2006-656: DIVERSITY IN ENVIRONMENTAL ENGINEERING: THE GOOD AND BAD

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Diversity in Environmental Engineering: The Good and Bad

Abstract

Engineering diversity remains a problem in the USA despite ongoing efforts by government, academia, and the private sector. A committee of the Association of Environmental Engineering and Science Professors (AEESP) is characterizing diversity within the environmental engineering field to determine if there are unique issues associated with this profession that need to be addressed. For this effort, diversity includes gender and ethnic diversity in terms of African Americans, Hispanic Americans, and Native Americans. The committee looked at populations of environmental engineering students (based on degrees granted), faculty, and practitioners using available data from the Engineering Workforce Commission, American Society of Engineering Education, U.S. Department of Labor, and the National Science Foundation. As expected, the study shows that contrary to engineering as a whole, the environmental engineering student population is very diverse in terms of gender. There is some gender diversity in terms of environmental engineering faculty, though numbers of female faculty are still below those for the general population. Also, there is a lower percentage of female environmental engineering faculty than the percentage of females graduating with doctorate degrees in that field. However, women are well represented among environmental engineering practitioners with a growing population trend related to the amount of degrees granted. Unfortunately, environmental engineering is not diverse in terms of ethnicity for students, faculty, and practitioners. At the aggregate level, ethnic diversity for environmental engineering is similar to engineering as a whole and well below the general population. Based on the aggregate results, the committee evaluated programs at ABET-accredited undergraduate environmental engineering programs and noted the subset of those colleges that are reportedly implementing best practices to enhance diversity and/or have a particular advantage in terms of attracting diverse students due to location, etc. This evaluation shows that those colleges that are somewhat successful at increasing ethnic diversity in engineering at the undergraduate level have similar success with environmental engineering programs. However, the remaining schools were less successful with achieving ethnic diversity in environmental engineering than within the overall engineering program. The results for ethnic diversity are limited because the populations are small. Additional study is also needed to determine the reasons why ethnically diverse students may choose engineering disciplines other than environmental engineering at a higher rate.

Introduction

The Association of Environmental Engineering and Science Professors (AEESP) made an initial effort to count environmental engineers in 2004[1]. That study sought to determine if demographic information for environmental engineers, including students, faculty, and practitioners exists, if it is accurately collected, and if it is effectively reported. The evaluation showed that environmental engineering demographic data is available, but with two main limitations. The first limitation is that the most comprehensive sources for environmental engineering demographics data for students (American Society of Engineering Education (ASEE) and the Engineering Workforce Commission (EWC)) and faculty (ASEE) depend solely on named degree programs and named departments. [1] In other words, a student graduating in civil engineering, but working in environmental engineering is not counted. Similarly, a faculty

member whose specialty is environmental engineering, but is employed in a chemical engineering department is likely not counted. The second limitation is that although the National Science Foundation (NSF) conducts surveys of sample populations of post-graduate engineers, the collected data for environmental engineers is not routinely reported. [1] NSF does, however use the graduate's subsequent career as opposed to degree name for categorization. [1]

The main purpose of our recent effort is to evaluate the diversity of the environmental engineering field. Our study evaluates gender diversity and ethnic diversity among U.S. citizens and permanent residents in terms of African Americans, Hispanic Americans, and Native Americans. Engineering diversity remains a problem in the USA despite ongoing efforts by government, academia, and the private sector. Chubin et. al. (2005) reported that since 1995, the proportion of women and minority freshman in engineering is declining.[2] However, for a similar time period, the representation of women and minorities in science, technology, engineering and mathematic (STEM) fields at both the baccalaureate and masters levels is not decreasing, with the exception of computer science.[2] Trends for minorities in engineering at the doctorate level cannot be determined due to small numbers.[2]

