focus on

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African American, Hispanic, and Native American Women among Bachelors in Physical Sciences and Engineering

Results from 2003–2013 Data of the National Center for Education Statistics

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Despite meaningful growth in the number of African American, Hispanic, and Native American women earning bachelor's degrees in the United States, they continue to be significantly underrepresented in the physical sciences and engineering. The authors of this report recognize that Asian American women, among others, may experience discrimination and bias in STEM fields; however, this report only explores groups that are statistically underrepresented in 16 fields in the physical sciences and engineering.

The number of female bachelor's degree recipients who are African American, Hispanic, and Native American has increased by 65% between 2003 and 2013. Since 2003, there has been a 36% increase in the total number of bachelor's degrees earned in the United States. In 2013, as **Table 1** details, there were 240,987 African American, Hispanic, and Native American women who earned bachelor's degrees. These women remain underrepresented in the physical sciences and engineering.

Table 1

African American, Hispanic, and Native American Women Among Bachelor's Degree Recipients in 2003 and 2013

	Number of Bachelors All Fields		Change '03 –'13
	2003	2013	%
All US Bachelor's Degrees	1,365,694	1,861,034	36
African American, Hispanic, and Native American Women Bachelor's Degrees	146,495	240,987	65

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Participation in Physical Sciences: Exploring Bachelors in Physics, Astronomy, Chemistry, and the Geosciences

In 2013, there were 29,384 degrees earned in all physical science fields. Of those, 1,753 were earned by African American, Hispanic, and Native American women—this is a 54% increase since 2003. **Table 2** shows the total number of degrees earned in each of the physical science fields in the United States and the number of degrees earned by these women

Table 2

Number of African American, Hispanic, and Native American Women Earning Bachelors in Physical Science Fields, 2003 and 2013

	Total Number of Degrees Earned		Degrees Earned by African American, Hispanic, and Native American Women	
	Degrees in 2013 (#)	Change '03–'13 (%)	Degrees in 2013 (#)	Change '03–'13 (%)
Earth Sciences	5,506	64	223	182
Atmospheric Sciences	760	25	19	111
Chemistry	14,886	50	1,307	41
Physics	6,760	59	118	40
Astronomy	413	33	11	-8
Oceanography	247	75	13	333
Other Physical Sciences	812	23	62	138
All Physical Sciences	**29,384**	**53**	**1,753**	**54**

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Other than in astronomy—where there was an 8% drop—more African American, Hispanic, and Native American women earned physical science degrees. In many disciplines, the rate of increase exceeded that for the overall total. In earth sciences, atmospheric sciences,

oceanography, and other physical sciences, the number of degrees earned by these women increased by 100% or more. Combined, the rate of increase in physical science degrees earned by these women was comparable to the overall growth.

Figure 1A-C displays the number of degrees earned by African American, Hispanic, and Native American women each year from 2003 to 2013 for nine physical sciences disciplines.

