

African Americans Among Degree Recipients in Physics and Geoscience

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REPORTS ON MINORITIES IN PHYSICS & GEOSCIENCE

African Americans and Hispanics Among Physics and Astronomy Faculty (Feb 2010)

Native Americans Among Degree Recipients in Physics and Geoscience (Aug 2010)

Hispanic Americans Among Degree Recipients in Physics and Geoscience (Sep 2010)

African Americans Among Degree Recipients in Physics and Geoscience (Oct 2010)

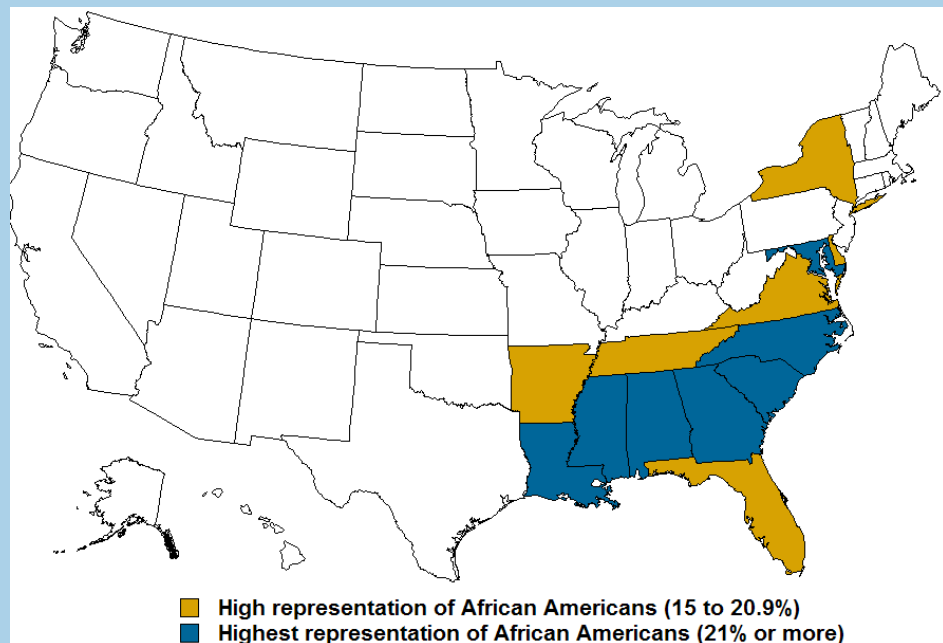
African Americans comprise 12.4% of the U.S. population.

Physics and geoscience consistently rank near the bottom among all disciplines in their ability to attract and retain African American students. Before delving into these trends, it is important to establish a context for discussing the data and their implications.

African Americans comprise 12.4% of the U.S. population, but their representation is highest in the southeast and several Middle Atlantic States. African Americans account for 21% or more of the population in seven states (shaded blue in Figure 1). Another six states (shaded gold in Figure 1) have relatively high representation of African Americans among their population (15.0 to 20.9%).

Figure 1

States with the highest representation of African Americans among their population.



AIP Statistical Research Center compiled data collected by the Census Bureau.

<http://www.aip.org/statistics>

African Americans are likely to attend college near where their families live. Thus, the seven states with the highest representation of African Americans among their population are the seven states with the highest representation of African Americans among their college graduates. In fact, 19% or more of the recent bachelor's degree recipients in these seven states were African American. This is far above the national average of 9.0% in academic year 2007-08.

The six states with the next highest representation of African Americans among their population (15%-20.9%) have the next six highest representation of African Americans among recent college graduates. In five of the six states, African Americans comprise 13-14.5% of bachelor's degree recipients. New York (although the 13th highest among all states) is far behind this pace at only 10.4%.

Table 1

African Americans among bachelor's degree recipients in 2008 and 1998.

	Number of Bachelor's All Fields		Change '98 to '08
	2008	1998	%
All Degree Recipients			
Total	1,579,955	1,198,938	32
Women	906,376	674,036	34
Men	673,579	524,902	28
African Americans			
Total	142,576	95,730	49
Women	93,860	62,190	51
Men	48,716	33,540	45

AIP Statistical Research Center compiled data collected by the NCES.