Chubin et. al.(2005) also reported that fewer than two in five minority first-year students who enter engineering graduate with an engineering degree. [2] Almost 27% of African Americans who earned their bachelor's degrees in science and engineering did so at historically black colleges and universities (HBCUs).[2] Furthermore, most African American doctorates in science and engineering have undergraduate degrees from Howard, Spelman, Hampton, Morehouse, North Carolina A&T, and Southern University, all HBCUs. [2] Not surprisingly, Latinos and Native Americans tend to go to schools in states where they are most concentrated. [2] In contrast, almost all Native American bachelor degrees come from non-tribal colleges since most tribal colleges only award associate degrees. [2] No single institution is a top producer for all minority groups.[2]

Although variation in engineering degrees among schools can be attributed to geography and HBCUs, some institutions implement policies and practices that are successful at increasing diversity.[2] A public-private partnership, Building Engineering and Science Talent (BEST), looked at what works to increase minority representation in STEM fields and concluded that there are eight principles: institutional leadership, targeted recruitment, engaged faculty, personal attention, peer support, enriched research experience, bridging to next level, and continuous evaluation.[2] Chubin et al. (2005) emphasize that transition points are places to target because this is where minorities leave in the greatest numbers.[2] Undergraduate transition programs, such as dual-degree programs, have been shown to increase retention rates for minority students. [2] In addition, formal orientation courses for freshmen, clustering of minority students in common sections, student study centers, structured study groups, student/faculty surveys, peer/professional advising, undergraduate research programs, summer bridge programs, adequate financial support, and internships are key elements of increased retention rates. [2] Graduate transition programs that work include undergraduate research, undergraduate faculty involvement, and financial aid such as the National Consortium for Graduate Degrees for Minorities in Engineering and Science fellowships.[2] Successful faculty programs include forming campus working groups to focus on diversity issues, establishing endowed professorships for outstanding minority faculty, dismissing the notion that research productivity is the only measure, expanding the faculty search processes, integrating campus minority chapter

organizations into engineering programs, and using on-line monitoring networks such as MentorNet. [2]

Methods

Realizing the importance of transition points, this study took a closer look at the sub populations of degrees granted at the undergraduate, masters, and doctorate levels, in addition to faculty and practitioners. We used data from EWC (2003) and ASEE (2002-2003 and 2004) for students. ASEE (2002-2003) provided faculty data that we supplemented with AEESP membership data from 2003. US Census (2000) and NSF (1999) provided the data for practitioners. We contacted the Society of Women Engineers (SWE), Society of Hispanic Professional Engineers (SHPE), American Indian Science and Engineering Society (AISES), and National Society of Black Engineers (NSBE) for any additional information on practitioners; NSBE was the only source able to provide information about membership. We considered overlapping data to improve the reliability of the evaluation. We also compared data for industrial, chemical, and bio/biomedical engineering since these three engineering fields are commonly known to have high percentages of women; there is no similar subset for ethnic diversity. We used the collected data to calculate percentages for each diversity group within each category of environmental engineers. Both data sources for students (EWC and ASEE) were only for those programs with named environmental engineering degrees. Similarly, the ASEE data for faculty was based on those within named environmental engineering departments.

Tables 1 through 6 illustrate the findings for student data. Table 1 shows the percentages of women who received bachelor's degrees, master's degrees, and doctorate degrees in 2003. Table 2 shows the percentages of women, African American, Native American, and Hispanic American who received degrees in environmental, chemical, industrial, and bio/biomedical engineering, and across all engineering fields in 2003. In Tables 3, 4, and 5, we compared the percentages of student enrollment and degrees awarded across degree levels for women, African Americans, Native Americans, and Hispanic Americans. Table 6 shows the percentages of faculty who were women, African American, Native American, and Hispanic American in 2003. Tables 7 through 9 provide information on practitioners in the various engineering fields and across all engineering fields. Table 10 compares female practitioner data from NSF to data from EWC. As stated, two sources of data were available for practitioners in the environmental engineering field, US Census 2000 and NSF 1999. Both sources provided data for environmental engineers, chemical engineers, industrial engineers, and across all engineering fields. However, bio/biomedical engineering is classified under the "other" category, therefore this data could not be obtained. The data for environmental engineering practitioners is not limited to those with environmental engineering degrees, but includes those who identify themselves as practicing environmental engineers. Although the two data sources are compared in Table 7, the data is for two different years.