Figure 1A

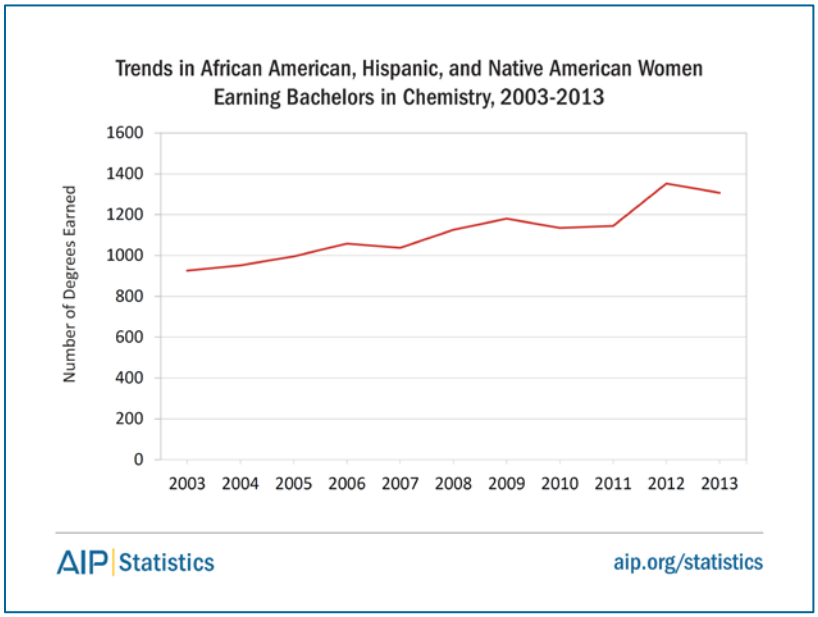


Figure 1B

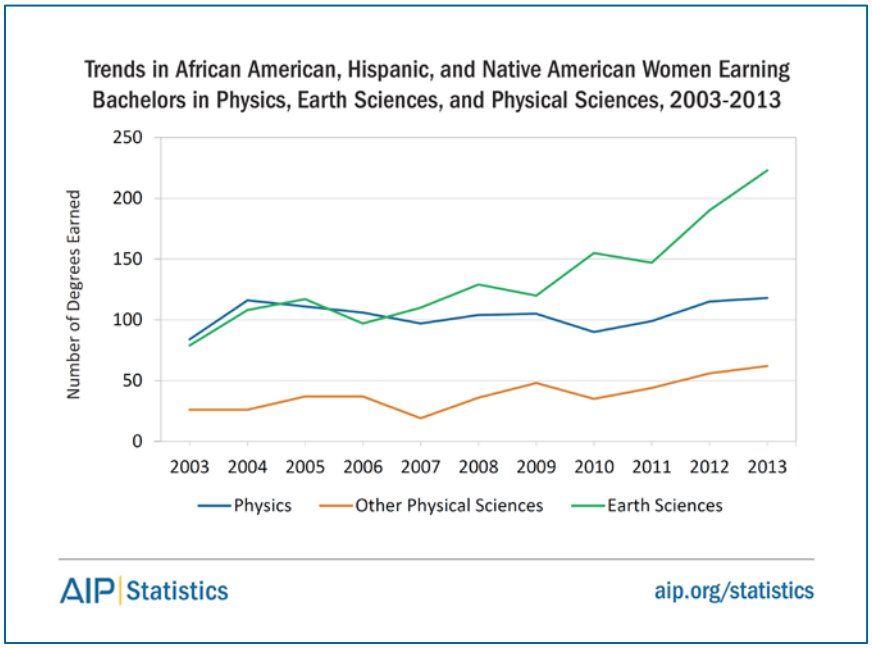
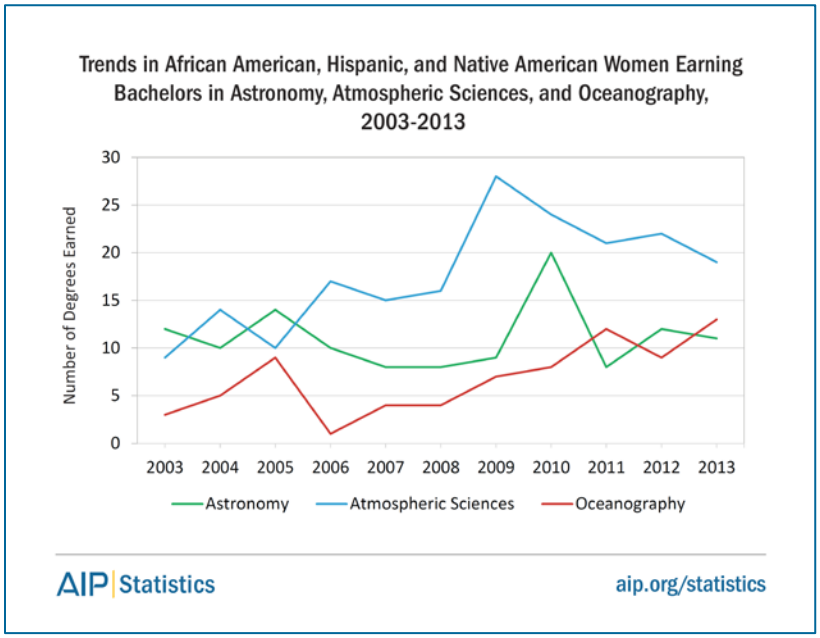


Figure 1C



Some of the year-to-year changes depicted in **Figure 1A-C** appear to be large; however, the low number of degrees earned by women in these fields magnifies small variations.

Participation in Engineering: An In-Depth Look at Engineering Fields

Compared to the 54% increase in the physical science fields, there was only a 15% increase in bachelor's degrees earned by African American, Hispanic, and Native American women in nine engineering fields from 2003 to 2013. As seen in **Table 3**, the number of engineering degrees earned by these women grew at less than half the rate for the overall number of degrees earned in these fields. Civil engineering was the only discipline with a growth rate for African American, Hispanic, and Native American women larger than the overall population.

