Our Promise
We engineer opportunity for minorities in STEM.

Our Mission
The purpose of NACME is 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.

Our Vision
An engineering workforce that looks like America.

Our Belief
Diversity drives innovation.

Our Purpose
Through partnerships with like-minded entities, we serve as a catalyst to increase the proportion of African American, American Indian, and Latino women and men in STEM careers. We inspire and encourage excellence in engineering education and career development toward achieving a diverse and dynamic American workforce.

Shaping an American STEM workforce where diversity drives innovation and global competitiveness
Dear Colleague,

We are pleased to release the 2013 NACME Data Book, the most authoritative source on the state of underrepresented minority group (African American, American Indian, and Latino) participation in engineering education and careers.

The year 2014 marks NACME's 40th Anniversary. Throughout its nearly four decades of operation, NACME has been committed to fostering research-based changes in policies and practices to raise awareness and promote discussion on the critical national imperative to increase diversity with equity in engineering education and careers. Data is the coin of the realm in energizing this discussion. We are proud that our data and analysis have been cited by colleagues in K-12 education, higher education, government, and business, and have appeared in prestigious academic journals, books, technical reports, and websites.

The 2013 NACME Data Book is designed to be accessible and useful to researchers, policymakers, and others. This document consists of an overview and a CD containing six data decks complete with PowerPoint slides. The flexible format will permit users to customize the data for their own presentations and reports.

Please let me thank you for joining NACME in the commitment to shape an American STEM—science, technology, engineering, and mathematics—workforce where diversity drives innovation and global competitiveness. We urge you to use the data in the 2013 NACME Data Book to make the case that the solution to America’s competitiveness problem is to activate the hidden talents of young women and men who have traditionally been underrepresented in STEM careers—African Americans, American Indians, and Latinos.

Cordially,

Irving Pressley McPhail, Ed.D
President and Chief Executive Officer
NACME, Inc.

CD Presentation Decks

DECK 1
Increasing Diversity of the U.S. Population

DECK 2
Pre-College Educational Challenges

DECK 3
Enrollment and Persistence in Engineering

DECK 4
Engineering Degrees in the U.S.

DECK 5
U.S. Engineering Workforce

DECK 6
40 Year Trends, 1974 to 2014

Authors:
The 2013 NACME Data Book was completed by: Christopher Smith, NACME Director of Research and Program Evaluation; Amanda Lain, NACME Consultant; and Lisa Frehill, former NACME Director of Research, Evaluation, and Policy. The authors are grateful for comments provided by the NACME Research and Policy Advisory Council: Linda S. Hagedorn, Iowa State University; Shaun Harper, University of Pennsylvania; Etta Hollins University of Missouri–Kansas City; Gary S. May, Georgia Institute of Technology; Jose Moreno, California State University, Long Beach; Watson Scott Swall, Educational Policy Institute; and Bevlee A. Watford, Virginia Polytechnic Institute and State University.

Cover photo right, Bechtel Corporation
© 2013 NACME, Inc.
Today the vision of creating an engineering workforce that looks like America is slowly being realized. URMs earned 9,736 engineering bachelor’s degrees in 2011, which represents 12.5 percent of the overall total. URMs also comprised 10.9 percent of the overall engineering workforce in 2010, which is a significant increase from years past, starting in 1999. Despite these gains, more work is needed to diversify the engineering pathway.

The following data shows that preparation is a major issue for URMs on the elementary and secondary levels. URM students who are enrolled in undergraduate institutions have lower retention and graduation rates compared to their peers. The statistics in these domains are even more alarming for URM women. As NACME celebrates its 40th anniversary in 2014, this comprehensive study of statistical trends in education and the workforce demonstrates how far URMs have come since 1974, and how far they still have to go in this field.

**DECK 1**

**Increasing Diversity of the U.S. Population**

The data in this deck provides a general picture of the overall U.S. population, and the elementary, secondary, and post-secondary population, by ethnicity. Figure 1 compares the U.S. Census Bureau’s population totals in 2012 to their projected population figures in 2050. By 2050, there will no longer be a majority race. The Latino population is expected to continue to grow rapidly, while the percentage of Asian Americans and Americans who identify with two or more races is expected to slightly increase. The percentage of African Americans, American Indians, and Alaska Natives is expected to remain relatively constant, while the percentage of Caucasians is expected to significantly decrease.