As will be discussed in the results section, initial studies showed that gender diversity for environmental engineering is not as great of a concern as ethnic diversity. Therefore, further studies focused on better determining the diversity of African Americans, Hispanic Americans, and Native Americans in named environmental engineering programs. To accomplish this, we collected ASEE data for 2004 to determine the percentages of engineering (in general) and

environmental engineering bachelor degrees awarded to minorities in 2004 at the 48 ABET-accredited environmental engineering programs. We focused on undergraduate degrees because this is a starting point for those who may eventually obtain graduate degrees in the field, assume faculty positions, and become practitioners. Attrition of students at the undergraduate level should provide an indication of the likely diversity at these other levels. Limitations of our study are that we did not consider associate degree programs, and that many future environmental engineers enter the field at points other than the undergraduate degree. We identified those ABET-accredited environmental engineering programs that are also reported as top producing institutions of B.S. minority engineers (in general). Table 11 provides the school-specific environmental engineering diversity information for bachelor degrees.

Results

Table 2 shows that 40% of total degrees awarded in environmental engineering in 2003 went to women. This percentage is slightly greater than that for women who received degrees in chemical, industrial, bio/biomedical engineering, and is higher than that for all engineering fields (21%). Table 1 shows that a lower percentage of women receive a master's degree than a bachelor's degree, and an even lower percentage receive a doctorate degree. Tables 3 through 5 show that similar percentages of women were enrolled at all degree levels in 2003.

About 2.4% of students who received environmental engineering degrees were African Americans which is slightly lower than the equivalent percentage (3.8%) across all engineering fields. Nearly 1.2% of students who received environmental engineering degrees were Native Americans which is slightly higher than the percentage who received degrees across all engineering fields (0.4%). Approximately 5.0% of students who received environmental engineering degrees were Hispanic Americans which is similar to the percentage who received degrees in all engineering fields (4.8%).

The faculty data from ASEE in Table 6 show that 14.7% of environmental engineering faculty members were women in 2003. That percentage is similar to the chemical, industrial, and bio/biomedical engineering fields. All of these fields have higher percentages of women than across engineering (9.9%). As a supplement, AEESP membership information indicates that 20% of the members in 2003 were women, which is consistent with the gender faculty data provided by ASEE.

ASEE (2003) did not provide data for Native American engineering faculty; it is likely that this is due to the small number of Native American engineering faculty in the United States. Table 6 shows that African Americans made up 4.9% of the environmental engineering faculty which is higher than the equivalent across all engineering fields (2.1%). About 2.9% of all environmental engineering faculty were Hispanic Americans in 2003, which is similar to the percentage for all engineering faculty (3.2%).

Table 7 shows there is a similar percentage of women practitioners in environmental engineering as in chemical and industrial engineering. All of these percentages are higher than for total engineers. In 2000, 22% of the environmental engineering practitioners were women as opposed to the 11% across all engineering fields. Although the percentage is higher, 22% is less than the

percentage of environmental engineering degrees awarded to women in 2003 (40%). Tables 8 and 9 illustrate the NSF time-series data for engineers who have had their degrees for more than 30 years, 25-29 years, 20-24 years, 15-19 years, 10-14 years, 5-9 years, and less than 5 years. The percentage of women in the environmental engineering fields has increased from less than 10% pre 1970 to over 36% for those who graduated between 1995 and 1999. As shown in Table 10, this latter percentage compares more favorably with the EWC degree data for 2003. This result suggests that the EWC data is reliable for gender information despite the limitation that the data is only for those who graduated with named environmental engineering degrees.

Table 7 also shows that according to the most recent data, environmental engineering practitioners include 4.2% African Americans, 0.3% Native Americans, and 3.1% Hispanic Americans. Such percentages are similar to the respective percentages across all engineering fields (3.9%, 0.3%, 3.9%). The time-series data from NSF shows that the percentages of African Americans and Hispanic Americans in the environmental engineering field have not increased over time. What is noteworthy, however, is that the practitioner data for African Americans does not agree with the degree data. Degree data for 2003 shows that 2.4% of environmental engineering bachelor degrees went to African Americans, but the practitioners' data is higher at 4.2% across all years, and 6.6% for those who graduated between 1995 and 2000. NSBE indicated in personal correspondence that 2.15% of its members were in the environmental science industry in 2003.

