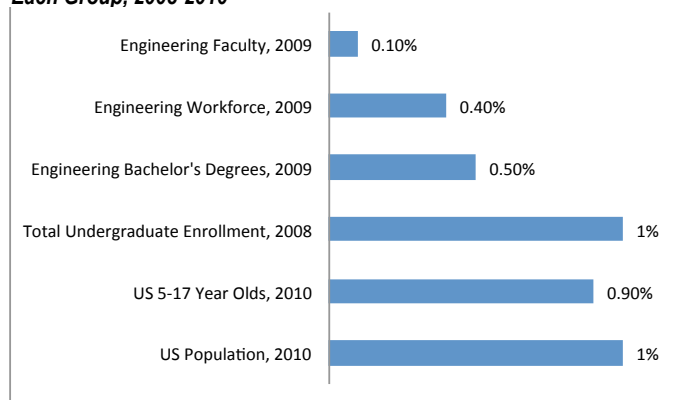


American Indians in Engineering

INTRODUCTION

Statistics consistently illustrate the gaps in minority representation in Science, Technology, Engineering, and Mathematics (STEM) fields to White and Asian peers. However, the presence of American Indians in STEM fields falls far short of other minority groups. Illustrating this, the data on American Indian and Alaskan Native representation (AI/AN) in STEM are very limited. This research brief aims to showcase the information that is known and present policy considerations for increasing degree attainment for these students and career development in STEM fields, specifically engineering.

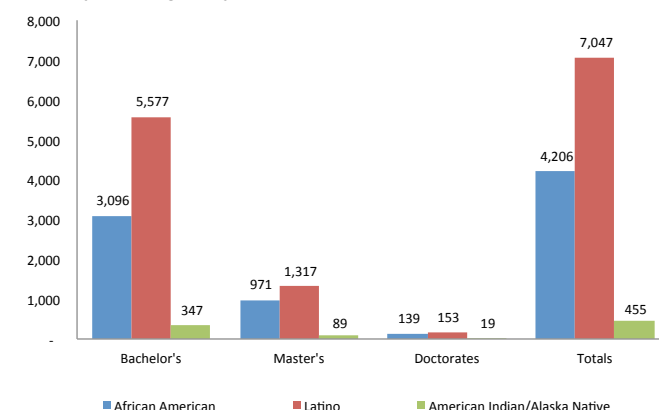
Figure 1. American Indian Representation in Engineering as a Percent of Each Group, 2008-2010



Source: NACME Data Book 2011, Sources credited by NACME: (1) U.S. Census Bureau, 2011; (2) IPEDS data accessed via NSF WebCASP database system (percent of U.S. citizens and permanent residents); (3) American Community Survey, analysis by NACME technicians; Research and Evaluation, October, 2010; includes "engineers," "engineering managers," and "engineering (4) American Society for Engineering Education, 2010. "By the Numbers, 2009."

As illustrated in Figure 1, American Indian representation in engineering fields are a mere fraction of other underrepresented minorities. While only 1 percent of the U.S. population is American Indian, and 1.8 percent of the entire workforce is represented by engineers, less than half a percent of the engineering workforce is represented by American Indians. And while the undergraduate enrollment rate of American Indians is on par with their ratio of

Figure 2. Number of Engineering Degrees Awarded to Minorities, by Race/Ethnicity and Degree Type, 2009



Source: NACME Analysis of IPEDS Data accessed via National Science Foundation 2011 (pulled and re-compiled from NACME Data Book 2011)

the total population, the percentage of American Indians earning engineering degrees is also only half a percent. Another crucial fact is that only one-tenth of a percent of engineering faculty are of American Indian descent.

Compared to their peers, the number of American Indians and Alaska Natives attaining an engineering education across all levels remains a fraction of other minority groups. Just 455 degrees in engineering, from bachelors to doctorates, were awarded to American Indians/Alaskan Natives in 2009 (Figure 2) compared to 7,047 for Latino students and 4,206 for African American students. While 153 and 139 engineering doctorates were awarded to Latino and African American students in 2009, only 19 were awarded to American Indians/Alaskan Natives. These numbers might be low, but the 19 doctorates awarded in 2009 represent a full 4.2 percent of graduating American Indian engineers, which actually exceeds the total US average of 3.7 percent.

What becomes promising is the representation of American Indian/Alaskan Natives in Science and Engineering and Science

Figure 3. Employment by Science & Engineering Occupations & Race/Ethnicity: 2006

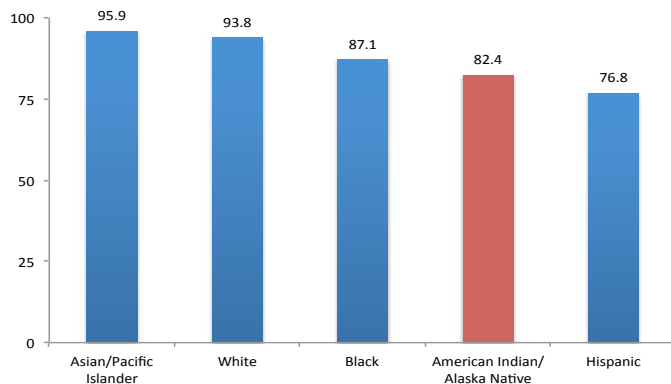
All Degree Levels	White		Asian		Black		Hispanic		AI/AN	
S&E Occupations	3,677,000	25%	808,000	42%	197,000	18%	230,000	22%	19,000	23%
S&E Related Occupations	4,042,000	28%	508,000	26%	302,000	28%	273,000	27%	26,000	32%
Non S&E Occupations	6,753,000	47%	616,000	32%	575,000	54%	525,000	51%	37,000	45%
Total	14,472,000	100%	1,932,000	100%	1,074,000	100%	1,028,000	100%	82,000	100%

SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT).

