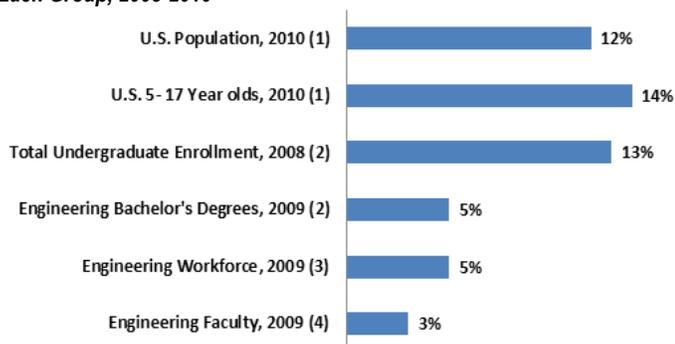


## African Americans in Engineering

### INTRODUCTION

African Americans remain one of the most underrepresented minority groups in engineering-related fields. African Americans comprise only 5 percent of all engineering bachelor's degrees achieved, with the same percentage of career holders in the engineering workforce. This stands in contrast to figures showing that African Americans represent at least 12 percent of the United States adult population, 14 percent of the youth population, and 13 percent of all undergraduate enrollment. The underrepresentation in engineering is glaring in light of these figures. (Figure 1)

**Figure 1. African American Representation in Engineering as a Percent of Each Group, 2008-2010**



Source: Table prepared for NACME Data Book 2011 based on analysis of (1) U.S. Census Bureau, (2) IPEDS data accessed via NSFWebCASPASPAR database (percent of U.S. Citizens and permanent residents), (3) American Community Survey, analysis by NACME Research and Evaluation, October 2010, (4) American Society for Engineering Education, 2010 "By the numbers, 2009".

The underrepresentation of African Americans in engineering begins at the educational level, as successful graduates of engineering are the necessary building blocks for successful careers. According to the U.S. Census Bureau, 286,000 African American high school completers enrolled in a 2- or 4- year college or university in the fall of 2010, representing just 9 percent of all high school completers in the country.<sup>1</sup> The science, technology, engineering, and mathematics (STEM) fields continue to attract low percentages of African Americans. In 2010, the levels of African American students enrolled in engineering programs remained at 5 percent, even with new freshmen applications. Underrepresentation at the post-secondary level extends beyond the students. African American faculty in engineering total only 3 percent of all engineering faculty in the United States (Figure 1).

Figure 2 illustrates the most recent data available on engineering degree attainment by level of education and group representation. In 2010, 135,846 engineering degrees were awarded in the United

**Figure 2. Engineering and Engineering-Related Degree Attainment**

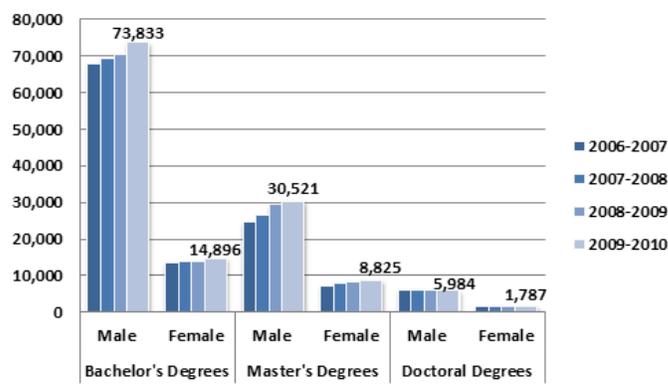
Engineering Degrees Attained by Group, 2010			
	Bachelor's	Master's	PhD's
White	62,314	15,424	2,505
Asian	9,667	4,301	569
Latino	6,105	1,573	210
African American	4,688	1,385	163
American Indian/Alaska Native	525	114	10
Non-Resident Alien	4,951	16,549	4,314

Source: U.S. Department of Education, National Center for Education Statistics, Integrated Post-secondary Education System (IPEDS), Completions Component, 2009-2010 (persons of two or more races excluded)

States across all levels, from bachelor's to Ph.D. African American graduates represented 5.3 percent of bachelor's, 3.5 percent of master's, and 2 percent of all engineering doctorates. African American students graduated with 30 percent fewer bachelor's in engineering fields than Latinos, just under the amount attained by foreign (non-resident alien) students. At the graduate level, foreign student master's and Ph.D. attainment exceed all groups, including that of White students, and represents a growing trend.

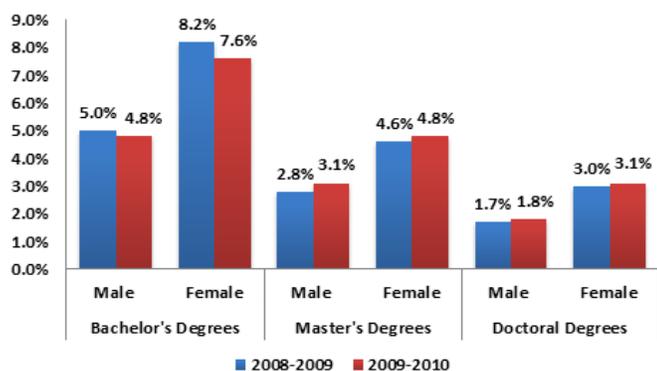
African American students may remain underrepresented in engineering degrees compared to other groups, yet they are bucking an important general trend that exists within the field. Figure 3 illustrates the difference between women's versus men's attainment across all engineering degrees and levels for 2010. In general, the ratio of male to female degree attainment in engineering indicates a relatively male dominated model. This is a critical area in which African American students are equalizing the playing field. Across all levels of degree attainment in engineering, African American