As shown in Table 11, there are 48 accredited environmental engineering programs at the undergraduate level in the USA. There was no available data from ASEE for five of these schools. There are an additional six programs accredited at the masters level that we did not include. However, we included two non-accredited programs listed by Chubin et al (2005) as top producers of minority students for a total of 50 schools evaluated. In total, 11 of the schools in Table 11 are stated by Chubin et al (2005) to be top producers of minority engineers.

The results in Table 11 show that it is very hard to compare individual schools in terms of environmental engineering because, for the most part, the ABET-accredited programs have extremely small undergraduate student population. We cannot access the diversity data for those undergraduate students in alternate degree programs (such as civil engineering, agricultural engineering, or chemical engineering) who are primarily interested in the environmental engineering aspect of those majors, which is an unfortunate limitation of our study. Despite this limitation, the results indicate that of the11 identified minority-producing schools, 73% have similar positive ethnic diversity results for environmental engineering as for engineering overall. Of the remaining 34 schools with data, 65% show worse ethnic diversity results for environmental engineering graduates as for engineering graduates overall (typically no ethically diverse students pursing that degree option).

Discussion and Conclusions

There is comprehensive student diversity data available for students from EWC that appears reliable despite being only for students with named environmental engineering degrees. Data for faculty is very limited and may not accurately represent the environmental engineering faculty population since it is only for those in named environmental engineering programs which is a

very small population. There is comprehensive time-series diversity data for environmental engineering practitioners from NSF that is comparable to the US Census data. For both students and practitioners, data from two sources were available, and therefore the conclusions drawn for these groups are more reliable than the conclusions drawn for faculty, for which no other adequate source of data was available for comparison. Although percentages are calculated for all diversity categories, several of the ethnic diversity categories include very small populations and therefore it was difficult to evaluate ethnicity trends across degree levels. In general, the minority percentages decline from bachelors to masters to doctorate levels.

The general conclusion is that environmental engineering is diverse in terms of female students with somewhat even distribution among degree levels. This diversity is slightly higher than engineering fields typically known to attract women and is higher than across all engineering fields. Unfortunately, environmental engineering is not diverse in terms of ethnicity. It remains unclear from the aggregate student data if ethnic diversity in environmental engineering has distinct problems as opposed to engineering in general.

Based on limited data, the general conclusion is that percentages for female faculty in environmental engineering range between 15% and 20% based on the limited data. Even though this is a higher percentage than across all engineering fields, the percentages are still below those for the general population, and are lower than those for students graduating with doctorate degrees in environmental engineering. The ethnic diversity of environmental engineering faculty is similar to that for students, and well below the general population.

Related to the conclusion for students, women are well represented among environmental engineering practitioners with increasing percentages for more recent graduates. The trend appears to be strong and related to the amount of degrees granted. Among environmental engineering practitioners, the data for ethnically diverse groups is limited and hard to use for conclusions, other than to state that diversity is lower than for the general population.

In general, the diversity data for ABET-accredited environmental engineering undergraduate programs show that those schools that do better with diversity across engineering programs also do somewhat better in environmental engineering than cohort schools. At the majority of schools not known to be particularly diverse in terms of ethnicity for engineering, environmental engineering diversity may even be worse. Unfortunately, it was impossible to assess ethnic diversity at schools without separate ABET-accredited environmental engineering programs which are likely to produce many more environmental engineering practitioners. Possible reasons that have not been substantiated as to why ethnic diversity may be worse within environmental engineering include the small size of environmental engineering programs at the undergraduate level, the lack of defined programs in environmental engineering at the undergraduate level, and the lack of K-12 information about environmental engineering.

Based on the above conclusions, the next step is to better clarify the reasons for a lack of diversity in environmental engineering by surveying engineering students in under-represented groups to find out what factors were most important in selecting their major, what information was available to them about different majors, and whether they had enough information about environmental engineering.