<http://www.aip.org/statistics>

The number of African American women earning bachelor's degrees increased by 51% over the last decade and the number of African American men increased by 45%.

More than 142,000 African Americans earned bachelor's degrees in academic year 2007-08. This represents a very strong increase of 49% from the 96,000 African Americans who earned bachelor's degrees 10 years earlier (See Table 1). This increase is substantially higher than the overall increase in bachelor's degrees (32%) over the last decade.

Women have earned about 57% of all bachelor's degrees since 1999. This participation rate is even more skewed in the African American community where women earned a remarkable 66% of all bachelor's degrees in 2008 (Table 1).

Table 2

African Americans among bachelor's degree recipients in selected fields in 2008.

Degree Field	African Americans	All Bachelor's	Percent African American
Business & Mgmt	35,495	344,892	10.3
Psychology	10,271	92,966	11.0
Education	8,170	124,846	6.5
Biological Sciences	6,003	82,387	7.3
Engineering	4,568	86,048	5.3
Computer Science	4,011	38,916	10.3
Chemistry	910	11,829	7.7
Mathematics	796	15,840	5.0
Physics	144	4,875	2.9
Geoscience	89	4,313	2.1
Bachelor's across all fields	142,576	1,579,955	9.0

AIP Statistical Research Center compiled data collected by the NCES.

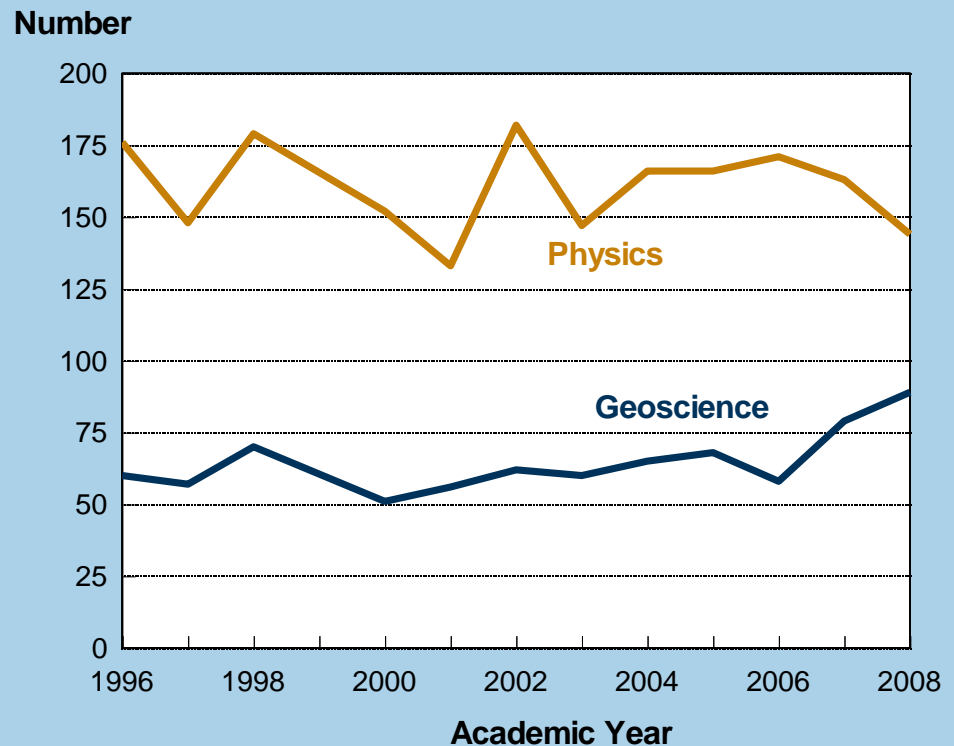
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African Americans earned 9% of all bachelor's degrees, but fewer than 3% of the bachelor's awarded in physics and geoscience.

African Americans earned 9% of all bachelor's degrees in academic year 2007-08. They were more likely than other students to major in psychology, computer science and business, earning 10 to 11% of all bachelor's degrees in those fields. Unfortunately, African Americans were far less likely than other students to major in physics and geoscience, earning a mere 2.9% and 2.1% of the bachelor's degrees awarded in those two disciplines.

