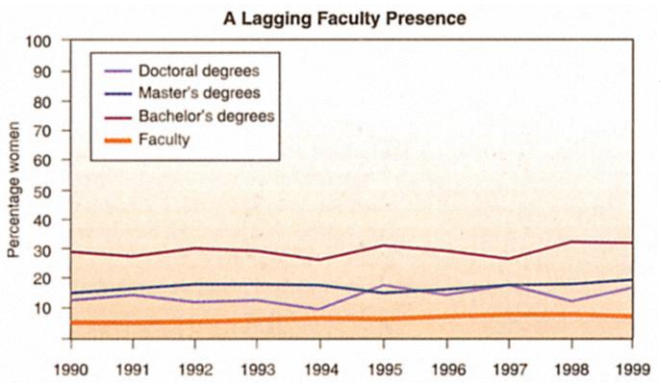
WOMEN IN ACADEMIA

Engineers Marginalized, MIT Report Concludes

BOSTON—A 1999 report that documented the plight of female researchers at the Massachusetts Institute of Technology (MIT) sparked a heated national debate about the need to improve the status of women scientists in academia. Now a new study of MIT's School of Engineering cites a host of similar barriers, leaving dean Thomas Magnanti to conclude that "MIT is not a hospitable environment" for many women.



Behind the times. The percentage of women earning MIT engineering degrees far outstrips their presence on the engineering faculty.

The largest of MIT's schools, engineering also has the lowest percentage of female professors—fewer than 10% of the school's 357 faculty members. Those hired are subject to "a consistent pattern of marginalization," states the 30-page study, which Magnanti commissioned in 1999 as one of four reviews of individual schools. Women's representation is far less than in the overall student body, which declines from the first to the final degree (see chart). Unlike the 1999 report on the school of science, however, the engineering study did not find significant inequities in salary and space based on gender. But there are "more subtle biases" that may be harder to redress, Magnanti says, including a dearth of women faculty members on Ph.D. committees and in senior administrative posts.

"Simply put, this situation is unacceptable," he says in a letter accompanying the report, which contains narratives along with some grim statistics. Magnanti also endorses the report's recommendations, which include doubling the percentage of women engineers in a decade, hiring consultants for job searches, and holding workshops to increase gender awareness. "Barriers persist," he writes, "and all too many of us remain oblivious to them."

MIT engineer Lorna Gibson, who chaired the study, says that much of the exclusion "is not malicious; it's unconscious." Such behavior takes a variety of forms. Gibson recalls that she was typically the one asked to cover for male colleagues on sabbatical. "It was like being a substitute teacher" rather than a valued professor, she says. That attitude changed, however, once she pointed out the disparity. And some women had never been asked to serve on a Ph.D. committee, a situation that Magnanti says he found "stunning."

The situation is better on the pay front. In late 1995, female engineers requested a salary review, which resulted in significant increases. Additional boosts followed a 2000 review. "The data suggest that salary inequities have occurred in the School of Engineering" but have since been addressed, the report concludes.

With regard to hiring practices, the engineering faculty has twice as many women as a decade ago, and this year three women accepted faculty positions for 2002. But the growth has been uneven. Between 1990 and 1998, for example, the electrical engineering and computer sciences department, one of the largest, hired 28 men and no women, although it has added three women since then. Between 1981 and 1999, according to the report, nearly three times as many women as men rejected job offers, citing "the difficulty in collaborating with colleagues."

Hiring women is one thing; keeping them is another. In the mechanical engineering department, for example, only one of the five women hired between 1987 and 2001 is still at MIT. "We need to make this a more welcoming environment," Magnanti says. Toward that end, MIT is modifying its family leave and child-care policies. The dean also has agreed to use consultants to search for qualified women and to examine why women reject MIT offers at a higher rate than men do. But Magnanti concedes that doubling the percentage of women in a decade will be "a stretch."

Women account for only 15% of MIT's total faculty, and reports from the architecture and management schools found smaller but similar numerical imbalances. There were no signs of salary inequities based on gender in the humanities school, which has the highest percentage of women faculty members.