References

1. Jones, S.A., Barnett, M.O., Bhandari, A., & LaPara, T. (2005). An Initial Effort to Count Environmental Engineers in the USA. Environmental Engineering Science, 2005, 772-782.
2. Chubin, D.E., May, G.S., & Babco, E.L. (2005). Diversifying the Engineering Workforce. Journal of Engineering Education, January 2005, 73-86.
3. Engineering Workforce Commission (2003).
4. American Society of Engineering Education (2003 and 2004). Engineering College Profiles and Statistics. http://www.asee.org/about/publications/profiles/index.cfm
5. National Science Foundation (1999).
6. U.S. Department of Labor Census (2000).

Table 1: Percentages of Degrees Awarded to Women: EWC 2003 & ASEE 2002-2003.

	Environmental		Chemical		Industrial		Bio/Biomedical		All Engineers	
	EWC	**ASEE**	**EWC**	**ASEE**	**EWC**	**ASEE**	**EWC**	**ASEE**	**EWC**	**ASEE**
BS	44	42	38	38	36	35	41	40	20	20
MS	39	42	28	21	22	30	36	38	22	22
PhD	29	31	25	23	23	25	27	32	17	17

Table2: Percentages of All Degrees Awarded to Students: EWC 2003.

	Environmental	Chemical	Industrial	Bio/Biomedical	All Engineers
Women	40	35	31	39	21
African American	2.4	5.0	5.7	3.4	3.8
Native American	1.2	0.4	0.3	0.4	0.4
Hispanic American	5.0	5.1	8.0	3.0	4.8

Table 3: Percentages for Enrollment and Degrees in 2003 (Bachelor Degrees): EWC 2003.

	Environmental		Chemical		Industrial		Bio/Biomedical		All Engineers	
	Degree	Enroll	Degree	Enroll	Degree	Enroll	Degree	Enroll	Degree	Enroll
Women	44	39		36		34		40	20	18
African American	2.4	1.5		6.4		9.0		4	4.6	6.1
Native American	2.0	1.4		0.6		0.5		0.70	0.5	0.6
Hispanic American	8.9	10		8.7		14		4.9	6.2	7.9

Table 4: Percentages for Enrollment and Degrees in 2003 (Master's Degrees): EWC 2003.

	Environmental		Chemical		Industrial		Bio/Biomedical		All Engineers	
	Degree	Enroll	Degree	Enroll	Degree	Enroll	Degree	Enroll	Degree	Enroll
Women	39	38		27		20		36	22	21
African American	2.5	1.4		3.0		4.3		2.2	2.5	2.2
Native American	0.7	0.1		0.3		0.2		0.2	0.2	0.2
Hispanic American	2.4	4.9		3.4		3.3		2.7	2.5	2.9

Table 5: Percentages for Enrollment and Degrees in 2003 (Doctorate Degrees): EWC 2003.

	Environmental		Chemical		Industrial		Bio/Biomedical		All Engineers	
	Degree	Enroll	Degree	Enroll	Degree	Enroll	Degree	Enroll	Degree	Enroll
Women	29	38		27		24		36	17	21
African American	1.7	1.6		1.7		3.2		3.1	1.6	1.7
Native American	0	0.3		0.2		0.1		0.0	0.2	0.1
Hispanic American	1.7	4.1		2.7		2.3		2.2	1.8	1.7

Table 6: Percentages for Faculty: ASEE 2002-2003.

	Environmental	Chemical	Industrial	Bio/Biomedical	All
Women	14.7	11.3	15.4	16.6	9.9
African American	4.9	2.4	3	1.5	2.1
Native American	N/A	N/A	N/A	N/A	N/A
Hispanic American	2.9	4.6	5.6	1.9	3.2

NA – Data not available probably due to small numbers.

Table 7: Percentages for Practitioners-Categorized by Engineering Field: US Census 2000 & NSF 1999.

