Spotlight Brighter on Minorities in Science

NSF, Black Caucus initiatives reflect growing concern about access to research careers

THE underrepresentation of minorities in U.S. science, engineering, and medicine is getting renewed political attention in Washington. There appears to be an increasing sense of urgency fueled by the demographic fact that blacks and Hispanics are expected to make up about 28% of the college-age cadre in the United States by 1995, yet these minorities currently account for less than 2% of the doctoral degrees in the physical sciences. There are similar disparities in other sciences and in engineering.

In the past few weeks alone, the Congressional Black Caucus announced establishment of a minority Institute of Science, Space, and Technology under its auspices; the Department of Education sponsored a 2-day symposium to promote science and technology partnerships among historically black colleges and universities, industry, and government; and the National Science Foundation (NSF) announced the creation of its first two minority research centers of excellence.

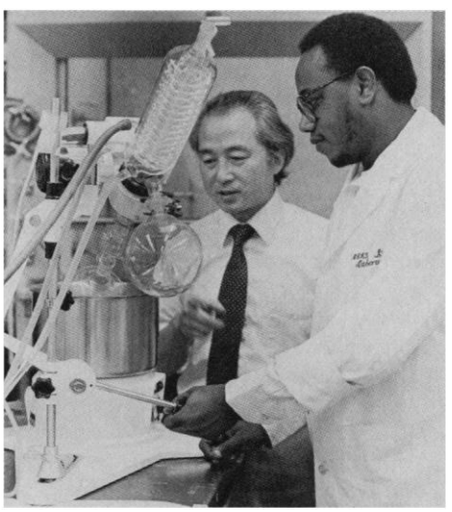
Earlier in September, the National Academy of Sciences Government-University-Industry Research Roundtable helped set the tone by releasing a report* warning of a shortfall in U.S. researchers and urging efforts to recruit women and minorities into technical fields to expand the pool.

Efforts to deal with the underrepresentation of minorities in science have a long history, but compensatory programs operated by school authorities, higher education institutions, and industry tend to have localized effects. Neither they nor the federal programs created in the 1960s and 1970s have made much of a dent.

Most observers, however, credit two programs established in 1972 by the National Institutes of Health (NIH), the Minority Biomedical Research Support (MBRS) and Minority Access to Research Careers (MARC) programs, with some success. But the experience of these programs, which held their annual symposium here on 1 to 3 October, illustrates not only the possibilities but also some of the problems facing efforts to increase the representation of minorities in science.

The MARC and MBRS programs were aimed initially at bolstering the historically black colleges and universities. These appeared to be suffering a drain of their best students and faculty under the impact of desegregation on U.S. higher education, and most lacked the resources to be competitive in science.

Both programs aim at increasing the number of minority students making careers in biomedical research by linking student support with measures to strengthen the biomedical curriculum and research capacity of their colleges and universities. Eligible institutions—about 100 form the category—are those that historically served minority students or that now have significant minority enrollments—20% or more appears to be the rule of thumb. Both programs focus mainly on undergraduates.



Research Training. *A student in the Minority Biomedical Research Support Program at Florida A&M.*

In MBRS, the larger program, the principal mechanism is to award research grants to biomedical faculty, but the program also provides support for such things as major equipment purchases and animal facilities for the institutions. Students are paid salaries—$4200 a year for undergraduates, $5604 for graduate students—to work as assistants on the projects and participate in the research process. The program budget for 1987, funded through NIH's Division of Research Resources, is $28 million; regular research grants from NIH institutes augment the program's effect.

The MARC program is more specifically a research training program for honor students. Like MBRS, it provides funds to bolster teaching and research programs in the biomedical sciences. Institutions with MARC programs select science honor students to participate in the program in their junior and senior years. The aim is to prepare students to pursue a doctoral degree in biomedical research and a commitment to such training is a major criterion for selection. The program pays tuition, fees, and a stipend currently set at $5000 a year for undergraduates. Research internships for two summers, usually at major research institutions, are also underwritten. A small number of top trainees qualify for predoctoral fellowships that provide tuition and fees and stipends of $6552 for 5 years. Funding for the program in 1987 is $8.6 million.

Over the years, the programs have evolved in two major ways, according to Richard Bennett, Jr., who has a long association with both programs and is now vice chancellor for academic affairs at Winston-Salem State University in North Carolina. At the outset, MBRS mainly gave faculty overburdened with teaching duties release time to conduct research. MBRS and MARC programs have enabled minority institutions to modernize their biomedical science programs and give faculty research experience to the point where they can compete in the grant process on the basis of scientific merit, says Bennett.

The character of the participating institutions has also changed. At the start, only historically black institutions were involved. Now the programs include institutions with substantial enrollments of Hispanics and American Indians, particularly in the Southwest and West, reflecting "better service to minorities in general," says Bennett.

The programs have produced solid if not sensational results. An MBRS tally indicates that 13,000 students have participated in the program, with more than 8,000 winning bachelor's degrees, 254 earning Ph.D.'s, 773 M.D.'s, and 51 D.D.S. degrees. Some 600 MBRS alumni are currently in medical school and 14 in dental school. MARC records indicate that of roughly 1,000 trainees, about 80% have gone on to graduate or professional schools.

The major concern expressed at the MARC-MBRS symposium was not a criti-

*"Nurturing Science and Engineering Talent: A Discussion Paper."

cism of the programs, but regret that great numbers of minority students have no opportunity to participate in them. The point made by keynote speaker Herman R. Branson, president emeritus of Lincoln University and now director of the precollege science and mathematics research program at Howard University in Washington, D.C., was that it is necessary to interest minority students in science at an earlier age and provide them with basic mathematics and science training. Otherwise the choice of research careers is effectively foreclosed. He called the two programs "an oasis in a desert of defeat and despair."