Figure 2

Number of African Americans who earned bachelor's degrees in physics and geoscience, 1996 through 2008.



This figure does not include academic year 1999 for which minority data are unavailable.

AIP Statistical Research Center compiled data collected by the NCES.

<http://www.aip.org/statistics>

In 2008, the number of African Americans earning bachelor's degrees in geoscience was the largest number in the last dozen years, while it was the second smallest number in physics.

The long term trends for African Americans in physics and geoscience have begun to go in opposite directions in the last few years.

While the numbers are very small, it is encouraging to note that more African Americans earned bachelor's degrees in geoscience in each of the last 2 years than in any of the preceding 11 academic years.

By contrast, it is disquieting to note that the number of African Americans earning physics bachelor's degrees dropped during the last 2 years. This is especially troubling as the total number of physics bachelor's degrees awarded to all students has increased dramatically over the last decade. Similarly, as indicated in Table 1, the total number of African Americans earning bachelor's across all fields has increased significantly.

Universities that are succeeding

About 760 universities offer a bachelor’s degree in physics in the U.S. The 15 universities listed in Table 3 graduated 37% of all African Americans who earned physics bachelor’s degrees over the last 5 years combined. All but two of these universities are Historically Black Colleges and Universities (HBCUs). The two exceptions are Harvard University and American University.

Of the 760 universities that award physics bachelor’s degrees, about 495 (65%) awarded no physics bachelor’s degrees to an African American and nearly 150 awarded only 1 physics bachelors to an African American over the last 5 years combined.

Historically, HBCUs have played a large role in the number of African Americans earning bachelor’s degrees in physics. Unfortunately, the number of African Americans coming out of HBCU physics departments has been declining. In fact, there has been a drop in the number of HBCUs that have physics degree-granting departments, with a loss of three during the last decade. For a detailed discussion, we recommend reading “Undergraduate physics programs at HBCUs: Can we stop the losses?” authored by Quinton Williams in Physics Today, June 2010, pp 46-48.

Table 3

Universities that awarded the most physics bachelor’s degrees to African Americans during the 5-year period from 2004 through 2008.

American University	Lincoln University (PA)
Benedict College (SC)	Morehouse College
Delaware State University	Norfolk State University
Dillard University	Southern University A&M College
Florida A&M University	Spelman College
Hampton University	Tuskegee University
Harvard University	Xavier University (New Orleans)
Jackson State University	

According to the NCES, each of the universities listed above awarded more than 10 physics bachelor’s degrees to African Americans over the last 5 academic years.

AIP Statistical Research Center compiled data collected by the NCES.

<http://www.aip.org/statistics>

All but two of the top producers of African Americans earning physics bachelor’s are Historically Black Colleges and Universities (HBCUs).

Table 4

Universities that awarded the most geoscience bachelor's degrees to African Americans during the 5-year period from 2004 through 2008.

Jackson State University
Mississippi State University
Pennsylvania State University
Savannah State University

According to the NCES, each of the universities listed above awarded more than 10 geoscience bachelor's degrees to African Americans over the last 5 academic years.

AIP Statistical Research Center compiled data collected by the NCES.

<http://www.aip.org/statistics>

Jackson State University is the only top producer of African Americans in both physics and geoscience.

There are about 460 universities that award bachelor's degrees in geoscience and some of these universities have more than one degree-granting department in geosciences, e.g. geology, atmospheric science and oceanography. The four universities listed in Table 4 are the only ones that awarded more than 10 bachelor's degrees to African Americans in geoscience over the last 5 years combined. Together they account for 19% of all geoscience bachelor's earned by African Americans. Jackson State University is a top producer in both physics and geoscience.

Three of the four top producers of African Americans earning geoscience bachelor's degrees are HBCUs. There are fewer than 10 degree-granting geoscience departments at HBCUs. By contrast, there are more than 30 degree-granting physics departments at HBCUs and, in fact, four of these award physics PhDs.

Over the last 5 years combined, about 300 universities with geoscience degree programs awarded no bachelor's degrees to African Americans and about another 95 awarded only one geoscience bachelor's to an African American.