These shifting demographics are evident in the 2012 U.S. population (see Figure 2). While Latinos comprise 17.0 percent of the overall population, they represent 20.7 percent of 18-24 year olds, and 23.2 percent of those between ages five and 17. URMs represent 30.0 percent of the overall population, 36.4 percent of college-aged students, and 37.9 percent of elementary and secondary school-aged students.
DECK 2
Pre-College Educational Challenges

The diversifying U.S. population makes it clear that the key to America’s future global competitiveness in STEM is engaging underrepresented populations at all stages of the educational pathway. The data in this deck details the educational preparation of students prior to college. The low representation of URMs in STEM can be traced to the elementary and secondary school levels. Fifteen percent of Latinos and 8 percent of African Americans between the age of 16 and 24 drop out of high school, compared to 5 percent of non-Latino White students. URMs are also underprepared in core STEM curricula, as only 8.6 percent of Latinos and 6.1 percent of African Americans take calculus versus 42.2 percent of Asian students and 17.5 percent of non-Latino Whites (Snyder and Dillow, 2012). These patterns are reflected in the low SAT math scores achieved by URM students. Figure 3 details the mean SAT mathematics scores in 2012 by ethnicity. While the average score was 514, African American students averaged 428, Puerto Rican students averaged 452, Mexican American students averaged 465, other Latino students averaged 461, and American Indian/Alaska Natives averaged 489.

DECK 3
Enrollment and Persistence in Engineering

The data in this deck details the enrollment and persistence patterns in colleges of engineering across the country. The percentage of Latinos who complete high school and enroll in college is lower than the percentage of African Americans and Whites who complete high school and enroll. Latinos, African Americans, and American Indian/Alaska Natives also have the highest enrollment in two-year institutions after high school, which can be attributed to several factors, including cost, accessibility, and location (Santiago, 2008). In addition, a low number of URMs intend to enroll in engineering upon matriculation. In 2010, only 9.3 percent of Latino students, 7.4 percent of African American students, and 5.6 percent of American Indian/Alaska Native students planned on majoring in Engineering, according to the National Science Board’s Science and Engineering Indicators 2012.

Figure 4 details the persistence patterns of students who enrolled in college and majored in computer science, engineering, or engineering technology. A large sample of students who first enrolled in the 2003-04 school year were tracked after six years. While 72.8 percent of Asian Americans and 63.7 percent of non-Latino Whites completed their degree in this time frame, only 52.3 percent of Latinos and 31.2 percent of African Americans were able to do so.
Figure 4.
Retention to Graduation, Computer Science, Engineering, and Engineering Technology, 2003-04 First-Year Students as of 2009

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Left Without Credential</th>
<th>Completed Associate’s or Certificate</th>
<th>Still Enrolled</th>
<th>Completed Bachelor’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>31.0%</td>
<td>10.2%</td>
<td>22.4%</td>
<td>9.9%</td>
</tr>
<tr>
<td>Asian American</td>
<td>14.8%</td>
<td>19.5%</td>
<td>5.5%</td>
<td>18.1%</td>
</tr>
<tr>
<td>Latino</td>
<td>21.5%</td>
<td>12.8%</td>
<td>19.8%</td>
<td>52.3%</td>
</tr>
<tr>
<td>Non-Latino White</td>
<td>31.2%</td>
<td>13.8%</td>
<td>52.3%</td>
<td>63.7%</td>
</tr>
</tbody>
</table>

Source: NACME Analysis of Beginning Postsecondary Students Longitudinal Study using National Center for Education Statistics’ PowerStats, June 2011.

DECK 4
Engineering Degrees in the U.S.
This deck displays the degree outcomes for bachelor’s, master’s, and doctorate students in engineering. Table 2 presents a detailed analysis of the ethnicity and gender of students at all three levels of education. Underrepresented minorities comprised only 12.47 percent of the total engineering bachelor’s degrees recipients in 2011. They also comprised 7.19 percent of engineering master’s degree recipients, and 3.98 percent of engineering doctoral graduates. These numbers are particularly miniscule for underrepresented minority females, who earned 2.94 percent of bachelor’s degrees, 1.96 percent of master’s degrees, and 1.23 percent of doctorate degrees in engineering.

