With set-aside programs under fire, "majority" institutions are being asked to find new approaches to achieve diversity

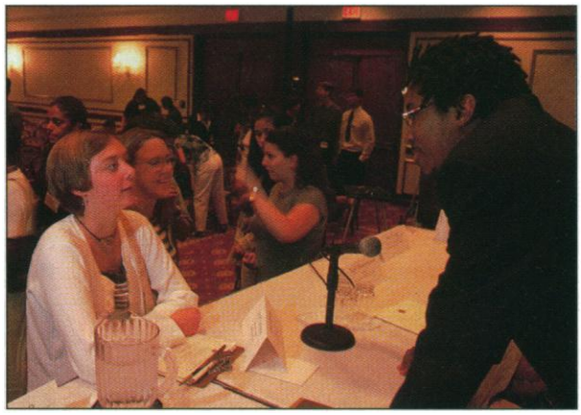
Wanted: A Better Way to Boost Numbers of Minority Ph.D.s

For years, the National Science Foundation (NSF) has reserved a portion of its prestigious graduate research fellowships for minority students seeking to launch a career in science. By holding a separate competition among underrepresented minorities—notably, African-Americans, Hispanics, or American Indians—for approximately 15% of the 900 slots, NSF officials hoped to increase their pitiably small number in academic science. But next month, when NSF announces the rules for its 1999 awards, the minority component will be gone.

The decision is triggered by a recent pretrial settlement of a white student's lawsuit claiming that the separate competition discriminated against majority students (*Science*, 26 June, p. 2037). And it's part of a much broader review of some two-dozen NSF programs, which last year received $110 million to help diversify the U.S. scientific work force. "This is a big issue," says Joe Bordogna, acting deputy director of NSF, who oversees the effort.

NSF is not alone in questioning such activities. In the wake of a string of legal and political reversals for affirmative action programs, federal agencies, universities, and private foundations are seeking ways to increase the number of minorities in science without running afoul of the law. They range from trying to change the culture of research universities to promoting mentoring and building bridges between predominantly white institutions and historically black colleges. Some also try to "prime the pump" by reaching down into high schools or even earlier, and others also target women, an underrepresented minority in many fields.

"There's no magic bullet," says cell biologist James Wyche, associate provost at Brown University in Providence, Rhode Island, and executive director of the Leadership Alliance, a consortium of 25 universities formed to address the issue that held its 6th annual symposium in Washington, D.C., last month. "We all need to come up with better ways to increase diversity." The dismantling of affirmative action programs, say others, doesn't indicate that the hurdles facing minority students who embark on a scientific career have disappeared. "Some people think that the playing field is now level," says microbiologist John Ruffin, head of NIH's Office of Research on Minority Health. "But nothing could be further from the truth."



RICK KOZAK

Building bridges. Savoy Brummer, right, talks about grad school with students at the recent Leadership Alliance conference.

A shaky record

This rethinking is coming at a time when, despite more than a generation of programs aimed at giving minorities a greater opportunity to compete for scientific careers, all but Asian-Americans remain dismally underrepresented in science. While African-Americans, Hispanics/Latinos, and American Indians comprise 23% of the U.S. population, they make up only 4.5% of those holding scientific doctorates. When physicist and university administrator Walter Massey, president of Morehouse College and former NSF director, challenged graduate science departments almost 10 years ago to produce more minority Ph.D.s from underrepresented groups, he noted that many of them had yet to produce a single minority Ph.D. Recent figures show little change in that situation (see tables).

As universities struggle to improve their record, two events have complicated their efforts. One was a 1996 California referendum, Proposition 209, that makes it illegal for state institutions to use race-based criteria in admissions and hiring decisions. The other is a 1996 federal appellate court ruling, *Hopwood* v. *Texas*, that imposed a similar prohibition in Texas, Louisiana, and Mississippi. This fall, residents of Washington State will vote on an anti–affirmative action referendum, and educators are also awaiting the outcome of a pending suit that accuses the University of Michigan of discriminatory admissions policies. These decisions would apply only to specific states or institutions, however; the Supreme Court has yet to go beyond its 1978 Bakke ruling, which allows education officials to use race as a factor in their decisions.

That situation has created widespread confusion over whether a particular law, court decision, or agency policy applies to a specific action by an individual institution. "As private and public institutions, we're not supposed to have set-asides," says Gary Ostrander, associate dean for research in the arts and sciences at Johns Hopkins University in Baltimore. "But federal agencies like NSF and NIH can have [campus-based] programs that target minorities and that we must administer without violating the law. It's a fine line that we all walk." Private philanthropies like the Howard Hughes Medical Institute and the Sloan Foundation are also struggling with the issue.

Many science educators say that the recent judicial and legislative activity has cast a pall over efforts to attract minorities into the profession. "It has a chilling effect on the groups you are trying to reach," says Herbert Nickens, head of minority programs for the 123-member Association of American Medical Colleges (AAMC), which in April issued a ringing 13-page defense of affirmative action in medical education. It calls the termination of such programs "a threat to diversity [that is] even more serious than the backlash in the mid-1970s." Notes Nickens: "Even as you're trying to drum up interest in academic science, it sends the clear message to minority students that, 'We don't want you.' "

However, others say that there's no point longing for something that's not coming back. "I think phase I of affirmative action is dead,

and I don't lament its passing," says Richard Tapia, an applied mathematician at Rice University in Houston, Texas, and a member of the National Science Board, which oversees NSF. "It gave us a jump start, but it was never supposed to be permanent. Now, we have to find other ways to achieve real gains."

New approaches

One way is to urge the "majority" universities that churn out the lion's share of U.S. Ph.D.s to lure and retain minorities without setting quotas. Next month, for example, in addition to revamping its fellowship program, NSF hopes to award up to $2.5 million over 5 years to each of eight or so universities that have promised to graduate more minority Ph.D.s in the natural sciences and engineering. "I've been prodding them for years to do something like this," says Representative Louis Stokes (D–OH), who inserted language last fall into NSF's 1998 spending bill that created the Minority Graduate Education (MGE) program and who provided for its continuation in the House version of NSF's 1999 budget bill. "I think we've been making minimal progress, and I think that putting more money into the effort will help." Last month, NSF received more than 50 applications featuring partnerships between majority and minority institutions, mentoring programs, networking, and other ways to funnel more minority students into graduate programs and to lower the barriers to success.

Although educators welcome the new program, many caution that it will be hard to change the culture at research universities—even at those with an exemplary record of trying to boost minority participation in science and engineering. For example, Purdue University has earned a national reputation for providing research opportunities for minority undergraduates under a program begun by a trio of faculty members that included biologist Luther Williams, now head of NSF's education directorate that sponsors the MGE program. But the institution still has a long way to go, says Purdue biologist Joe Vanable. "The climate here is no worse than anywhere else, but it's not good," he says.

So, Vanable led a group that penned a proposal in response to NSF's new program requesting money for, among other things, intensive workshops aimed at opening the minds of his colleagues on matters of race. But senior university officials questioned the likely impact of such efforts and refused to submit it to NSF. Vanable remains bitter about the decision. "It's a question of priorities," he says. "Once, when enrollment was declining, we were threatened with budget cuts if we didn't improve the numbers. So, we met weekly to come up with ways to succeed. That's never happened with the recruitment of minorities or the hiring of minority faculty."

Vanable's lament that minority issues are slighted by the scientific mainstream is common among educators who have labored to raise participation rates. "What I'd like more than anything is a national summit on the subject so that we can see what everybody else is doing," says Joel Oppenheim, director of the Sackler Institute of Graduate Biomedical Sciences and associate dean of graduate studies at New York University (NYU), who travels around the country seeking minority applicants for the university's summer research program as well as for his graduate school. "We've never had one."

Looking for results

Because trying to change the culture of an institution can be a long, slow process, some funding organizations focus on departments and individuals with a good track record. "We've decided to concentrate on helping the people who have shown that they can make it happen," says Ted Greenwood, who runs the Sloan Foundation's effort to increase the number of minorities receiving Ph.D.s in science and engineering.

Sloan's program, begun in 1994, tries to boost Ph.D. output by giving faculty members and departments $30,000 to support each additional minority student. It also keeps score, trimming the grants of those who fall short by failing to recruit or retain the expected number of students. Although the program has yet to graduate its first Ph.D., Greenwood hopes that his annual budget of $3 million, including a grant to Purdue's biology, chemistry, and engineering departments, will eventually add 100 minority doctorates a year to the existing academic pool.

NSF's revamped graduate fellowship program is looking for racially neutral ways to serve minorities without reserving a certain number of spots for them. At the urging of the Justice Department, which wanted to avoid a politically charged trial and a possible precedent-setting defeat, NSF officials settled the case for $95,400—paying $14,400 to the student, Travis Kidd, and $81,000 to his lawyers.

The new selection criteria for next year's class of fellows are expected to downplay the importance of scores on standardized tests, in particular the Graduate Record Exam (GRE). One approach would set a threshold score above which every applicant

INSTITUTIONS GRADUATING THE MOST MINORITY PH.D.S (annual average, 1992–96)

BIOLOGICAL SCIENCES (267 institutions)	
University of California, Davis	9.0
University of California, Berkeley	8.4
Howard University	7.8
University of Florida	7.8
Harvard University	7.2
Number of schools graduating:	
Fewer than one per year	100
None	56

GEOSCIENCES (169 institutions)	
University of Arizona	2.6
Texas A&M University	2.2
University of Miami	1.8
Columbia University	1.4
SUNY, Stony Brook	1.4
Number of schools graduating:	
Fewer than one per year	70
None	84

MATHEMATICS (179 institutions)	
University of California, Berkeley	2.6
University of Arizona	2.4
SUNY, Stony Brook	2.0
University of California, Los Angeles	1.8
University of Iowa	1.8
Number of schools graduating:	
Fewer than one per year	88
None	76

CHEMISTRY (208 institutions)	
Texas A&M University	5.8
Howard University	4.0
University of Puerto Rico, Rio Piedras	3.8
University of Florida	3.4
Louisiana State U. and A&M College	2.4
Number of schools graduating:	
Fewer than one per year	117
None	52

ENGINEERING (202 institutions)	
University of California, Berkeley	10.2
Texas A&M University	10.0
Georgia Institute of Technology	9.0
Massachusetts Institute of Technology	8.6
University of Texas, Austin	8.2
Number of schools graduating:	
Fewer than one per year	73
None	46

PHYSICS/ASTRONOMY (192 institutions)	
Massachusetts Institute of Technology	1.8
Stanford University	1.8
University of Texas, Austin	1.8
Florida State University	1.6
University of Illinois, Urbana-Champaign	1.6
Number of schools graduating:	
Fewer than one per year	88
None	82

For a complete list, see www.sciencemag.org/feature/data/2811268.shl

SOURCE: NSF/NIH/NEH/USED/USDA SURVEY OF EARNED DOCTORATES, 1992-1996.

PHOTO: RICK KOZAK

is deemed acceptable and then use other factors that many people believe are equally relevant to success in science, including creativity, determination, and real-life experience, to choose the winners.

Tapia, who advocates such a threshold as a way to increase diversity without using set-asides, says such an approach would be a marked improvement over current practices. "The misuse of standardized tests has been the worst enemy of minorities," he says. Rice's freshman class contains a significant number of underrepresented minorities with "substantially lower SAT scores than the university at large," he says, who were chosen on the basis of other, race-neutral criteria. "But once admitted," Tapia says, "they are on a par in terms of retention rates and grade point average."

Applying the same policy to graduate admissions, he says, has allowed his colleagues to assemble a computer and applied mathematics department of some three dozen students that is one-third minority and more than half women. "And we graduate at those rates," he says proudly. Tapia currently receives funding from the Sloan program and is hoping to win NSF funding to replicate that success at a consortium of universities.

But administrators of other programs aimed at minorities worry that, whatever guidelines are used, the results may not make up for the loss of the minority fellowships. "[The settlement] could have a devastating effect," warns NIH's Ruffin. "These things are very competitive, and the people who make the decisions bring to the table their own sense of what makes someone most qualified. They may not be biased, but they may not know all the factors involving minority students."

Indeed, choosing the appropriate factors is so problematic that most federal agencies, including NIH, sidestep the issue by making grants to institutions, which are then free to use their own selection criteria. Through bridge and partnership programs with colleges and universities that have large numbers of minority students, majority universities also can tap a much larger pool of minority students than exists on their own campus.

At Johns Hopkins University, for example, that means linking up with two nearby historically black universities—Coppin State and Morgan State. A summer research fellowship program funded in part by the Howard Hughes Medical Institute, for instance, uses those connections to team up a dozen or so minority undergraduates with Hopkins's world-class faculty. "It happens that the program involves Coppin and Morgan State, whose student body happens to be more than 90% black," says Hopkins's Ostrander. "We will not take race and gender into consideration in the selection process. However, if it turned out that the top 10 applicants for the program were white males, we probably wouldn't run the program."

Granting sources like Hughes are also treading warily. The philanthropy is still a defendant in a suit brought by a white high school student denied entry to a summer science camp for minorities run by Texas A&M University, which U.S. officials agreed to settle last December (*Science*, 2 January, p. 22), and top officials declined to be interviewed on the subject. "There is a changing legal climate that raises questions we have to address," says Hughes spokesman David Jarmul. "But we think our commitment to supporting programs that increase participation by minorities and women is compatible with the law and consistent with our goal of training biomedical researchers."

NYU's Oppenheim also wants to do good science in an atmosphere that fosters diversity. And that requires a major commitment from "majority" institutions such as his. In 1990, he began a summer research program to attract minorities to NYU's graduate schools. It was through the program, which is now "color-blind" and currently 75% majority, that he befriended Savoy Brummer, an African-American graduate of Howard University.

Now a second-year medical student in the honors (research-oriented) program at the medical school, Brummer has spent the past three summers at NYU doing research. He says that Oppenheim, who is white, has been an immeasurable help as he takes his first steps into a career in medical research and that trust, not a desire to remove racial barriers, is the key to their close relationship. "I decided to come to NYU because Joel promised to stay here until I'm done," he says. "In a way, I've put my life in his hands. And he's always there for me."

—JEFFREY MERVIS

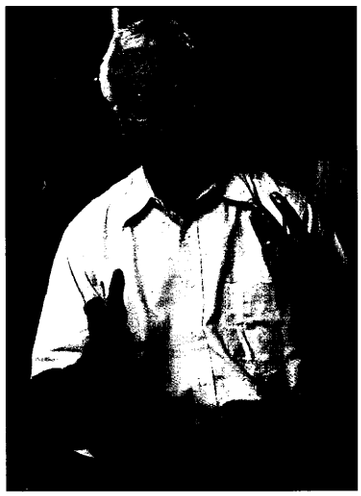
AIDS RESEARCH

NIH Concocts a Booster Shot for HIV Vaccines

After being criticized for moving too slowly on AIDS vaccine research, NIH is putting more urgency into the push to develop and test candidates

When the National Institutes of Health (NIH) decided 4 years ago not to fund large-scale efficacy trials of the leading AIDS vaccines then under development, the move underlined a stark and sobering message: A decade had passed since HIV had been unmasked as the cause of AIDS, yet researchers had not even found a vaccine promising enough to justify the expense of a full-scale test. The field lost what little momentum it had. Now, NIH is trying to give AIDS vaccine research a shot in the arm.

Neal Nathanson, a viral epidemiologist who in May left a long career at the University of Pennsylvania to take over NIH's Office of AIDS Research (OAR), says revitalizing the vaccine program is his top priority. "NIH money watered the basic science field, and we've let 100 flowers bloom," he says. "Now, we have to figure out some way of harvesting those and getting them eventually into [human] trials." In recent interviews with *Science*, Nathanson laid out how he and other NIH officials plan to speed vaccine development. The steps include boosting funding; creating a new peer-review study section to evaluate vaccine proposals; launching a set of standardized, comparative tests of candidate AIDS vaccines in monkeys; and trying to stimulate partnerships between U.S. investigators and colleagues in other countries. NIH even announced last week that it will collaborate in analyzing results from tests of one of the very vaccines it declined to sponsor 4 years ago—tests that are now being carried out by a private company.



SAM KITTNER

... it's time "to take an orderly, logical approach."

—Neal Nathanson