African Americans among PhDs

During academic year 2005-06, 1,659 African Americans earned PhDs in the US representing 3.6% of all PhDs awarded that year. These numbers are actually down somewhat compared to past trends. Over the last decade, an average of more than 1,700 African Americans have earned PhDs representing slightly more than 4% of all PhDs awarded.

A PhD is an entrée into the world of research. Thus it is no surprise that more than half of recent PhDs (53%) are in STEM fields, compared to only 16% of all bachelor's degrees. STEM fields in this report include natural sciences, engineering and mathematics. However, only a quarter (26%) of all African Americans who earned PhDs in 2006 did so in STEM fields.

Table 5

PhDs awarded across all disciplines by race and ethnicity in 2006.

45,596	All PhDs
26,917	US Citizens
1,659	African Americans
1,560	Asian Americans
1,370	Hispanic Americans

The data on African, Asian and Hispanic Americans include US citizens and people on permanent visas.

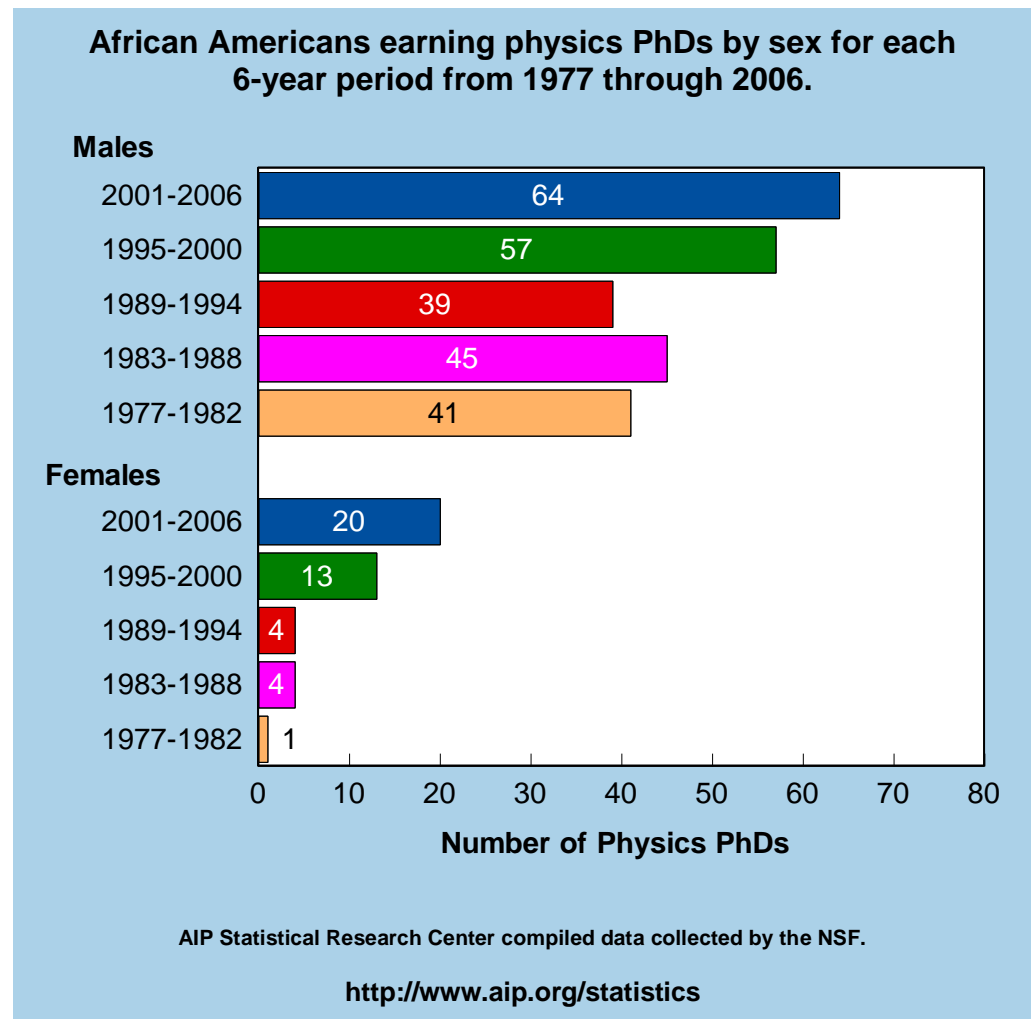
In 2006, 2,732 PhDs did not report their citizenship and, of US citizens who earned PhDs that year, 930 did not report their race or ethnicity.

