

# A New Report Issued on the Lack of Minorities in STEM – But Will It Make a Difference?

by Gary M. Stern

**The** report *Confronting the “New” American Dilemma*, issued by the well-respected National Action Council for Minorities in Engineering (NACME) in May 2008, covers why minorities are not pursuing careers in engineering, math and science and what to do about this crisis. Is there anything new in the report, and what impact will it likely have?

Just as hummingbirds migrate north in the spring, periodic reports are written about what colleges can do to graduate more minority engineers. In the past, most studies critiqued colleges for not doing a better job of encouraging more minority students to pursue careers in science, technology, engineering and math (a.k.a. STEM). Since Hispanics are the fastest-growing under-age-21 population in the U.S., motivating Latinos to become engineers could serve as a major pipeline for producing this

much-needed specialty.

In the NACME report, John Brooks Slaughter, president and CEO of NACME, wrote, “We find ourselves at this moment in history with the number of engineering graduates at one of its lowest levels of the past 20 years, and yet at a time when the demand for young people prepared to work in America’s high-technology industries has never been higher.” He added that the solution to solving America’s competitiveness in engineering and the sciences is to “activate our hidden work force of young men and women who have traditionally been underrepresented in STEM careers – African-Americans, American Indians and Latinos.”

Nicholas Donofrio, an executive vice president at IBM, noted in the report, “We need to rekindle excitement in kids before they lose it. Other countries are going to outnumber us in graduating engineers, but we need



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diversity of thought and innovation to stay ahead.”

The report noted that minorities are 30 percent of the nation’s high school students and will grow to 32 percent in 2010 and 38 percent by 2025. Latinos account for 90 percent of this growth and will constitute one-sixth of the American population by 2011. The low number of Latinos in engineering is attributable to “benign neglect and, at worst, active discrimination,” the report said. Indeed, it stated that only 4 percent of minority students, 28,000 of 690,000 students, graduate from high school “engineering eligible.” Moreover, only 7,000 minority students enrolled in engineering programs in the U.S. Only about 7,000 minority students gain an engineering degree annually, a remarkably low number given the size of the population.

The report’s title was inspired by Gunnar Myrdal’s groundbreaking 1944 study on race relations, *An American Dilemma*, which stated that American colleges weren’t suited to teach a changing student body. Nearly 65 years later, Myrdal’s words continue to resonate.

What prompted the study was the “real demographic gap between the 30 percent of 18 to 24 years stemming from three underrepresented groups – Latinos, African-Americans and American Indians – and the low number of them in engineering. Employers are screaming for engineers,” noted Lisa Frehill, one of the report’s main writers and the executive director of the Commission on Professionals in Science and Technology (CPST), based in Washington, D.C.

“We are losing the global competitive race in STEM and wanted this report to focus a great deal of attention on doing something dramatic, with a particular focus on the K-12 system and doubling the size of the National Science Foundation budget,” declared Irving McPhail, executive vice president and COO of NACME. McPhail sees this study as an “open call to action

to ensure that underrepresented minorities aren’t lost in the large issues of what needs to be done to position America in a pre-eminent role in the sciences going forward.” A NACME conference held in May 2008 brought industry leaders together as a follow-up to the report and to consider implementing recommended changes.

Here are 12 specific steps to encourage more Latino and minority students to launch careers in engineering and the sciences:

**1. University presidents must make a major commitment.**

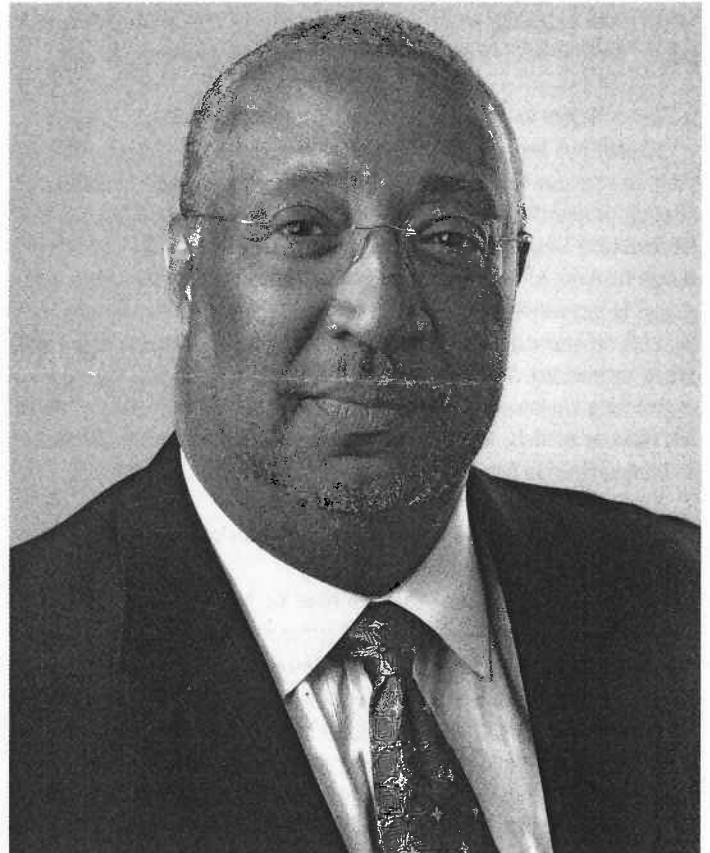
Having edited the report and serving as director of the science and engineering capacity committee at the Association for the Advancement of Science (AAAS), Daryl Chubin said forthrightly, “I’d like university presidents to put their money where their mouth is. If they want to educate the students that represent where America is now, then they can’t just recruit in the suburbs or recruit kids who can pay.” He’d like to see presidents exercise more leadership and remind faculty that professors are responsible for “educational outcomes, not just research outcomes.” If faculty were judged and awarded tenure on their ability to promote more diversity in the sciences and other areas, the number of minorities majoring in engineering would likely rise.