It is clear from these numbers that universities across the country are having difficulty in recruiting and graduating URMs in engineering. The institutions that awarded the most engineering bachelor’s degrees to URMs in 2011 are profiled in Table 1. Those institutions which are highlighted in blue are NACME Partner Institutions, which serve as models of best practices in developing an environment that supports diversity and recognizes the academic achievement of all students.

DECK 5
U.S. Engineering Workforce
All of the patterns seen in the previous figures have a cumulative impact on the engineering workforce. This deck highlights the presence of underrepresented minorities in academia, and separately, in the STEM workforce. URM faculty are rarely seen at colleges of engineering throughout the country, as they represent slightly more than 6 percent of all engineering faculty members. Figure 5 details the progression of URMs in the engineering workforce over time. While URMs comprised only 10.9 percent of the engineering workforce in 2010, this represents growth from 1999, when they comprised 6.3 percent.

DECK 6
40 Year Trends, 1974 to 2014
This deck highlights the growth of URM representation in engineering education and the engineering workforce over the past 40 years. The overall U.S. population has grown from 203.2 million in 1970 to 313.9 million in 2012. While the percentage of African Americans and American Indians in the population has only grown slightly in that time, the percentage of people who identify as Latino has sharply
Retention to graduation in engineering, computer science and engineering technology continues to be a significant problem, especially for African American students.

### Table 2.
**Engineering Degrees in the U.S., 2011**

<table>
<thead>
<tr>
<th></th>
<th>Bachelor's</th>
<th>Master's</th>
<th>Doctorates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Total</td>
</tr>
<tr>
<td><strong>2011</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Underrepresented</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minorities</td>
<td>2,299</td>
<td>7,437</td>
<td>9,736</td>
</tr>
<tr>
<td></td>
<td>(2.94%)</td>
<td>(9.52%)</td>
<td>(12.47%)</td>
</tr>
<tr>
<td>African American</td>
<td>809</td>
<td>2,288</td>
<td>3,097</td>
</tr>
<tr>
<td></td>
<td>(1.04%)</td>
<td>(2.93%)</td>
<td>(3.97%)</td>
</tr>
<tr>
<td>Latino</td>
<td>1,407</td>
<td>4,910</td>
<td>6,317</td>
</tr>
<tr>
<td></td>
<td>(1.80%)</td>
<td>(6.29%)</td>
<td>(8.09%)</td>
</tr>
<tr>
<td>American Indian/</td>
<td>83</td>
<td>239</td>
<td>322</td>
</tr>
<tr>
<td>Alaska Native</td>
<td>(0.11%)</td>
<td>(0.31%)</td>
<td>(0.41%)</td>
</tr>
<tr>
<td><strong>All Other U.S.</strong></td>
<td>11,295</td>
<td>51,817</td>
<td>63,112</td>
</tr>
<tr>
<td><strong>Citizens</strong></td>
<td>(14.46%)</td>
<td>(66.35%)</td>
<td>(80.81%)</td>
</tr>
<tr>
<td>and Permanent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Residents</strong></td>
<td>13,594</td>
<td>59,254</td>
<td>72,848</td>
</tr>
<tr>
<td></td>
<td>(17.41%)</td>
<td>(75.87%)</td>
<td>(93.28%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>U.S. Citizens</strong></td>
<td>14,658</td>
<td>63,441</td>
<td>78,099</td>
</tr>
<tr>
<td>and Permanent</td>
<td>(18.77%)</td>
<td>(81.23%)</td>
<td>(93.28%)</td>
</tr>
<tr>
<td><strong>Residents</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Temporary</strong></td>
<td>1,064</td>
<td>4,187</td>
<td>5,251</td>
</tr>
<tr>
<td><strong>Residents</strong></td>
<td>(1.36%)</td>
<td>(5.36%)</td>
<td>(6.72%)</td>
</tr>
<tr>
<td><strong>GRAND TOTAL</strong></td>
<td>14,658</td>
<td>63,441</td>
<td>78,099</td>
</tr>
<tr>
<td></td>
<td>(18.77%)</td>
<td>(81.23%)</td>
<td>(93.28%)</td>
</tr>
</tbody>
</table>

Sources: NACME analysis of Integrated Postsecondary Education Data System (IPEDS) data accessed via National Science Foundation’s WebCASPAR database system, July 2013.