AIP Statistical Research Center compiled data collected by the NSF.

<http://www.aip.org/statistics>

Over the last decade, an average of more than 1,700 African Americans earned PhDs each year.

Figure 3



Over the last 30 years combined, 246 African American men and 42 African American women earned physics PhDs.

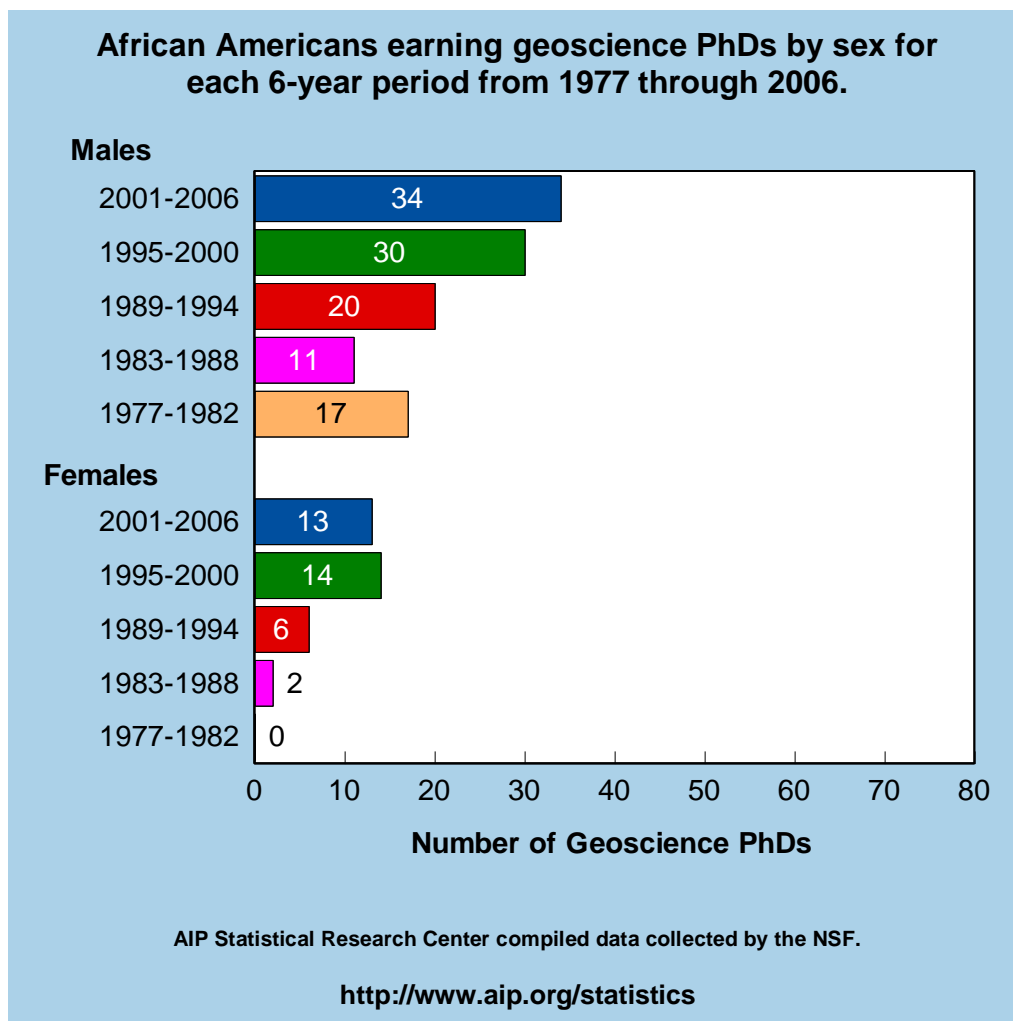
The number of PhDs awarded in physics can be considered a bellwether of the health of the discipline. In academic year 2005-06, 1,365 physics PhDs were awarded in the US, representing a 15% increase since the recent nadir in PhD production 2 years earlier. Of the physics PhDs awarded in 2006, only 12 (less than 1%) were earned by African Americans.