	Environmental		Chemical		Industrial		All Engineers	
	US Census 2000	**NSF 1999**	**US Census 2000**	**NSF 1999**	**US Census 2000**	**NSF 1999**	**US Census 2000**	**NSF 1999**
Women	22	20	17	19	14	19	11	9.5
African American	4.2	2.4	4.0	3.2	4.2	4.6	3.9	3.6
Native American	0.3	0.3	0.2	NA	0.2	NA	0.3	5.4
Hispanic American	3.1	3.6	4.1	3.6	3.4	5.4	3.9	3.9

NA – Data not available probably due to small numbers.

Table 8: Percentages for Practitioners: Years Since Degree for Environmental Engineers: NSF 1999.

	1950-1965 30+ years	**1970 25-29 years**	**1975 20-24 years**	**1980 15-19 years**	**1985 10-14 years**	**1990 5-9 years**	**1995 <5 years**
Women	8.3	NA	7.7	26	14.6	26.8	36.1
African American	NA	5.6	NA	NA	NA	9.5	6.6
Native American	NA	NA	NA	NA	NA	NA	1.6
Hispanic American	NA	NA	1.9	NA	8.3	4.9	4.9

NA – Data not available.

Table 9: Percentages for Practitioners: Years Since Degree for All Engineers: NSF 1999.

	1950-1965 30+ years	**1970 25-29 years**	**1975 20-24 years**	**1980 15-19 years**	**1985 10-14 years**	**1990 5-9 years**	**1995 <5 years**
Women	1.9	1.6	6.5	11	11	11	17.5
African American	0.7	1.5	2.8	3.9	2.7	3.3	4.8
Native American	NA	NA	NA	NA	NA	NA	NA
Hispanic American	2.1	2.4	2.8	4.0	5.1	4.4	5.8

NA – Data not available.

Table 10: Comparison of 1999 NSF Practitioners Data for Recent Female Graduates with EWC 2003 Degrees Awarded Data for Women.

	Environmental, %	**Chemical, %**	**Industrial, %**	**All, %**
NSF 1999	36	25	31	13
EWC 2003	40	35	31	21

Table 11. Undergraduate Degrees (2004) at ABET-accredited Environmental Engineering Programs (ASEE)

School	Total Engineering Degrees	Total Environmental Engineering Degrees	State Diversity Breakdown, % 2004 US Census			African American, %		Hispanic American, %		Native American, %	
			AfAm	HiAm	NaAm	All Eng	Env. Eng	All Eng	Env. Eng	All Eng	Env Eng
University of California-Irvine	416	6	6.7	32.4	1	1.2	0	8.9	0	0	0
University of California - Riverside	259	1	6.7	32.4	1	3.5	0	13.5	0	0.4	0
Cal Poly San Luis Obispo	756	19	6.7	32.4	1	0.4	0	**9.3**	**5.3**	0.7	0
University of Central Florida	612	17	15.1	19.1	0.3	**7.2**	**5.9**	**10.6**	**11.8**	0.5	0
University of Cincinnati	295	0	11.7	2.2	0.2	4.4	0	1	0	0	0
University of Colorado-Boulder	486	13	3.8	17.1	1	0.4	0	5.3	0	0.8	0
Colorado State University	271	5	3.8	17.1	1	0.7	0	5.2	0	0.4	0
Columbia University	350	6	15.9	15.1	0.4	3.7	0	4.9	0	0	0
University of Delaware	170	6				**8.2**	**16.7**	1.8	0	0.6	0
Drexel University	502	3	10	3.7	0.1	5.4	0	1.6	0	0	0
University of Florida	923	17	15.1	19.1	0.3	3.7	0	**12.2**	**17.6**	0.2	0
Humboldt State University	No Data	No Data	6.7	32.4	1	No Data	No Data	No Data	No Data	No Data	No Data
Louisiana State University	361	12	32.5	2.7	0.5	**7.5**	**8.3**	3.9	0	0.8	0
Manhattan College	118	10	15.9	15.1	0.4	6.8	0	**15.3**	**30**	0	0
Massachusetts Institute of Technology	645	11	5.4	6.8	0.2	5.6	0	**11.9**	**9.1**	**2.2**	**9.1**
University of Miami	182	3	15.1	19.1	0.3	11.5	0	**29.1**	**33.3**	0.5	0
Michigan Technological University	642	29	14.2	3.3	0.6	1.2	0	0.5	0	0.6	0
Montana Technological at University of Montana	109	20	12.2	14.2	0.8	0	0	0	0	0.9	5
University of	185	1	12.2	14.2	0.8	0	0	4.3	0	0.5	0