Table 3

Number of African American, Hispanic, and Native American Women Earning Bachelors in Engineering Fields, 2003 and 2013

	Total Number of Degrees Earned		Degrees Earned by African American, Hispanic, and Native American Women	
	Degrees in 2013 (#)	Change '03–'13 (%)	Degrees in 2013 (#)	Change '03–'13 (%)
Aerospace Engineering	3,571	74	67	68
Chemical Engineering	8,933	61	373	18
Civil Engineering	15,929	69	633	73
Electrical Engineering	18,630	-11	416	-34
Mechanical Engineering	22,443	59	418	45
Materials Engineering	1,465	49	41	28
Industrial Engineering	4,815	22	296	7
Other Engineering	12,805	75	439	60
Engineering Technologies	18,427	17	689	-4
All Engineering Sciences	**107,018**	**33**	**3,372**	**15**

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Figure 2A

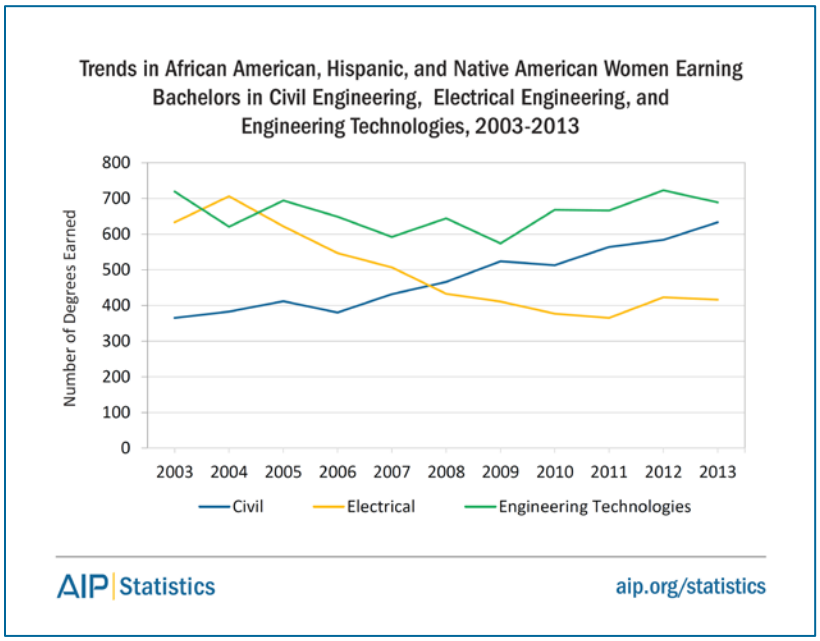


Figure 2B

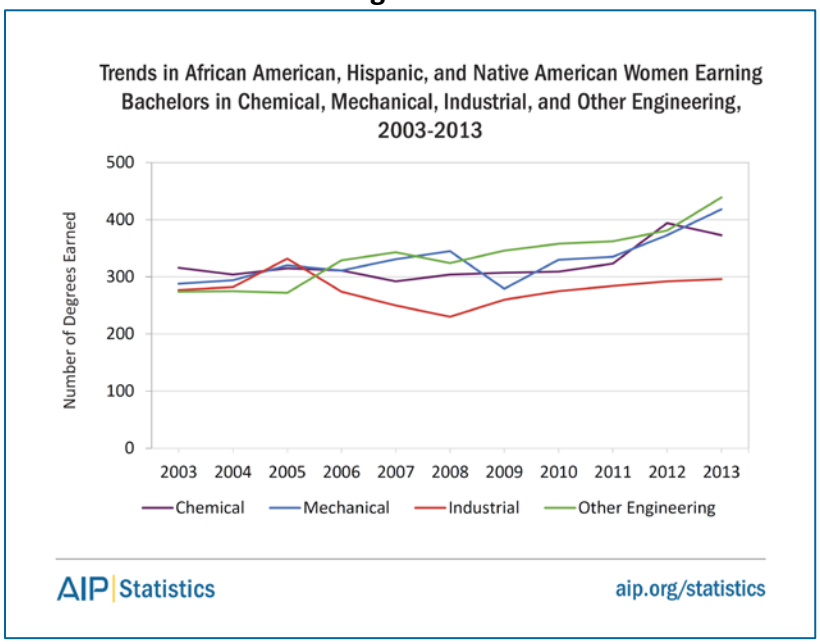
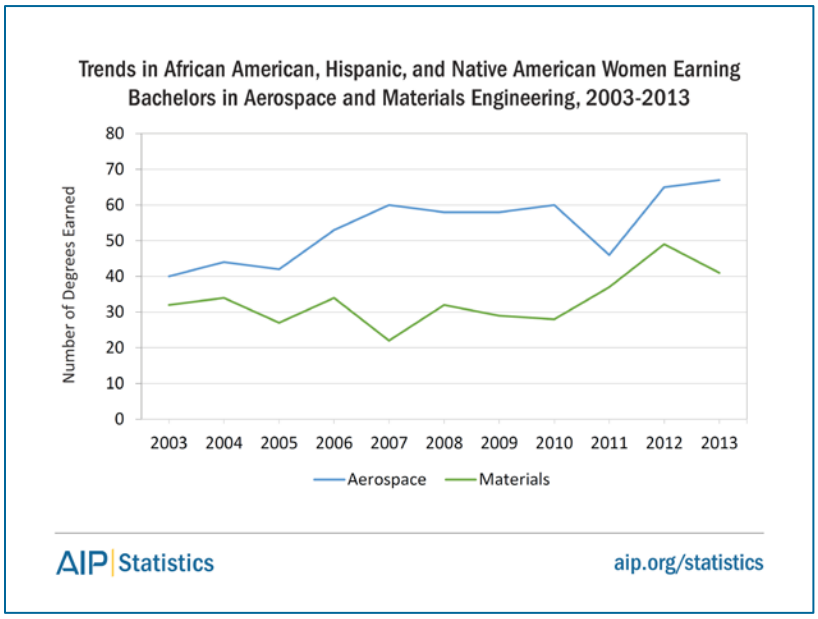


Figure 2C



The most noticeable change among the earned degree trends is electrical engineering, which declined noticeably through the years (**Figure 2A**).

Rates of Bachelor's Degrees Earned: Comparisons of African American, Hispanic, and Native American Women to All US Bachelor's Degree Recipients

