Diversifying Science

Biologists know diversity is required for healthy ecosystems and evolution. The same concept is true for the pool of students pursuing science.

JUAN MAGANA TRAVELED ONLY 100 MILES FROM HIS HOMETOWN OF SALINAS, California, to attend college at the University of California, Berkeley. But it might as well have been to another planet. Salinas, an agricultural town and birthplace of writer John Steinbeck, has recently become well-known for its Latino street-gang activity and the closing of its public libraries. Graduating 25th in his class, Magana was one of just a handful of students from his high school to go to college. ¶ But when he bombed his first calculus exam, Magana realized he was not as prepared as most other Berkeley students.

Luckily, at orientation he had received an invitation to join the Biology Scholars Program (BSP), an HHMI-supported program that offers academic support and a sense of community to struggling life-science majors at Berkeley—many of whom are underrepresented minorities (African American, Latino, or Native American) or from underprivileged backgrounds. Now a fourth-year public health major, Magana excels in his courses and tutors freshmen BSP students in chemistry.

His success story was but one of those presented in the Symposia on Diversity in the Sciences, a series of meetings where college and university faculty, students, and administrators share the challenges and results of campus programs aiming to recruit and retain underrepresented minorities majoring in science, math, and engineering. These HHMI-sponsored symposia, which began in 2005, have taken place at Harvard University, the University of Louisiana at Monroe, and, most recently (October 27 and 28, 2006), the University of Washington, Seattle. A fourth and final session at HHMI headquarters in Chevy Chase, Maryland, planned for early 2008, will wrap up the series.

Underrepresented minority and disadvantaged students enter college with the same level of interest in science as do other students, say symposia organizers. Yet, only a small percentage of minority students graduate with a science degree. For example, African American students represent 11 percent of all U.S. college students, but earn only 6.9 percent of the bachelor's degrees in the sciences and less than 2 percent of the science and engineering doctorates awarded.

"We have been losing them in our own house," says Michael F. Summers, a chemist and HHMI investigator at the University of Maryland, Baltimore County (UMBC). But a program on his own campus—the Meyerhoff Scholars Program—is making a difference, as shown by the data Summers has presented at each symposium. Not only has the Meyerhoff program increased the performance and retention rates of participating African American students, it has also led to dramatic increases in enrollment and retention of the African American science students *not* in the program. Summers explains that, by raising the achievement levels of minority students in science, the program has slowly changed faculty attitudes. "Now, the expectations are higher."

Yet "it's not just about increasing numbers" per se, says Freeman Hrabowski, president of UMBC, "but increasing the numbers of students who excel, who become passionate, who develop a vision about science. I want to hear them say, 'I dream about science, I dream I'm in the lab.'" (See "To Reshape a Culture," page 40.)

Robert Lue, HHMI program director at Harvard and co-director of the symposia, believes that, just as biologists recognize diversity as essential to a healthy ecosystem, so too should all scientists recognize that diversity in the pool of future scientists will make science a more robust enterprise. "Diversity in the sciences," he says, "is about making sure we don't lose the insights that come from a range of experiences and backgrounds."

And there are programs to increase diversity that work. So Lue and the other symposia organizers decided to take "on

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Kris Snibbe / Harvard News Office

Illustration: Christopher Silas Neal

the road" the lessons from campuses—Louisiana State University; University of California, Berkeley; UMBC; and Xavier University of Louisiana, among others—where underrepresented minority students excel in science. Their aim is to encourage other institutions to make similar changes.

All the model programs strive to excite students about hands-on research early in their college careers and to involve them in student-faculty interactions. They also include components that focus on building a sense of community among minority science students and improving their chances of academic success. Strategies include intense mentoring by faculty or peers, summer courses to teach study skills, refocusing of the ways introductory courses are taught, and students' studying in peer groups—one of the most effective practices but also one of the most controversial, as students and faculty often resist it.

But Jasmine McDonald, an alumnus of the UMBC program and now a doctoral student at Harvard, recalls the value, in her own peer group, of hearing concepts explained in different ways. And there were other, more profound benefits as well. "It was a support group, not just a study group," she says. "If someone failed, the group failed. I learned that any successful person has someone backing them, pushing their potential."

In backing these students, however, these programs also treat them with respect. "BSP doesn't hold our hands or treat us as mediocre students," says Magana. "It just sets up a level playing field. It gives me an opportunity to excel in science, to be both dorky and cool about it."

Wendy Raymond, a molecular geneticist at Williams College in Williamstown, Massachusetts, and co-director of the symposia, says that having the students' perspectives in the mix during symposium discussions has been powerful in changing faculty and administrator attitudes about diversity.

Such attitude shifts are critical, says Raymond, because "a single sentence can change a student's life for better or for worse." Students at the symposia in fact shared some examples, of both types, from their own experiences. It can be disheartening, said one student, when a science professor asks a minority student, on the first day of class, "Are you on the football team?" Conversely, said another, it can be immensely encouraging to hear a faculty member ask, "How are you really doing in class?" or for the professor to take the time to urge a student to apply for a research position.

Seventy-six colleges and universities, serving an estimated 915,000 students, were involved in the symposia. Some came away ready to make changes. After participating in the Harvard symposium, Cornell University

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