---

**Figure 5.**
**Engineering Workforce by Race/Ethnicity: 1999-2010**

- **African American:**
  - 1999: 2.6%
  - 2000: 2.6%
  - 2008: 3.1%
  - 2010: 3.2%

- **Latino:**
  - 1999: 3.4%
  - 2000: 3.4%
  - 2008: 5.6%
  - 2010: 5.3%

- **American Indian:**
  - 1999: 0.3%
  - 2000: 0.3%
  - 2008: 0.2%
  - 2010: 0.3%


**Figure 6.**
**Bachelor’s Degrees in Engineering Earned by URMAs, 1977-2011 (n=187,685)**

- **Latino Sum:** 104,347
- **African American Sum:** 76,144
- **American Indian Sum:** 7,194

Source: NACME analysis of Integrated Postsecondary Education Data System (IPEDS) data accessed via National Science Foundation’s WebCASPAR database system, July 2013.
increased. In 1980, the first year that complete census data was available on Latinos, only 6.4 percent of the population identified as such. In 2012, 17 percent of the population identified as Latino, and as seen in Figures 1 and 2, this percentage is expected to increase in the future.

Mirroring the growth of the overall population, the number of awarded engineering bachelor’s degrees has steadily increased since 1977, rising from 49,677 to 78,099. Not surprisingly, the number of bachelor’s degrees in engineering earned by Latinos has also steadily increased over this time, as seen in Figure 6. Since 1977, URMs have earned 11 percent of the 1.8 million plus undergraduate engineering bachelor’s degrees allotted. While this percentage is increasing over time, more work is needed to make engineering graduating classes look like America.
Figure 9. NACME Scholars by Gender, 1974-2013 (n=23,574)

33% Men 67% Women

Figure 10. NACME Scholars by Gender, 2012-2013 (n=1,250)

32% Men 68% Women

Figure 11. NACME Scholars by Ethnicity, 1974-2013 (n=23,555)

41% African American 56% American Indian/Alaska Native 3% Latino 1% Other

Figure 12. NACME Scholars by Ethnicity, 2012-2013 (n=1,250)

53% African American 40% American Indian/Alaska Native 6% Latino 1% Other

Figure 13. NACME Scholars by Academic Discipline, 1974-2013 (n=23,517)

Electrical Engineering 31%
Mechanical Engineering 19%
Other Engineering 14%
Chemical Engineering 10%
Civil/Environmental Engineering 10%
Computer Engineering 7%
Industrial Engineering and Operations Research 5%
Biomedical/Bioengineering 2%
Computer Science/Information/Systems/Technology 3%

Figure 14. NACME Scholars by Academic Discipline, 2012-2013 (n=1,250)

Mechanical Engineering 24%
Electrical Engineering 17%
Other Engineering 16%
Civil/Environmental Engineering 13%
Chemical Engineering 9%
Computer Engineering 7%
Industrial Engineering and Operations Research 6%
Biomedical/Bioengineering 5%
Computer Science/Information/Systems/Technology 3%
NACME Scholars

NACME has provided scholarship support for URMs in engineering since 1974. During that time, 23,718 minority engineering students have received scholarship support from NACME, and many of those who graduated are now leaders in government, industry, and academia. Figures 9 through 12 detail the demographic backgrounds of these scholars, from the 2012-13 school year, and from NACME’s founding. Overall, since 1974, 67 percent of NACME-supported scholars were male, while 56 percent were African American, 41 percent Latino, and 3 percent American Indian/Alaska Natives. In 2012-13, 68 percent of NACME Scholars were male, while 40 percent were African American, 53 percent Latino, and 6 percent American Indian/Alaska Natives. Since 1974, the most popular majors for these students were electrical engineering (31 percent) and mechanical engineering (19 percent), which is consistent with the pattern seen in 2012-13, as shown in Figures 13 and 14.

Conclusion

The U.S. population is becoming more diverse each year. By 2050, URMs will represent more than 40 percent of the population, and there will be no majority race. The demand for qualified STEM professionals is high, but the supply of STEM workers to fill these positions is at risk if underrepresented groups are not engaged in these fields. The data featured in the accompanying decks highlight some of the challenges that exist for URMs in the STEM fields. URMs complete high school at lower rates than their peers. They also score lower on their standardized test scores, which can serve as a barrier to college admission. The retention-to-graduation rates for URMs who do enroll as undergraduate STEM majors are comparatively low as well. As a result, the engineering workforce does not look like America. However, this data also shows that progress has been made. URMs earned nearly three times as many engineering bachelor’s degrees, more than four times as many engineering master’s degrees, and more than seven times as many engineering doctorate degrees in 2011 than they did in 1977. The engineering workforce is also diversifying over time, though at a slower rate than the overall population. The accompanying data decks provide in-depth information on all of the critical issues that are associated with URM participation in the engineering field, and we encourage researchers, policymakers, educators, and businesses to utilize them.