African American, Hispanic, and Native American women are not earning degrees in the physical science or selected engineering fields at the same rate as the total recipient population. In no instance that we analyzed did African American, Hispanic, and Native American women earn degrees at a higher rate than the total population. **Table 4** details a comparison of degrees earned by African American, Hispanic, and Native American women and the total US recipient population.

Table 4

Number of Bachelor's Degrees Earned in Physical Sciences and Engineering per 1,000 Degrees: African American, Hispanic, and Native American Women and All US Bachelor's Degree Recipients, 2013

Field of Study	All Degree Recipients	African American, Hispanic, & Native American Women
Astronomy	0.21	0.04
Chemistry	7.60	5.23
Physics	3.45	0.47
Other Physical Sciences	0.41	0.25
Atmospheric Sciences	0.39	0.08
Earth Sciences	2.81	0.89
Oceanography	0.13	0.05

Field of Study	All Degree Recipients	African American, Hispanic, & Native American Women
Aerospace Engineering	1.82	0.27
Chemical Engineering	4.56	1.49
Civil Engineering	8.14	2.53
Electrical Engineering	9.51	1.67
Mechanical Engineering	11.46	1.67
Materials Engineering	0.75	0.16
Industrial Engineering	2.46	1.19
Other Engineering	6.54	1.76
Engineering Technologies	9.41	2.76

