

# Congressional Black Caucus Education Summit

110<sup>th</sup> Congress  
Washington, DC  
July 23, 2007

John Brooks Slaughter, Ph.D., P.E.  
President & Chief Executive Officer  
NACME, Inc.



**CREATING OPPORTUNITIES, ENSURING SUCCESS**

440 Hamilton Avenue, Suite 302, White Plains, NY 10601-1813  
Tel: 914-539-4010 Fax: 914-539-4032 Web: [www.nacme.org](http://www.nacme.org)

# A PROFILE OF NACME

## **Our Mission:**

To provide leadership and support for the national effort to increase the representation of successful African American, American Indian and Latino women and men in engineering and technology, math- and science-based careers.

## **Our Vision:**

An engineering workforce that looks like America.

## **Our Goal:**

Working with our partners to produce an engineering graduating class that looks like America.

## **Our Purpose:**

Our aim is diversity with equity, our metric is parity in the workforce, and our methodology is the formation of partnerships with those corporations, educational institutions, foundations, nonprofit agencies and governmental bodies that share a commitment to these aims.

## **Our Beliefs:**

We believe in the concept of the “learning organization,” a community in which each member is encouraged and assisted to grow and develop. We believe that we must work, not only to continuously improve our skills and capabilities for performing our individual responsibilities increasingly well, but also to strive to be cooperative and effective team members who are committed collectively to the fulfillment of NACME’s mission and purposes.



07/25/2007

# **INCREASING THE REPRESENTATION OF MINORITIES IN STEM**

**Testimony Presented  
at the  
Congressional Black Caucus (CBC) Education Summit  
Rayburn House Office Building  
Washington, DC  
July 23, 2007  
by  
John Brooks Slaughter, Ph.D., P.E.  
President and CEO  
National Action Council for Minorities in Engineering, Inc.**

## ***Introduction***

**I come to you today after a professional career in engineering and education of over fifty years. This includes 16 years spent as a college and university president and the last seven as the president and CEO of NACME, the National Action Council for Minorities in Engineering, Inc. Throughout that entire period, I have been involved in one sense or another with efforts to increase the number of African Americans, Latinos and American Indians in science and technology, particularly in the field of engineering. And while I have seen progress, I am fully aware that it has not been enough and that barriers continue to rise to make further progress even more difficult to attain.**

**Since its founding in 1974, NACME has become the largest private provider of scholarships in engineering for underrepresented minority students. Over that span, we have provided more than \$100 million in aid to 20,000 students at 160 colleges and universities. Today, more than 1200 undergraduates and 350 graduate students are receiving support through NACME. We are the leading source of research information on the status of minorities in engineering education and employment and are active in the formulation of policy positions for improving opportunities for minorities in STEM. Through collaborations with several partners, we are launching a national network of urban-centered, open enrollment, high-school level engineering academies that will provide all students with a strong science and math education so that they will be college-ready for engineering study. By involving parents, community resources, local corporations and universities (two-year and four-year) in the activities of the academies, it is expected that they will have the potential of dramatically increasing the numbers of underrepresented minorities who will be prepared to engage in engineering education.**

### *The New American Dilemma*

**This is a critical time for our nation. Whereas 30 years ago American corporations competed with one another, today competition is on a global scale. Among other things, corporations that depend upon a position of leadership in research and development in science, technology, engineering and math (STEM) must confront the reality that the sources of brainpower needed to maintain their preeminence are changing and that new and creative approaches will be required to ensure an adequate talent pool in the future.**

**Given the confluence of the rapid demographic changes that are occurring in America, the tremendous progress in science and technology that is taking place in developing countries, the serious shortcomings of our public education systems, shifting immigration policies, and the historic underrepresentation of sizable elements of our population, our nation must act quickly on a number of fronts to maintain a strong position of leadership in the STEM disciplines and to ensure a future of prosperity and security. Preeminence in innovation and entrepreneurship will reside in the hands of those nations that are the most adept at quickly building and retaining talent. Other countries, certainly China and India, are moving faster than we are. This is the dilemma facing our nation today.**

**Huge changes have occurred in our economy largely as a result of globalization and technological innovation. Manufacturing has declined while the information age requires more professional and high-tech skills from employees. It is estimated that more than a half million engineers will be needed over the next decade to replace those who retire and that at least that many new engineers will be needed to fill the demand that will exist at the end of that period. We find ourselves importing talent and exporting jobs, not just because it is less expensive to have the work performed by lower-wage skilled workers in developing countries but also because we do not produce enough native-born, well-qualified scientists and engineers in our nation's colleges and universities.**

