geophysical Union will probably have to contain their excitement a few more months. In the aftermath of 11 September, the Defense Department's National Imagery and Mapping Agency (NIMA) has "requested" that NASA not release any of the data returned by the Shuttle Radar Topography Mission (SRTM, right), in which NIMA was a major partner.

After almost 2 years of processing the 10 terabytes of data, researchers had topographic maps of Oregon, California, and the Philippines' Mount Pinatubo volcano ready to show their colleagues how geologic hazards such as landslides, coastal erosion, and volcanic mudflows can be better understood and anticipated. NIMA is "talking to NASA about how to start releasing the data," says SRTM deputy project scientist Tom G. Farr of the Jet Propulsion Laboratory in Pasadena, California. "They're just trying to be cautious, to do the right thing. I don't think it'll be longer than a few months"—just long enough to spoil the holiday fun.

CREDIT: (RIGHT) NASA