The congressionally founded Institute of Science, Space, and Technology is designed to address broader questions of minority access to science. Prime mover in the effort to establish the institute was Representative Mervyn M. Dymally (D–CA). The institute is intended to provide a national focus for efforts to promote minority competence and involvement in technical areas. One early aim is the creation of forums in congressional districts to foster discussion of successful models in science education for minorities. Still very much in its formative stage, the institute is headquartered at Howard.

NSF's initiative extends its expansion of specialized research centers to minority institutions. NSF's first two minority research centers will be established at Howard and at Meharry Medical College in Nashville. The centers will offer research support for science faculty members and seek to attract minority students to science careers through scholarships and a variety of outreach efforts to other higher education institutions and to schools. Howard and Meharry will each receive $5 million for the centers over 5 years. NSF plans a total of six minority research centers.

Other specifically labeled minority programs in the foundation provide a total of about $10.5 million for graduate fellowships for minority students, funds for improving research facilities in institutions with substantial minority enrollments, and grants to permit minority scientists to make a start as NSF investigators. NSF staff says that the support minority institutions and individuals receive under regular foundation programs usually exceeds that provided under the special minority programs.

Drawing conclusions on what the flurry of conferences, reports, and program initiatives signifies requires caution. Concern about minority underrepresentation in science has been cyclical. This time may be different, however, since the concern is driven not only by considerations of equity, but also by an emerging consensus on manpower needs. ■ JOHN WALSH

Reinventing the Space Truck

NASA and the Air Force are off on a race into the past, ransacking technologies from the 1970s and 1960s to create a new space cargo vehicle to launch heavy loads

ENERGIA, a 198-foot pile of Soviet rocketry, took off from a launch pad near Tyuratam on the evening of 15 May carrying a test cargo of 220,000 pounds. The news gave a jolt to U.S. rocket designers, who have been engaged since early this year in a campaign to build a cargo vehicle for the United States. Working in competing teams for the Air Force and the National Aeronautics and Space Administration (NASA), they hope to develop a new, unmanned space truck.

Energia, in comparison, might be called a space barge. The weight of its payload was more than the entire U.S. shuttle fleet could carry if all four orbiters (including the one not yet built) were launched at once.

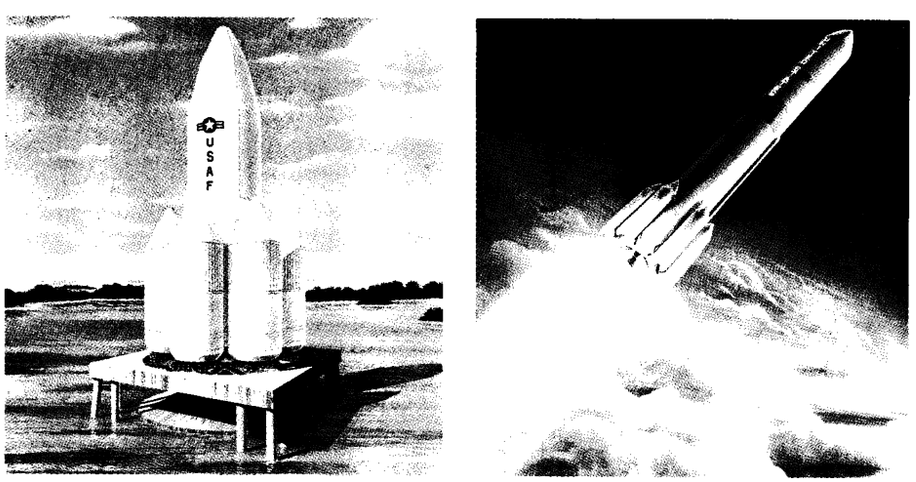
Experts were dazzled not only by Energia's muscle, but by its use of high-thrust, supercooled fuels. These had not been seen before on a Soviet launcher, even though the shuttle and other U.S. systems have used liquid oxygen and hydrogen for 20 years. It also was a surprise to hear the Soviets announce the test in advance—a sign of confidence.

Meanwhile, the U.S. shuttle is in the doldrums. Several reviewers, including a NASA advisory group headed by retired Air Force General Jasper Welch and a National Research Council panel headed by Robert Seamans, Jr., have urged that the shuttle not be used for cargo but treated as a rare and fragile tool. It should be held in reserve for unusual missions that must involve humans. "It just doesn't make sense to use this precious resource for a truck," one panel staffer says.

For cargo missions, both the Air Force and NASA want to build a new, heavy-duty rocket. The Air Force may need one to carry millions of pounds of weapons hardware to orbit each year for the Strategic Defense Initiative (SDI), and NASA needs one to orbit large components of the space station in the mid 1990s and to send planetary exploration craft into deep space.

In July, the two agencies were asked by Congress to begin working together on a joint R&D project, but so far they have hardly been able to sit at the same table. They agree that the new launcher must be able to carry twice the payload of the shuttle, but apart from that, their specifications do not merge. Since Energia's launch, the rivalry between the two has grown intense, and at times they seem to be competing more with one another than with the Soviets.

This summer, NASA's Marshall Space Flight Center in Huntsville, Alabama, and the Air Force's Space Division in Denver, Colorado, began a kind of world series of



Need a lift? *Martin Marietta's entry into the heavy lift sweepstakes (left) features a cryogenic core stage and multiple strap-on boosters. Hughes Aircraft's rocket (right) would have 32 or more Centaur engines packed together in bundles of 8.*