**The significance of the competitive situation facing our country has come to be recognized and responded to by the highest branches of government and by corporations, foundations and academic institutions at all levels. Offshoring, outsourcing and increasing H-1B visa allotments either have been employed or are under consideration. But in the midst of the activity that has been spawned, in large part, by widely-read publications like Thomas Friedman's book, *The World is Flat*, and the National Academies' report, *Rising Above the Gathering Storm*, our leaders seem to have lost sight of the fact that there are many persons in America for whom participation in science and engineering has been and, in too many instances, continues to be less likely for a variety of reasons. And their numbers are growing dramatically.**

**While outsourcing and offshoring may be here to stay, depending upon foreign countries to fill our requirements is not a long-term and tenable practice. Exporting jobs and importing talent is not sound national policy. Certainly we need to develop a more rational set of immigration policies for those wishing to study and work in science and engineering in this country but, perhaps, even more important is the need to increase opportunities for native-born students to prepare for and study these disciplines. America will be unable to retain its leadership position in scientific and technological innovation and keep its competitive edge in the global marketplace of ideas and products unless it does so.**

To NACME, as well as many other organizations that focus on the needs and interests of underserved and underrepresented populations in science and engineering, the relative absence of African Americans, Latinos and American Indians in scientific and engineering study and careers is the new *American Dilemma*. The disparity in the representation of minorities, as well as women, is increasingly becoming a problem for the STEM disciplines given the demographic changes underway in society. The field of engineering has to a large extent ignored the trends and failed to recognize or, perhaps, admit that diversity drives innovation and that its absence imperils our designs, our products and, most of all, our creativity.

#### *The State of Minority Students in STEM Education*

Today, fewer than 12 percent of baccalaureate engineering graduates are underrepresented minorities. Unless there are dramatic improvements in education at all levels of the public schools, the number of students, including minorities and women, who will enter the engineering workforce in the future will be too small to meet our nation's needs. Given that the number of college-age minority students will grow dramatically over the next decade and that significant gaps in college participation and success exist for them as compared to their non-minority peers, we must facilitate, not deter, their entry and graduation in order to help meet the nation's need for well-prepared college graduates. This is particularly true for the disciplines of science and engineering, key ingredients to America's ability to strengthen its capacity for innovativeness and global competitiveness.

It is a sad reality that over the past several years fewer young people, both minority and non-minority, are choosing to get on the pathway to a science or engineering career. Sadder still is the fact that many of them are robbed of the option to even consider such a career before they have left middle school. For example, slightly more than 650,000 minority students graduate from high school each year, but only about 26,000 have taken the necessary math and science courses to be fully qualified for admission to engineering study and fewer than 15,000 of them actually enroll. There are about 7,500 black freshmen and roughly 23,000 black students total in engineering programs in America's colleges and universities. Annually, there are approximately 3,500 black engineering graduates.

It seems counter-intuitive to me that with all the technological artifacts in our lives, young people are not more interested in science, engineering and technology what with cell phones, digital cameras, MP-3 players, IPODs, PCs, CDs, PDAs, DDRs, VCRs and TIVOs everywhere. Those of us in positions to help must share much of the blame for not conveying to young people the excitement, satisfaction and rewards to be found in science and engineering and for not providing in some comprehensive manner the outreach that will encourage and inspire more youth to prepare themselves for the opportunities that will be available to them.

Much has been written and discussed about the academic achievement and performance gaps of underrepresented minority students as compared to their white and Asian counterparts. Many theories abound concerning why these gaps exist and why they are so difficult to eliminate. Part of the answer is due to the poorer preparation many of these

young people receive from the beginning and which continues throughout their elementary and secondary schooling. Despite the promises of *No Child Left Behind*, the achievement gap in reading and math for poor fourth- and eighth-grade students, black and white, is not narrowing but, instead, is showing signs of increasing. And African American and Latino 12<sup>th</sup>-graders are performing at the same academic levels as white eighth-graders. We should not assume that the problems are in any way limited to minority children. Only 67 percent of all ninth-graders in America will graduate from high school in four years, only 26 percent of them will still be in college within two years of entry, and just 18 percent will graduate from a community college in three years or a baccalaureate granting institution in six years.

The uneven distribution of wealth in this country has an impact upon the preparedness of the poor and many minority students for college and for their retention to graduation. They are far more likely to come from less well-educated families, to attend the worst schools, to be taught by the least capable teachers and to suffer from the low expectations imposed upon them by society. Fewer than half of them will graduate from high school and those who do go on to college are far more likely to enroll in a two-year school than a four-year one.

We must ask ourselves why we cannot produce adequate numbers of people with the highly developed analytical and quantitative skills necessary for the technology-intensive jobs that are going unfilled in this country. Part of the reason is due, as I mentioned earlier, to the poor preparation and lack of encouragement many of them encounter in our public schools. It is a sad fact that teachers without the appropriate college major or minor are teaching a quarter of all students in mathematics and more than half of all students in the physical sciences in grades 7 to 12. And most of them are teaching in schools with the largest numbers of poor and minority students. And it is an equally sad fact that even well meaning teachers and counselors are woefully ignorant about the STEM professions and, therefore, unable to guide students in any meaningful way toward such careers.

On top of everything else, the real costs of education are continuing to rise. Tuition has risen 519 percent over the past 25 years. Today, the cost, including room and board, of attendance at a public university is in the range of \$12,000 to \$15,000 per year and at private institutions, it can be \$35,000 or much more per year. Grants are flat or decreasing and non-federal borrowing has increased by 150 percent over the past three years. Tuition discounting through merit awards, a device used by institutions to attract the best students, has drastically reduced the amount of need-based aid available to give to qualified, low-income applicants. A generation ago, Pell Grants covered 84 percent of the cost of attending a four-year public university; today they cover approximately 35 percent of the cost. The average public college graduate has more than \$20,000 of debt that increases over time with interest. It is important to understand that a shift of \$1,000 from grant to loan is estimated to have as much as a 17 percent impact on retention for minority students.

Even with the changing demographics that foretell larger numbers of minorities within the college-age cohort, there is no guarantee that many of our colleges and universities will reflect the presence of these students in their student populations. There are three principal reasons for this prediction.

The first is that the high price of attendance and correspondingly low levels of financial aid will discourage many, particularly those first-generation college-goers from low-income families. Peter Sacks, in commenting about his new book, *Tearing Down the Gates: Confirming the Class Divide in American Higher Education*, has gone even further. He stated that “This uniquely American ideal—the promise of equal educational opportunity—is close to vanishing unless we change course. Education is becoming like health care and so many other aspects of American life where money rules the system. We are creating a system in which ability to pay is the main thing that separates those who go to college from those who don’t go to college.”

Second, selective colleges and universities are receiving more applications and, therefore, admitting a significantly smaller percentage of students today than they were in the past. This trend is expected to continue. In the universities’ efforts to increase prestige, the losers are likely to be those minority students who meet the entrance requirements but may not fare well in a highly competitive, SAT- and GPA-driven admissions environment.

And, third, there are a number of social, political and institutional barriers that impede entry and success in higher education for minority students. For black students, in particular, the most glaring of these are the attacks on the use of any form of affirmative action by colleges and universities for the admission and support of students and for the employment of staff and faculty.

#### *The Attack on Affirmative Action in Higher Education*

The escalation of anti-affirmative action measures is having a debilitating impact on efforts to promote and sustain diversity on college campuses. California Proposition 209, Washington Initiative 200 and Michigan Proposal 2 along with court rulings, legislation and/or executive and administrative actions in Texas, Florida, Oklahoma, Virginia, Georgia and other states have changed the landscape for those who wish to pursue practices and policies of pluralism and inclusion. Its consequences for those who wish to improve the access and retention of underrepresented minorities and to develop and hire faculty members of color are enormous. And the momentum is building. Many other states are being identified as future targets including Arizona, Colorado, Missouri and Oklahoma. Nebraska or South Dakota may be added to the list.

In addition, the 2003 U.S. Supreme Court decisions on the *Gratz* and *Grutter* admissions cases at the University of Michigan were not only ambiguous and difficult to interpret but the U.S. Department of Education offered no meaningful or helpful guidance to universities on how to comply and, in my opinion, has been culpable in threatening institutions with the loss of federal support. The result has been that the matter of affirmative action in higher education in order to achieve racial diversity has remained muddled.

The attack that has been mounted against taking race into consideration in college admissions, scholarships, employment and programs of support has already had significant and damaging consequences for the access and retention of underrepresented minorities in

higher education. In spite of a more diverse group of college-eligible, high school graduates in the future, it is highly probable that some institutions may even be less diverse, at least racially, than they are today. Even though during the period 2004-2015, according to the *National Center for Education Statistics of the U.S. Department of Education*, enrollment of African American students in degree-granting institutions is expected to grow 28 percent, the bulk of the growth will occur in the community colleges and, based on current patterns, few of those students will go on to four-year institutions to study STEM subjects. It is not beyond the realm of possibility that we could return to a condition such as the one that existed in 1962 when Harvard had only nine black students in its freshman class.

To prove that point it is only necessary to look at what has happened in California. Although California may represent the most extreme situation with respect to the effects of the successful passage of an anti-affirmative action initiative, it is instructive to study the impact that *Proposition 209* has had at the University of California and several of its campuses.

First, black student admissions have plummeted. In terms of undergraduate admissions, UCLA has been the hardest hit by the measure. With 47,315 applicants, the largest applicant pool of any university in the nation, UCLA accepted 12,219 students in 2006. In this group were 244 black students, which yielded 99 enrollees, two percent of the ultimate class of 4,800 freshmen. At most, five were engineering students. Moreover, it is estimated that one-half of those who did enroll were athletes. Admittance of African American freshmen in 1997, the year before *Proposition 209* took effect for undergraduates, accounted for 5.4 percent of the admitted pool. Worse still, the 2006 figure represents a decline of 17 percent from the previous year and yielded the lowest number of black freshmen since 1973. (UCLA, of course, is located in Los Angeles, a city with more than one million African American residents and 10,000 black high school graduates, annually.)

At UC Berkeley, which saw a drop in black freshmen enrollment of 57 percent the first year that *Proposition 209* was in effect, blacks constituted 305 members of an acceptance pool of 9,913 in 2006; 140 of them ultimately enrolled. (Berkeley had zero black freshmen students in engineering in 2005.) UC San Diego, my graduate alma mater, with 52 black enrollees and UC Merced, the newest campus of the University of California, with 35, were the lowest achievers of African American total freshmen enrollment. The 10-campus UC System admitted 55,242 students of which 1,880 students were African Americans.

Second, and more important, far too few black, California students graduate from high school with the academic preparation that stamps them as UC eligible. This makes it difficult, if not impossible, for many of them to compete successfully in an applicant pool in which one-half of the students have 4.0 or higher grade-point averages, as was the case at UCLA in 2006. Of 24,000 black California high school graduates, only 3000 were UC eligible and fewer than 2000 were in the top quartile of the eligibility pool from which the University of California draws. Clearly, a top focus must be placed on improving the elementary and secondary educational experiences for all children, particularly for those most at risk—the poor and the underrepresented who are disproportionately found in the lowest performing schools.

Third, in California in particular, the publicity about the actions of the UC Regents (especially, but not limited to, Ward Connerly), *Proposition 209*, and the often contentious debates and confrontations over illegal immigration have caused many minorities in the state to feel disenfranchised and disempowered and, for many, unwilling to attempt to enter an environment in which they feel unwanted. Consequently, although eligible, many do not even apply for admission, a large percentage of those who are accepted do not enroll, and the numbers who leave or transfer because they feel unwelcome is of major concern to those who believe diversity on a college campus is important.

And finally, the steep rise in tuition and the reduction in need-based financial aid in favor of more merit-based aid has had a disproportionately negative impact on the ability of disadvantaged and minority students to attend institutions such as the University of California. In their quest for prestige, measured in part by low acceptance rates and high student SAT scores, universities are turning away high-performing, deserving but needy students in favor of those from high-income and more advantaged circumstances by offering them financial incentives to enroll. This practice on top of all the other disadvantages poor and underrepresented students encounter suffice to make it difficult to create a college enrollment picture that is diverse and inclusive.

*Proposition 209* has had one other important effect on California higher education that should not be overlooked. The ban against the use of affirmative action in employment has affected the hiring of minority faculty at public institutions throughout the state. Over the twenty-year period from 1984-2005, black faculty appointments accounted for 3.4 percent of hires at the University of California but slightly less than 3.0 percent since the enactment of *Proposition 209*. The paucity of minority faculty in our nation's colleges and universities is a blemish on the record of higher education in America. According to the July 12, 2002 issue of the *Chronicle of Higher Education*, "While 5 percent of the faculty are African American, about half of them work at historically black institutions. The proportion of black faculty members at predominantly white universities—2.3 percent—is virtually the same as it was 20 years ago." The picture has not improved much since this was written.

In STEM disciplines, one percent or fewer of faculty members are either black or Latino in flagship and research universities. The absence of minority faculty members robs minority students of much needed mentors and role models and equally important, in my view, deprives non-minority students of exposure to and contact with well-educated minority professionals. This is a problem that is particularly true in science and engineering where minority contributions are often overlooked and minority faculty are most scarce.

The situation in chemistry is a glaring example of this. During the ten-year period between 1993 and 2003, not one of the 50 top-ranked university chemistry departments hired an African American, Latino or American Indian as an assistant professor, despite the fact that data from the *Commission on Professionals in Science and Technology (CPST)* shows that a sizable number of them received Ph.D.s in chemistry during that time span. Twenty-three of the institutions had none on their faculties and blacks and Latinos accounted for only 43 of the 1,637 tenured and tenured-track faculty members (slightly over 2.6 percent) at those fifty institutions in 2003.

**The barriers to admission and the elimination or reduction of the early intervention and academic support programs for low-income and underrepresented minorities coupled with the increasing costs, the reductions in financial aid, and rising student debt levels present a serious picture for the access and persistence of millions of young black students in the future. Your support for addressing these matters is essential.**

### *Recommendations*

**What lies before us, if we are to reverse the trends I have described, is not simple but the task is straightforward. We need to concentrate on several actions simultaneously.**

- 1. We need to encourage, inspire and inform elementary and secondary school students and their parents about the opportunities a first-rate education can provide and what they need to do to prepare for them. We need to encourage their dreams, tell them that we believe in them and assure them that they can achieve their goals.**
- 2. We need to demand that our education systems, from pre-K to graduate school, provide all students with a quality educational experience regardless of race, gender, place of birth, language, physical ability or economic class.**
- 3. We need to demand that every classroom has a qualified teacher, that colleges and universities produce them and that we support our public schools and pay teachers commensurate with our expectations for their performance.**
- 4. We need to make certain that deserving students with financial need have the resources necessary to complete their educations without fear of having to drop out or stop out because of the lack of money.**
- 5. We must realize that this is a marathon, not a sprint, and that we must all work closely with each other to address the issues at each point along the spectrum from pre-K to graduate school.**

**And we must do all these things with a sense of urgency! Then and only then can we close the achievement gap in math and science, one of the greatest challenges facing our nation today.**

### *Conclusion*

**In mid-November 2005, NACME hosted a symposium that addressed many of the myriad issues associated with strengthening America's worldwide leadership position in engineering and technology. We did so in order to focus national attention on a number of important topics—the shortage of American students prepared to pursue undergraduate degrees in engineering and technology; the requirement to strengthen the teaching of the science, technology, engineering and math (STEM) curricula in our middle and high schools; and the need to raise students' awareness of the excitement, opportunities and benefits of careers in those fields. Copies of the report emanating from that symposium are among the materials I have provided.**

**NACME, in conjunction with the American Association for the Advancement of Science (AAAS), is planning a one-day summit in the fall of 2007. It will focus on the continuing history of the relative absence of underrepresented minorities in the various fields of science and technology in this country and the accompanying need for more minority students to receive an education in the STEM disciplines in order to reverse the trend. The position paper emanating from this event will serve as the basis for a two-day symposium in the spring of 2008 from which an action plan including recommendations to be presented to the framers of the presidential campaign platforms is expected to result. The NACME Symposium will be held at the Sheraton Premiere at Tyson's Corner in Vienna, VA, May 27-29. We will be certain to extend an invitation to members of the Congressional Black Caucus to attend. Information about attendance can be obtained by contacting the NACME event coordinator, Mr. Nick Tomasso, by sending him an e-mail at [ntomasso@nacme.org](mailto:ntomasso@nacme.org).**

**Finally, NACME is producing a series of three reports on the status of underrepresented minorities in engineering: Latinos, African Americans and American Indians, respectively. Copies of these documents will be available upon their publication and will be accessible through our website, [www.nacme.org](http://www.nacme.org).**