Magnanti, along with Gibson and other women engineers, hopes that the report will extend the debate launched by the science report and serve as a model for other academic institutions. "This is not just an MIT problem," says Gibson. MIT officials also hope to lead the way in fostering diversity among female faculty members, although provost Bob Brown did not offer specific proposals at a recent meeting of minority women scientists.

The fact that "MIT is saying everybody should pay attention" is an important statement, says Evelynn Hammonds, a science historian who organized the meeting and is the only tenured African-American woman at MIT. There are just four women of color among MIT's 94 tenured women, including one engineering professor.

–ANDREW LAWLER

PALEOANTHROPOLOGY

African Skull Points to One Human Ancestor

Almost 1.8 million years ago, a new kind of human appeared on the scene in Africa and Eurasia. It stood as tall as living humans do and had a relatively large brain, slender hips, and a barrel-shaped rib cage. These early humans used stone tools adeptly, scavenged meat on the open savanna, and colonized more than one continent. But anthropologists have been divided for 2 decades about their identity: Were they members of one peripatetic species, *Homo erectus*, which included later fossils in China and Indonesia? Or did they belong to a different species called *H. ergaster*?

A report in this week's issue of *Nature* offers an answer, based on a million-year-old skull from Ethiopia, that meshes with the judgment of a previous generation. The team of American and Ethiopian researchers has concluded that all of the African and Asian fossils belong together in one species, *H. erectus*. The debate is more than academic quibbling about classification: The skull shares key features with both the early African and somewhat later Asian

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One, at a million. This skull suggests that one human species—not many—lived 1 million years ago.

and African fossils, and it therefore links them all as interbreeding members of the same wide-ranging species that gave rise to living humans.

"This fossil is a crucial piece of evidence showing that the splitting of *H. erectus* into two species is not justified," says co-author and paleoanthropologist Tim White of the University of California, Berkeley. "This African fossil is so similar to its Asian contemporaries that it's clear *H. erectus* was a truly successful, widespread species throughout the Old World." If White and his colleagues are right, there was a single species that spread from Africa to Europe to Asia 1 million years ago, rather than several different species alive at once.

But others say it is premature to write a death notice for *H. ergaster*. "I don't think it takes the wind out of the sails of *H. ergaster*," says Bernard Wood of George Washington University in Washington, D.C., who still thinks more than one species was alive 2 million to 1 million years ago. "I'm not at all convinced it is an intermediate," agrees Jeff Schwartz of the University of Pittsburgh. "To me, it says there was more diversity in these hominids."

The idea of *H. erectus* as the direct ancestor of living humans is a return to a view embraced by most anthropologists until the mid-1980s. That's when several scientists, including Wood, proposed that fossils found in Africa in the 1970s—including hominids that had lived as early as 1.8 million years ago on the shores of Lake Turkana in Kenya—differed from the classic specimens of *H. erectus* from Java, Indonesia, which appeared between 200,000 and 750,000 years later (*Science*, 2 March 2001, p. 1735). The Asian fossils, they argued, had generally more robust features and belonged to a separate species. That meant that *H. ergaster* was the human ancestor—and *H. erectus* was an Asian dead end, says Philip Rightmire of the State University of New York, Binghamton.

More than a decade of debate ensued. Then, in 1997, White's graduate student W. Henry Gilbert found a calvaria—a skull without a jaw—in the 1-million-year-old Daka member of the Bouri Formation of Ethiopia. Although gnawed by animals, it was well preserved. Most importantly, it shared features with both Asian and African fossils, including large, projecting brow ridges like those of the Asian *H. erectus*, says co-author Berhane Asfaw of the Rift Valley Service in Ethiopia.