Nevada -Reno											
University of New Hampshire	176	4	12.2	14.2	0.8	No Data	No Data	No Data	No Data	No Data	No Data
New Jersey Institute of Technology*	375	2	13.6	13.3	0.2	12.8	0	**13**	**50**	0.8	0
New Mexico Institute of Mining	No Data	No Data	1.9	42.1	9.5	No Data	No Data	No Data	No Data	No Data	No Data
State University of New York - Buffalo	513	8	13.6	13.3	0.2	3.1	0	0.8	0	0	0
North Carolina Agriculture and Technical State University*	191	6	21.6	4.7	1.2	**78**	**71**	2	0	2	3
North Carolina State University-Raleigh	1308	20	21.2	6.1	1	5.9	0	**2.0**	**15**	0.6	0
Northern Arizona University	132	9	3.1	25.3	5	0.8	0	**3.8**	**11.1**	**9.8**	**22.2**
Northwestern University	366	9	14.7	14	0.2	**3.6**	**9.1**	4.1	0	0	0
Ohio State University	913	N/A	11.7	2.2	0.2	3.8	N/A	1.0	N/A	0.7	N/A
University of Oklahoma	355	3	7.6	5.2	7.9	8.7	0	5.9	0	7	0
Old Dominion University	132	3	19.6	4.7	0.3	16.7	0	1.5	0	0	0
Oregon State University	535	15	1.6	8	1.3	0.4	0	3	0	0.9	0
Pennsylvania State University-Harrisburg	No Data	No Data	10	3.7	0.1	No Data	No Data	No Data	No Data	No Data	No Data
Pennsylvania State University – State College	1273	12	10	3.7	0.1	1.3	0	1.6	0	1.0	0
Polytechnic University of Puerto Rico	312	15	No Data	No Data	No Data	0	0	**100**	**100**	0	0
Rennselaer Polytechnic Institute	619	8	15.9	15.1	0.4	4.5	0	6	0	0.5	0
Roger Williams University	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

San Diego State University	257	1	6.7	32.4	1	2.3	0	16.3	0	0.4	0
University. of Southern California	405	10	6.7	32.4	1	5.4	0	**8.6**	**20**	0.5	0
Southern Methodist University	88	6	11.5	32	0.6	0	0	8	0	**10.2**	**33.3**
Stanford University	375	2	6.7	32.4	1	5.6	0	**7.2**	**50**	0.8	0
Stevens Institute of Technology	235	5	13.6	13.3	0.2	5.1	0	9.4	0	0	0
Syracuse University	179	7	15.9	15.1	0.4	2.2	0	3.4	0	0.6	0
Tufts University	219	8	5.4	6.8	0.2	2.7	0	2.3	0	0	0
Tulane University	153	3	32.5	2.7	0	2	0	7.2	0	0	0
US Air Force Academy	298	12	12.2	14.2	0.8	**3.4**	**16.7**	5.7	0	1.7	0
US Military Academy	276	15	12.2	14.2	0.8	7.2	0	7.2	0	0	0
Utah State University	189	5	12.2	14.2	0.8	0	0	**0.5**	**20**	0	0
Wentworth Institute of Technology	28	14	5.4	6.8	0.2	3.6	0	3.6	0	0	0
Wilkes University	No Data	No Data	10	3.7	0.1	No Data	No Data	No Data	No Data	No Data	No Data
University of Wisconsin - Platteville	254	16	12.2	14.2	0.8	0	0	0.8	0	0	0

* = non ABET-accredited

Bold = Chubin et al.[2] article top producer of minority engineers

Bold = doing better than the cohort group in some categories