References/Sources


NACME Board of Directors

NACME is grateful to the following individuals and companies for serving on our Board of Directors.

**Chair**
Arthur P. Burson
Merck & Co., Inc.

**Vice Chair**
Mark E. Russell
Raytheon Company

**President and CEO**
Irving Pressley McPhail, Ed.D.
NACME, Inc.

**Corporate Secretary**
James C. Vardell, III
Cravath, Swaine & Moore LLP

Mary Adamo
Consolidated Edison Company of NY, Inc.

Rodney C. Adkins
IBM Corporation

Mark W. Albers
Exxon Mobil Corporation

Michael J. Barber
General Electric

Sue Barsamian
Hewlett-Packard Company

Jay Bennett
Rolls-Royce

James R. Blackwell
Chevron Corporation

Eileen M. Campbell
Marathon Oil Company

E. Renae Conley
Entergy Corporation

Marian Croak, Ph.D.
AT&T Labs

Carlos Dominguez
Cisco Systems, Inc.

Howard D. Elias
EMC Corporation

Aamir Farid
Shell Oil Products U.S.

William Gipson
Procter & Gamble Company

Donna Gulbinski
Bristol-Myers Squibb Company

Margery Harris
Apache Corporation

John Hill
L-3 Communications Corporation

William G. Hofmann
Johnson Controls, Inc.

Christopher D. Holmes
3M

Christopher T. Jones, Ph.D.
Northrop Grumman Corporation

Susan M. Lewis
The Dow Chemical Company

John T. Lucas
Lockheed Martin Corporation

John A. MacDonald
Bechtel Corporation

Willie C. Martin
DuPont

Roderick B. Mitchell
PenFed

David C. Nagel
BP America, Inc.

Anthony C. Neal-Graves
Intel Corporation

Douglas M. Owen, PE, DEE
ARCADIS

Ramanath I. Ramakrishnan
Eaton Corporation

Larry Robinson, Ph.D.
Florida A&M University

Mark Rosenberg, Ph.D.
Florida International University

Katepalli Sreenivasan, Ph.D.
Polytechnic Institute of New York University

Randy Stashick
United Parcel Service, Inc.

Terri Timberman
Broadcom Corporation

Frederiek Toney
Ford Motor Company

John J. Tracy, Ph.D.
The Boeing Company

Charles M. Vest, Ph.D.
National Academy of Engineering

Gregory G. Weaver
Deloitte & Touche LLP

TBD
Xerox Corporation
CD Presentation Decks

This CD contains a series of PowerPoint presentation decks, which will allow you to choose slides and include them in your presentations. Each deck is organized around a different theme with each reviewed in this book. Supplemental decks and updates will be made available periodically as new data becomes available.

DECK 1
Increasing Diversity of the U.S. Population

DECK 2
Pre-College Educational Challenges

DECK 3
Enrollment and Persistence in Engineering

DECK 4
Engineering Degrees in the U.S.

DECK 5
U.S. Engineering Workforce

DECK 6
40 Year Trends, 1974 to 2014

2013 NACME Data Book
A Comprehensive Analysis of the “New” American Dilemma
Our Promise
We engineer opportunity for minorities in STEM.

Our Mission
The purpose of NACME is to ensure American competiveness 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.

Our Vision
An engineering workforce that looks like America.

Our Belief
Diversity drives innovation.

Our Purpose
Through partnerships with like-minded entities, we serve as a catalyst to increase the proportion of African American, American Indian, and Latino women and men in STEM careers. We inspire and encourage excellence in engineering education and career development toward achieving a diverse and dynamic American workforce.

Shaping an American STEM workforce where diversity drives innovation and global competitiveness

National Action Council for Minorities in Engineering, Inc.
440 Hamilton Avenue
Suite 302
White Plains, New York, 10601
(914) 539-4010
(914) 539-4032 Fax
nacme.org

Connect with us: