

## ACADEMIC INSTITUTIONS OF MINORITY FACULTY WITH S&E DOCTORATES

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Science and engineering (S&E) doctorates awarded by U.S. institutions to minorities (Asians, blacks, Hispanics, and American Indians/Alaska Natives)<sup>1</sup> have been generally increasing in number and percentage over the past couple of decades, but their doctorate numbers and the numbers of minority doctoral S&E faculty remain small, especially in the leading research institutions.<sup>2</sup> This InfoBrief examines the characteristics of minority faculty with S&E doctorates, the types of schools from which they earn their doctorates, the types of schools in which they teach, and how they compare to nonminority faculty.

Blacks, Hispanics, and American Indians, as a group, earned about 2,200 S&E doctorates from U.S. universities in 2003, about 9% of all S&E doctorates (NSF 2004). Blacks earned 835, Hispanics earned 1,336, and American Indians/Alaska Natives earned 75 S&E doctorates in 2003. Asians earned 6,632 S&E doctorates in 2003, about 26% of all S&E doctorates. Of these, 1,030 were awarded to U.S. citizens and 525 to permanent visa holders.

<sup>1</sup> In this report, the racial/ethnic categories are mutually exclusive. The non-Hispanic white, black, Asian and American Indian/Alaska Native categories are referred to here as white, black, Asian, and American Indian/Alaska Native, respectively. Native Hawaiians and other Pacific Islanders and respondents choosing multiple races (excluding those selecting an Hispanic ethnicity) are included in the "other" race/ethnicity category. The faculty data included in this report refer only to U.S. faculty with doctoral degrees in science, engineering, or health fields from U.S. institutions. See Data Notes at the end of this InfoBrief.

<sup>2</sup> Although the number of S&E doctorates awarded to Asians is much larger than the numbers awarded to blacks, Hispanics, and American Indians, most (85%) are to non-U.S. citizens on permanent resident or temporary visas.

Among employed S&E doctorate holders in 2003, higher percentages of blacks (62%) and Hispanics (59%) than of all other racial/ethnic groups (37–49%) were employed in education in 2003 in a variety of settings and appointments. About 49% of white and 37% of Asian S&E doctorate holders in the United States were employed in education (table 1). Differences in field of doctorate account for some of the differences in employment by sector. Black, Hispanic, and American Indian/Alaska Native doctorate holders are more likely than white and Asian doctorate holders to have doctorates in social and behavioral sciences, fields in which academic employment is prevalent (NSF 2003).

### Characteristics of Minority Faculty with S&E Doctorates

Of the approximately 280,000 S&E doctorates employed<sup>3</sup> in educational institutions in 2003, 214,000 were faculty in universities and colleges. Of these, 12% were Asian, 4% black, 3% Hispanic, and less than 1% American Indian/Alaska Native (table 2). Because the fraction of science and engineering doctorates awarded to minorities has increased over time, minorities are a higher percentage of faculty with recent S&E doctorates than they are of all faculty with S&E doctorates. Among faculty who received S&E doctorates in 2000 or later, 16% were Asian, 7% were black, 4% were Hispanic, and less than 1% were American Indian/Alaska Native.

<sup>3</sup> Employment refers to principal employer during the week of October 1, 2003, and includes both full- and part-time employment.



TABLE 1. Employed doctoral scientists and engineers, by race/ethnicity and sector of employment: 2003

Race/ethnicity	All sectors	Education	Self employed, Business or not industry incorporated				Nonprofit	Government
			Number					
All employed doctoral scientists and engineers	593,300	279,550	190,910	36,130	29,650	57,070		
White	457,040	221,440	132,330	32,600	24,330	46,340		
Asian	98,170	35,810	50,300	1,750	3,540	6,770		
Black	17,480	10,780	3,330	530	870	1,980		
Hispanic	15,650	9,190	3,720	820	600	1,320		
American Indian/Alaska Native	3,950	1,920	960	380	230	460		
Other	1,010	410	270	S	S	200		
			Percent distribution					
White	100.0	48.5	29.0	7.1	5.3	10.1		
Asian	100.0	36.5	51.2	1.8	3.6	6.9		
Black	100.0	61.6	19.1	3.0	5.0	11.3		
Hispanic	100.0	58.7	23.8	5.2	3.9	8.4		
American Indian/Alaska Native	100.0	48.6	24.3	9.7	5.8	11.6		
Other	100.0	40.9	27.0	S	S	20.1		

S = suppressed because fewer than 50 weighted cases.

NOTES: Numbers rounded to nearest 10. Detail may not add to total because of rounding. Other race/ethnicity includes Native Hawaiian/other Pacific Islander and multiple race.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients, 2003.

Differences in years since doctorate are likely to account for some of the differences by race/ethnicity in rank and tenure. Smaller percentages of black, Hispanic, and Asian doctoral faculty with S&E doctorates than of white and American Indian/Alaska Native such faculty are full professors and larger percentages are assistant professors. Similarly, smaller percentages of blacks, Hispanics, and Asians than of whites and American Indians/Alaska Natives are tenured.

As is the case with field of doctorate, faculty with S&E doctorates differ by race/ethnicity in field of employment. A higher percentage of black faculty than of all other faculty with S&E doctorates are employed as non-S&E faculty (figure 1). A lower percentage of Asian than of all other faculty with S&E doctorates are employed as social science faculty and a higher percentage are computer science, mathematics, or engineering faculty.

Minority faculty with S&E doctorates also differ in citizenship status and sex. About one-third each of black and Hispanic, 90% of Asian, 10% of white, and 2% of American Indian/Alaska Native S&E doctoral faculty members are non-U.S. born, most of them naturalized citizens (table 2). Higher percentages of black and Hispanic faculty with S&E doctorates are female than is the case for other racial/ethnic groups.

### From What Types of Schools Did They Earn Their Doctorates?

Most (77%) faculty with S&E doctorates employed in U.S. academic institutions earned their doctorates at Research I institutions.<sup>4</sup> Lower percentages of black, Hispanic, and American Indian faculty (69%, 72%, and 68%, respectively) than of white or Asian faculty (77% each) earned their doctorates at Research I institutions and higher percentages earned them at Research II or other types of doctorate-granting institutions (table 3). In particular, a higher percentage of black faculty than of all other groups earned their doctorates at Doctorate-granting I institutions.

The majority of the top 20 (including ties) institutions awarding S&E doctoral degrees to blacks, to Hispanics and to American Indians during 1999–2003 were Research I institutions. About 9% of blacks earned their S&E doctorate at historically black colleges and universities (HBCU). Howard University was the leading S&E doctorate-origin institution of blacks, followed by the University of Michigan and the University of Maryland. For Hispanics, Texas A&M was the leading doctorate-origin institution, followed by the

<sup>4</sup> The classification used here is the 1994 version of the Carnegie Foundation for the Advancement of Teaching's classification of academic institutions. See Data Notes.

TABLE 2. Selected characteristics of faculty with S&amp;E doctorates: 2003

Characteristic	All races/ ethnicities	White	Asian	Black	Hispanic	American Indian/ Alaska Native	Other
All doctoral S&E faculty	214,030	172,390	24,630	8,140	6,930	1,570	360
Year of doctorate							
Pre-1970	19,510	17,070	1,470	310	440	180	S
1970-1974	25,380	22,360	1,680	650	440	200	S
1975-1979	24,730	21,430	1,830	950	360	160	S
1980-1984	26,010	22,130	2,400	670	610	160	S
1985-1989	30,010	23,650	3,660	1,280	1,140	280	S
1990-1994	35,570	26,530	5,730	1,390	1,660	190	S
1995-1999	37,400	28,200	5,370	1,850	1,610	310	70
2000 or later	15,420	11,020	2,510	1,050	680	90	S
Rank							
Professor	94,550	79,800	8,670	2,590	2,530	820	140
Associate professor	58,430	47,200	6,400	2,520	1,980	280	S
Assistant professor	53,250	39,270	8,540	2,690	2,180	430	150
Instructor	7,800	6,120	1,020	350	250	S	S
Tenure status							
No tenure system at institution	7,500	5,860	950	400	260	S	S
No tenure system for position	12,940	10,990	1,090	380	370	100	S
Tenured	130,290	108,340	12,720	4,260	3,800	1,000	170
On tenure track but not tenured	43,510	32,180	6,690	2,400	1,750	390	90
Not on tenure track	19,790	15,010	3,180	700	760	S	S
Faculty occupational field							
Computer and mathematical sciences	21,220	15,470	4,450	630	610	S	S
Biological, agricultural, and other life sciences	46,280	37,530	5,510	1,230	1,550	380	S
Physical and related sciences	27,140	22,820	2,730	490	840	200	S
Social and related sciences	55,350	46,190	3,600	2,780	2,060	600	120
Engineering	19,940	13,950	4,380	820	660	S	S
S&E-related field	21,260	17,440	2,260	890	470	170	S
Non-S&E field	22,840	18,990	1,700	1,300	750	100	S
Citizenship							
U.S. citizen, native	169,290	155,180	2,470	5,540	4,300	1,540	250
U.S. citizen, naturalized	27,520	9,850	14,330	1,590	1,650	S	S
Non-U.S. citizen, permanent resident	12,800	5,620	5,690	740	720	S	S
Non-U.S. citizen, temporary resident	4,420	1,740	2,150	270	250	S	S
Sex							
Female	60,730	48,650	5,830	3,220	2,490	450	100
Male	153,300	123,740	18,810	4,930	4,440	1,120	270

S = suppressed because fewer than 50 weighted cases.

NOTES: Numbers rounded to nearest 10. Detail may not add to total because of rounding. Faculty include full, associate, and assistant professors and instructors. Other race/ethnicity includes Native Hawaiian/other Pacific Islander and multiple race. Faculty in health sciences are included in S&E-related occupations. Non-S&E faculty include faculty in business, management, education, arts and humanities, and other fields.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients, 2003.

University of Texas, Austin, and the University of California, Berkeley. For American Indians, Oklahoma State; University of California, Berkeley; the University of Oklahoma, Norman; and University of Washington, Seattle; were the leading doctorate-origin institutions (NSF 2004).

### Where Are They Employed?

Among faculty with S&E doctorates employed in U.S. academic institutions in 2003, 37% were employed in Research I institutions, 24% were employed in other doctorate-granting institutions or medical schools, and 21% were employed in comprehensive (master's-



granting) institutions (table 4). Black faculty with S&E doctorates differ from other racial/ethnic groups in that a lower percentage were employed in Research I institutions and a higher percentage were employed in comprehensive institutions. Twenty-eight percent of black faculty with S&E doctorates, compared with about one-third of Hispanic and American Indian faculty with S&E doctorates, 37% of white faculty with S&E doctorates, and 41% of Asian faculty with S&E doctorates were employed in Research I institutions.

Faculty with S&E doctorates who earned doctorates at Research I institutions tend to teach at Research I institutions. Relatively small percentages (less than 20%) of those who earned doctorates at Research II institutions or doctorate-granting institutions are employed at Research I institutions. Those who earned doctorates from Research II or doctorate-granting institutions are most likely to teach at comprehensive (master's-granting) institutions (table 5).

Among faculty who received their S&E doctorates from Research I institutions, 35% of black faculty were

employed in Research I institutions compared with 40–47% of faculty of most other racial/ethnic groups. A higher percentage of black faculty (28%) than of most other racial/ethnic groups (21% or less) were employed in comprehensive institutions.

The relative prevalence of black faculty in comprehensive institutions is at least partly attributable to their prevalence in HBCUs (figure 2), most of which are comprehensive institutions. Although HBCUs are the employers of only 2% of all faculty with S&E doctorates, they are the employers of 28% of black doctoral S&E faculty.