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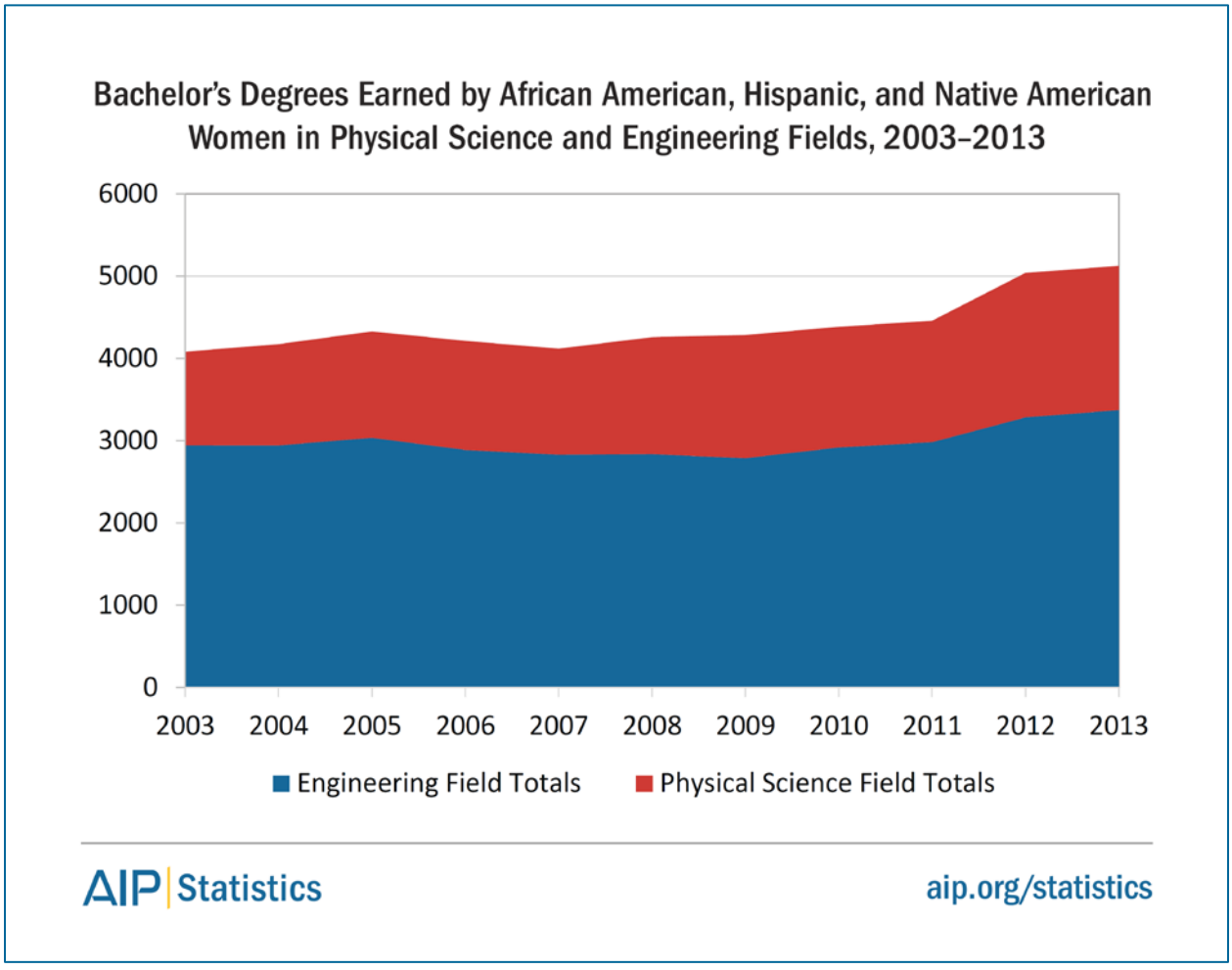
Conclusion

The number of bachelor's degrees earned by African American, Hispanic, and Native American women grew by 65% between 2003 and 2013. This compares favorably to the overall growth in the number of bachelor's degrees awarded during this period (36%). However, the number of degrees earned by African American, Hispanic, and Native American women in physical science and engineering disciplines combined have not grown as much. For physical science fields, the growth in the number of degrees awarded to African American, Hispanic, and Native American women was similar to the overall growth rate in these disciplines (53%). In engineering, the rate of growth in the number of degrees earned by African American, Hispanic, and Native American women (15%) was much lower than the overall growth rate (**Figure 3**). At these rates, African American, Hispanic, and Native American women will continue to be significantly underrepresented in the physical sciences and become even more underrepresented in engineering.

Figure 3



References

US Department of Education, Institute of Education Sciences, National Center of Education Statistics.

Survey Methodology

This focus on contains bachelor's degree data from the Integrated Postsecondary Education Data System (IPEDS). IPEDS collects institution-level data from postsecondary institutions in the United States (50 states and the District of Columbia) and other US jurisdictions using a web-based survey. These data are made publicly available by IPEDS through a partnership with the National Science Foundation. Raw data can be accessed at: https://nces.ed.gov/

Staff members at the American Institute of Physics analyzed IPEDS data on bachelor's degree attainment. Data were downloaded for this study in February of 2015. Percentage change calculations are based on degrees earned in 2003 and 2013. Disciplines were defined based on standardized detailed classifications settings determined using the WebCASPAR search function.

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