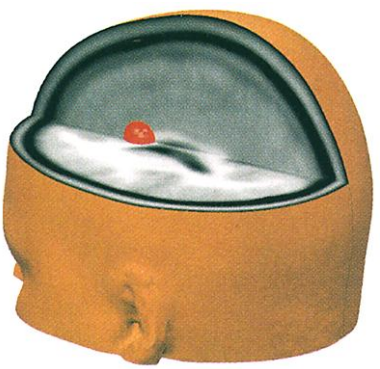
The team compared the Bouri fossils with others from Africa, Europe, and Asia and used cladistic methods to rank 22 characters in the skulls, sorting them on an evolutionary tree. The researchers found that the Bouri skull, along with another skull from Olduvai in Tanzania, overlapped extensively with Asian forms and later African fossils. "This clearly shows that the features previously considered to separate the Asian and African forms do not hold," says Asfaw. That evidence is persuasive for Rightmire and Eric Delson, a paleoanthropologist at Lehman College of the City University of New York. "So, *H. erectus* is still a pivotal species," says Delson. "This was the only game in town for a million years." But Wood and Schwartz continue to think there were other players on the scene, suggesting that the question is far from settled. "I don't think the issue will dry up and go away," predicts Rightmire.

–ANN GIBBONS

NEUROSCIENCE

The Good, the Bad, and The Anterior Cingulate

Making good decisions on the fly is a skill critical for many activities, from navigating freeway traffic to trading stocks on the Internet. Now researchers have linked a key component of this type of decision-making—the split-second evaluation of how well things are going—to a distinct pattern of brain activity.



CREDIT: WELLCOME DEPARTMENT OF COGNITIVE NEUROLOGY, LONDON

Winning big? The anterior cingulate cortex can tell good news from bad.

On page 2279, psychologists William J. Gehring and Adrian R. Willoughby of the University of Michigan, Ann Arbor, report that electrical activity in the anterior cingulate cortex (ACC)—an area tucked into the crease between the two cerebral hemispheres—registers financial wins and losses as people play a gambling game. The authors believe that this brain activity may represent an immediate emotional reaction to the outcomes. The findings add a twist to theories on the role of the ACC and may provide insight into how decisions are swayed by emotion.

In recent years, studies by Gehring and others have suggested that the ACC plays a critical role in evaluating the outcomes of one's behaviors. For example, one theory holds that the ACC reacts when people make mistakes. But the new study suggests that the ACC may be doing something even more

ScienceScope

New Face at CNRS? One of the most powerful posts in French science is about to be filled. Bernard Pau, currently director of the Institute of Biotechnology and Pharmacology in Montpellier, is the leading candidate for director of the life sciences department at CNRS, France's behemoth basic research agency, *Science* has learned. He would replace cell biologist Jacqueline Godet when she steps down in coming weeks.

Pau, 50, has an international reputation for developing diagnostic techniques for heart disease and other maladies. At CNRS, he would head a corps of 3285 researchers, nearly a third of the agency's total scientific cadre.

Researchers say that Pau's nomination will continue a trend, reinforced 2 years ago when medical researcher Geneviève Berger became CNRS director-general, of recruiting administrators ready to emphasize applied research. Says one French scientist: "CNRS is pushing very hard in that direction."

Misconduct Defined Marking the end of a long debate, the National Science Foundation (NSF) this week adopted a government-wide definition of what constitutes misconduct in science.

Two years ago, the Clinton Administration issued guidelines that defined scientific misconduct as fabrication, falsification, and plagiarism—"FFP" in Washington lingo (*Science*, 15 October 1999, p. 391). But the guidelines dropped a fourth term, "serious deviations," that NSF had argued was needed to cover misdeeds such as sexual harassment—but scientists argued was too open-ended. The final wording, echoed by the NSF rule published 18 March in the *Federal Register*, preserves the concept by requiring that FFP must rise to the level of a "serious departure" to be considered misconduct.

Other agencies are still incorporating the federal definition into their policies. The Department of Health and Human Services—the parent agency of the National Institutes of Health—expects to issue a rewrite of its 13-year-old rule later this year, according to staffers. And in the United Kingdom, the Wellcome Trust has proposed a misconduct definition far broader than FFP, including "deliberate, dangerous, or negligent deviations from accepted practices" (*Science*, 24 August 2001, p. 1411).

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