The National Action Council for Minorities in Engineering, Inc. (NACME) was founded in 1974 to ensure American competitiveness in a flat world by leading and supporting the national effort to expand U.S. capability through increasing the number of successful African American, American Indian, and Latino women and men in science, technology, engineering and mathematics (STEM) education and careers. NACME Alumni hold leadership positions in industry, medicine, law, education and government. With funding from corporate and individual donors, NACME has supported over 24,000 students with more than \$124 million in scholarships and other support. Currently NACME provides scholarship support to more than 1,300 college engineering students through a national network of 50 partner universities. NACME's STEM education strategy incorporates a continuum of programs and activities from middle school through workforce entry. Visit us at www.nacme.org.

and Engineering related occupations. As of 2006, the percentage of AI/AN engineering graduates (bachelors, masters, and PhDs) who hold employment in science and engineering fields (S&E) are higher than any other minority group. A full 55 percent of American Indian/Alaskan Native graduates are employed in S&E and S&E related occupations, compared to 46 percent of Blacks and 49 percent of Hispanics (Figure 3). Whites are similarly occupied at a rate of 53 percent, while Asians top the scales at 68 percent.

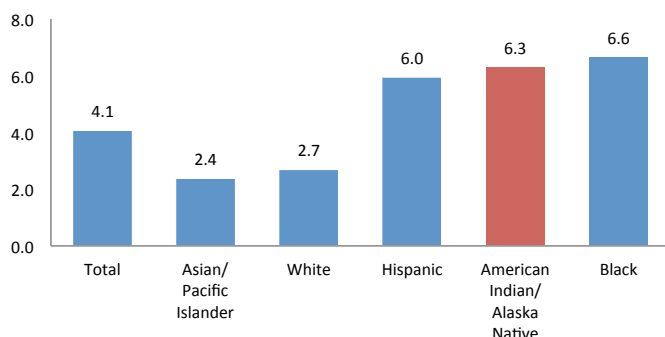
Figure 4. High School Completion Rates of persons aged 18-24, by Race/Ethnicity, 2009



SOURCE: Table 9, p. 44, Chapman, C., Laird, J., Ifill, N., and KewalRamani, A. (2011). Trends in High School Dropout and Completion Rates in the United States: 1972-2009 (NCES 2012-006). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved May 31, 2012 from <http://nces.ed.gov/pubsearch>. Note: "high school completion" includes all high school graduates including GED recipients aged 18-24.

The challenges facing American Indian representation in STEM fields occur in part because of issues along the educational pathway. Figure 4 illustrates the high school graduation rates of persons aged 18-24 years in 2009. In comparison to Asians and Whites in the 90 percent range, AI/AN students graduate at a rate of 82.4 percent, which is higher than Hispanics (76.8 percent) but lower than Blacks (87.1 percent). A different perspective concludes with similar results (Figure 5). In 2009 alone, the dropout rate for American Indian students for grades 9 through 12 was a high of 6.3 percent—double that of White youth.

Figure 5. High School Dropout Rates, by Race/Ethnicity, 2008-09



SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), Public School Graduates and Dropouts from the Common Core of Data, 2007-08 and 2008-09. (This table was prepared August 2011.)

Figure 6 illustrates the success that NACME has had in responding to the needs of the American Indian and Alaskan Native Engineering student community by providing management services for the Alfred P. Sloan Foundation Minority Ph.D. and Indigenous Graduate Partnership.

The success of the Sloan Scholarships is based on the concept of selecting faculty who can successfully recruit, mentor, and graduate underrepresented minority students to earn the doctoral degree.

Figure 6. Top Institutional Support of AI/AN Students in Engineering, 2011

Top Institutional Support of AI/AN Students in Engineering 2011	
Most NACME Scholarship Recipients- 2011-2012	
University of Arkansas	11
University of Colorado at Boulder	7
Missouri University of Science and Technology	4
Northern Arizona University	4
Most Engineering Degrees Awarded 2011	
Oklahoma State University	23 Bachelors
University of Oklahoma, Norman Campus	20 Bachelors
George Washington University	6 Masters
University of California, Berkeley	1 Doctorate

SOURCE: NACME Data Book 2011, NACME Scholarship 2011-2012 Demographic Report

POLICY CONSIDERATIONS

It is essential that federal and state policies provide opportunities for underrepresented minorities and others who have not traditionally prepared for nor entered the STEM arena. In particular, there is a great need to support the American Indian/Alaska Native community. To do so, NACME encourages policymakers, educators, and business and industry leaders to pursue the following policies and practices:

- K-12 EDUCATION.** The issues of American Indian/Alaska Native post-graduate attainment in STEM fields begins at the K-12 level. Support needs to be provided to see AI/AN students through to high school graduation, stemming the drop-out rate, and increasing overall academic achievement levels.
- HIGHER EDUCATION.** Funding for higher education opportunities to increase percentages of American Indian/Alaska Native students enrolling and completing college, with special emphasis on STEM disciplines. Additional focus must be made on increasing the graduate and professional production of this group.
- GOVERNMENT.** Data on American Indians/Alaska Natives is scant at best. Even when data exist, it is often difficult to dissect due to small cell sizes. Government can help by improving the data on American Indian/Alaska Native education, academic attainment, and career placement. Providing additional support for Tribal Colleges and other entities that serve high percentages of American Indians/Alaska Natives is key.
- BUSINESS.** Provide internships and opportunities for American Indians/Alaska Native STEM candidates beginning at the high school level and continuing through to college graduation. Business can partner with Tribal Colleges and affiliate organizations (e.g., AISES).