Although the numbers are very small, there has been an increase in the number of African Americans earning physics PhDs when viewed over a 30 year time scale (see Figure 3). During the last 3 decades combined, about 35,400 physics PhDs were awarded in the U.S. Of them, only 288 were earned by African Americans and 30% of the physics PhDs earned by African Americans were in the last 6 years.

The number of PhDs awarded in geoscience has been increasing slowly (13%) over the last 5 years. In academic year 2005-06, 757 geoscience PhDs were awarded in the US. However, only eight of them were earned by African Americans.

Over the last 3 decades, about 22,000 PhDs were awarded in geoscience in the U.S. However, only 147 of those geoscience PhDs were earned by African Americans. Despite these small numbers, there has been noticeable growth in the number of African Americans earning geoscience PhDs when viewed over a 30 year time scale. Of the 147 geoscience PhDs earned by African Americans during the last 3 decades, about one-third were earned in the last 6 years.

Figure 4



Over the last 30 years combined, 112 African American men and 35 African American women earned geoscience PhDs.

Table 6

Number of African Americans who are physics faculty by highest degree awarded by department, 2000, 2004, and 2008.

Highest Degree Awarded By Department	African American			All Faculty Members		
	2008	2004	2000	2008	2004	2000
PhD	66	64	38	5,400	5,400	4,950
Masters	29	29	41	800	900	750
Bachelor's	88	78	62	2,900	2,700	2,550
All Departments	183	171	141	9,100	9,000	8,250

Data collected and compiled by AIP Statistical Research Center.

<http://www.aip.org/statistics>

This report focuses on African Americans among recent degree recipients in physics, geoscience, and across all disciplines. However, the Statistical Research Center has also published data on the representation of minorities among physics faculty in universities and 4-year colleges. Table 6 comes from the **focus on African Americans and Hispanics among Physics & Astronomy Faculty** (February 2010) located at www.aip.org/statistics/minorities.

The number of African Americans who are faculty members at PhD-granting physics departments has increased by about 70% over the last 8 years. Despite this increase, African Americans now comprise only 1.2% of the faculty members at PhD-granting departments. African Americans are far more likely to hold faculty positions in bachelor's-granting physics departments, where they comprise 3% of the faculty.

More than 85% of all physics departments have no African Americans among their faculty members. In fact, more than half of all African Americans (100 out of 183) who have faculty positions in physics departments work at 33 HBCUs (Historically Black Colleges and Universities).

Methodology

The bachelor's data in this **focus on** were all compiled from the Integrated Postsecondary Education Data System (IPEDS). IPEDS is the core postsecondary education data system for the National Center for Education Statistics (NCES) of the U.S. Department of Education. IPEDS is a comprehensive system built around a series of interrelated surveys that collect data on students, faculty members, finances, libraries, etc. These surveys are conducted at the institutional level, that is, one person or office reports data for the entire institution. In the case of the bachelor's data used for this report, someone at the institution provided all of the data by sex, ethnicity and subject of degree. IPEDS is available as an on-line resource. To learn more, see <http://nces.ed.gov/ipeds>

The PhD data in this **focus on** were all compiled from WebCASPAR, the integrated science and engineering resources data system maintained by the National Science Foundation (NSF). WebCASPAR emphasizes PhDs in science and engineering. However, it does include data on non-science and on other degree levels. The data on PhD recipients in WebCASPAR are collected from individuals who report on their own gender and race as well as categorizing the field of their degree. WebCASPAR is an on-line resource. To learn more about this important data resource, see <https://webcaspar.nsf.gov/>

The data on the representation of minorities among physics faculty in universities and 4-year colleges were collected from the Statistical Research Center's Academic Workforce Survey. This is a biennial study during which we contact all 800 physics and astronomy degree granting departments in the country. Findings from this study were published in **focus on African Americans and Hispanics among Physics & Astronomy Faculty** (February 2010), and can be found at <http://www.aip.org/statistics/minorities>

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