**Figure 3. Degrees in Engineering and Engineering Technologies Awarded by Level and Gender, 2007-10**



Source: U.S. Department of Education, National Center for Education Statistics, Integrated Post-secondary Education System (IPEDS), Completions Component, 2006-2010, released Nov 2011

**Figure 4. Percentage of African American Engineering Degree Attainment by Level and Gender, 2009 and 2010**



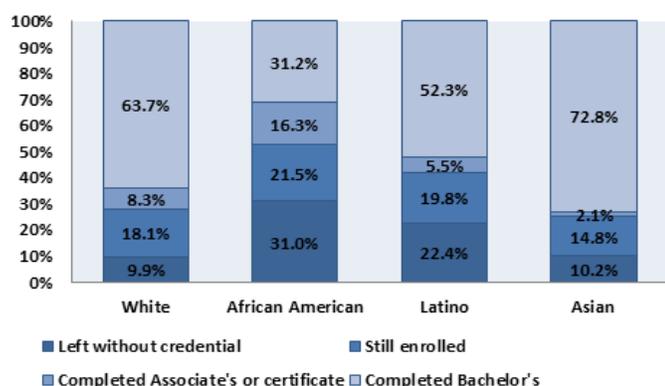
Source for Figure 2 & 3: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education System (IPEDS), Completions Component, 2006-2010, released Nov 2011

women's representation continues to grow. In 2010, 7.6 percent of all bachelor's degrees in engineering earned by women were earned by African Americans, compared to 4.8 percent for African American men. The women's bachelor degree attainment of 7.6 percent represents a full 52 percent higher than the average representation rate of 5.3 percent for African American bachelor graduates. This trend continues across all levels of education, from master's to doctoral level degrees as well (Figure 4). In addition, African American women are increasing their achievement in engineering-related graduate degrees at a rate comparable to their male peers, increasing at least 1 percentage point in representation on a yearly basis.

Risks clearly remain for African American engineering students (Figure 5). Compared with other student groups, African American students entering engineering programs are less likely to complete their degrees, take longer to complete their degrees, and transfer to and complete an associates or certificate program at a higher level.

NACME stresses the need for continued support for this group of students, especially through providing scholarships and services to assist African American students to degree completion. Figure 6 illustrates some of the successes NACME has had in respond-

**Figure 5. Retention to Graduation, Computer Science, Engineering, and Engineering Technology, 2003-04 First-Year Students as of 2009**



Source: NACME analysis of Beginning Postsecondary Students Longitudinal Study using National Center for Education Statistics PowerStats, July 2011

ing to the need for continued support of the African American engineering student community in the most recent academic year.

**Figure 6. Top Institutional Support of African American Students in Engineering, 2011**

Top Institutional Support of African American Students in Engineering 2011	
<b>Most NACME Scholarship Recipients, 2011-2012</b>	
Prairie View A&M University*	41
Louisiana State University	36
Drexel University	29
Georgia Institute of Technology	29
<b>Most Engineering Bachelors Degrees Awarded, 2011</b>	
North Carolina Agricultural & Tech State University*	145
Georgia Institute of Technology	111
Morgan State University (Maryland)*	71
Prairie View A&M University*	66
*Historically Black College or University	

Sources: NACME Data Book 2011 and NACME Scholarship 2011-2012 Demographic Report

### POLICY CONSIDERATIONS

It is vital for federal and state policies to provide opportunities for underrepresented minorities to increase their presence and achievements in science, engineering, technology, and mathematics (STEM) fields. African Americans remain a highly underrepresented minority in the growing field of engineering, in particular. To ensure the continued success of this group along the pathway from education to career, we encourage policymakers, educators, and business people to adopt the following practices:

- 1. K-12 EDUCATION.** Introduce STEM education and career options at an earlier age to minority students, by providing access to academic support programs, after-school tutoring for ACT/SAT preparation, and STEM integrated curriculum to increase the ability for high school graduates to enter the college arena prepared for the academic rigor required for these fields.
- 2. HIGHER EDUCATION.** Increase the percentage of African American high school graduates that continue to post-secondary education and select STEM degree options by providing entry-level academic support, financial support, and mentoring opportunities. Additional focus must be made on increasing the representation of STEM faculty who are African American.
- 3. BUSINESS.** Business groups can directly support promising students by providing scholarships, tuition reimbursement, and job placement for young African Americans pursuing STEM degrees. Even those that are not traditionally STEM-related can provide much needed information, as an example from *Black Enterprise Magazine* published in June 2012 illustrates with an article titled, "My Cool STEM Career." Institutions should support the perception that it is 'cool' to achieve success with high level STEM degrees such as engineering.

<sup>1</sup>U.S. Census Bureau, Current Population Survey, 2011—"high school completers" includes GED recipients; data excludes persons of two or more races.

<sup>2</sup><http://www.blackenterprise.com/career/career-advice/my-cool-stem-career>.