**2. Engineering and science faculty need to be trained to motivate minority students.**

Outspoken Chubin urged engineering and science faculty to take more responsibility for encouraging minority students, many of whom hail from troubled urban schools, to succeed. “Many courses and professors in the first two years of engineering are not supportive of minority students. It goes hand in hand with expectation issues. Many don’t think minorities

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can cut it. It's a form of stereotyping because persons of color haven't performed well in the past, and (some professors think) they won't do well in the future," Chubin noted. Hence, colleges should train science faculty how to reach and teach minority students.

### **3. Consider separating women from men in science and engineering classes.**

The NACME report also noted that women constitute only 9 percent of the nearly 1.5 million engineers in the U.S. Chubin said that science faculties and universities must do a better job of learning why women are turned off to the sciences and uncover ways to change that disinterest. He suggested the possibility of segregating women in science classes to avoid their competing with men.

### **4. Ensure that minority students receive advanced math in high schools.**

High schools need to offer students more "rigorous courses in math and science," Chubin said. He also noted that studies have shown that the single best predictor of success of engineers in the work force is how rigorous were the mathematic courses – calculus, trigonometry, advanced math – taken in high school.

### **5. Change how science is taught K-12.**

NACME's McPhail said that money alone won't improve the teaching of science to minority students on a K-12 level, but better pedagogy likely will. He recommends that high school science teaching become more hands-on and participatory, not just about lectures, so science comes alive and urban students can appreciate the role that science plays in our life and the potential it has to serve mankind. Capturing the imagination of urban youth in biology and chemistry class is critical at a time when video games, the Internet, DVDs and iPhones vie for their attention.

### **6. Use colleges as models to learn from each other.**

NACME has formed partnerships with a variety of colleges over the years to create programs that encourage minority students to enter engineering programs. Chubin said the University of Texas-El Paso, Florida International University, the University of Texas-San Antonio and the New Jersey Institute of Technology exemplify colleges that have made major strides in increasing minorities in science. Frehill noted that 30 percent of the undergraduate degrees awarded by the University of Puerto Rico (UPR) are in engineering. Many are to women. UPR has reached a critical mass of engineering graduates and been able to maintain it. Other colleges should use them as models, learn from them and adopt the techniques that they have highlighted to encourage more minorities in the sciences.

### **7. Issue report cards to colleges on how they're doing with minorities in the sciences.**

An institution of higher education must be held "accountable for students it recruits, retains and awards degrees to. And what we've seen is – very few institutions are doing that," Chubin said. Too many colleges focus on the cream of students who can most easily afford college and don't pour enough resources into helping the middle class, working class and poor afford college and pursue science majors. Students who enter universities "aren't getting the kind of encouragement and support they need once they matriculate." He suggested circulating a report card for colleges

that would track how many minority students they graduate and create peer pressure on them to change.

### **8. Support minority students in community colleges.**

A Lumina Foundation for Education study reported that 85 percent of community college students – many of whom are minority – who planned on attending a four-year college dropped out in their first year of community college. Imagine if funding were given to community colleges to offer tutoring, guidance and financial support to assist these minority students to help them gain their associate degree and assist them in transferring to four-year colleges, Frehill noted.

### **9. Collaborate with community college science professors.**

Since many Latino and minority students start their higher education at community colleges, which are more affordable than four-year colleges, stronger connections must be made between science faculties. In the past, Chubin suggested that articulation with community college was often an afterthought. One way to reach minority students would be to target them in community college, bring them onto campus and pave the way for their success in four-year programs.

### **10. Create programs to encourage more American citizens to pursue Ph.D.s in engineering.**

Frehill urged major changes "at the end of the pipeline" when engineering students pursue doctorates. Currently, 60 percent of all engineering doctorates are awarded to non-U.S. citizens. "If we admitted only 50 percent noncitizens, you'd see a 10 percent jump in American-born students earning doctorates," she said. These non-U.S. citizens are supported by grants and fellowship funded from our tax dollars, and if more funding could be funneled into U.S.-born citizens, minorities would likely reap a portion of that increase.

### **11. Encourage more businesses to support programs.**

"Businesses have been stepping up to the bar better than government," Frehill noted. For example, Project Lead the Way is funded by businesses and provides curriculum reform, real-life learning in the sciences. Why are businesses financing this nonprofit? "They need engineers. And businesses are working hard to support diversity efforts in engineering because people of different backgrounds bring creative solutions," she said.

### **12. Fund more minority graduate assistants.**

If the National Science Foundation stepped up grants to minority graduate students, it would go a long way to increasing the number of minorities who pursue careers in engineering. Since grants are based on criteria that include intellectual merit and broader impact, increasing the number of minority graduate assistants would help the greater good.

What's the one major impact that NACME's McPhail would like to see this study have? Most of all, he'd like to see Congress pass the America Competes Act. Written in 2007, it would double the budget of NSF and provide additional funding to increase the number of certified math and science teachers in public schools.