**Data Notes**

This InfoBrief draws upon the National Science Foundation's 2003 Survey of Doctorate Recipients (SDR) to describe the characteristics of minority faculty with science, engineering, or health doctorates. The SDR provides data on people who have earned S&E or S&E-related doctorates from U.S. institutions and who are employed in the United States. Thus, the faculty data included in this report refer only to U.S. faculty

TABLE 4. Doctoral S&E faculty, by Carnegie classification of employer: 2003

Carnegie classification of employer	All races/ ethnicities	White	Asian	Black	Hispanic	American Indian/ Alaska Native	Other
	Number						
All institutions	214,030	172,390	24,630	8,140	6,930	1,570	360
Research university I	79,730	64,490	9,980	2,310	2,310	520	130
Research university II	16,740	13,440	2,180	450	420	210	S
Medical schools and medical centers	10,450	7,960	1,530	320	620	S	S
Doctorate granting	24,410	19,530	2,990	880	780	S	S
Comprehensive	44,570	35,720	4,210	2,540	1,610	340	160
Liberal arts	18,310	15,920	1,060	870	430	S	S
2-year institutions	8,030	6,520	690	440	300	S	S
Other	11,790	8,810	2,000	340	470	180	S
	Percent distribution						
All institutions	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Research university I	37.3	37.4	40.5	28.3	33.3	33.0	35.5
Research university II	7.8	7.8	8.9	5.6	6.0	13.3	S
Medical schools and medical centers	4.9	4.6	6.2	3.9	8.9	S	S
Doctorate granting	11.4	11.3	12.1	10.8	11.2	S	S
Comprehensive	20.8	20.7	17.1	31.1	23.2	21.4	44.1
Liberal arts	8.6	9.2	4.3	10.7	6.2	S	S
2-year institutions	3.8	3.8	2.8	5.4	4.4	S	S
Other	5.5	5.1	8.1	4.2	6.7	11.3	S

S = suppressed because fewer than 50 weighted cases.

NOTES: Numbers rounded to nearest 10. Detail may not add to total because of rounding. Faculty include full, associate, and assistant professors and instructors. Other race/ethnicity includes Native Hawaiian/other Pacific Islander and multiple race. The Carnegie classification used here is the 1994 version of the Carnegie Foundation for the Advancement of Teaching's classification of academic institutions. Although the classification variables reflect the early 1990s, the 1994 classification system better describes the different institutional characteristics for S&E than the subsequent 2000 version, which uses more aggregate categories.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients, 2003.

TABLE 5. Faculty with S&amp;E doctorates, by Carnegie classification of the institution from which they earned their doctorate, Carnegie classification of employer, and race/ethnicity: 2003

Race/ethnicity and Carnegie classification of doctorate-granting institution	Carnegie classification of employer								
	All academic employers	Research university I	Research university II	Medical schools and medical centers	Doctorate granting	Comprehensive	Liberal arts	2-year institutions	Other institutions
All institutions	214,030	37.3	7.8	4.9	11.4	20.8	8.6	3.8	5.5
White	172,390	37.4	7.8	4.6	11.3	20.7	9.2	3.8	5.1
Asian	24,630	40.5	8.9	6.2	12.1	17.1	4.3	2.8	8.1
Black	8,140	28.3	5.6	3.9	10.8	31.1	10.7	5.4	4.2
Hispanic	6,930	33.3	6.0	8.9	11.2	23.2	6.2	4.4	6.7
American Indian/Alaska Native	1,570	33.0	13.3	S	S	21.4	S	S	11.3
Other	360	35.5	S	S	S	44.1	S	S	S
Research university I	163,680	43.3	7.6	4.2	10.6	18.4	7.7	2.9	5.2
White	132,880	43.3	7.6	4.2	10.4	18.3	8.4	3.0	4.8
Asian	18,940	46.7	8.7	4.1	11.9	15.8	3.5	1.9	7.4
Black	5,620	34.9	4.8	4.1	10.2	28.4	9.3	4.1	4.3
Hispanic	4,960	40.2	6.1	6.8	11.2	20.8	5.9	3.2	5.8
American Indian/Alaska Native	1,070	47.4	13.1	S	S	19.6	S	S	S
Other	210	52.4	S	S	S	24.5	S	S	S
Research university II	23,350	17.1	13.7	4.3	10.3	32.5	11.0	6.5	4.6
White	18,520	17.5	13.5	3.8	10.4	32.3	11.8	6.9	3.8
Asian	2,580	17.9	17.7	8.8	9.9	26.9	S	S	7.9
Black	1,090	11.3	11.7	S	8.3	45.5	15.0	S	S
Hispanic	850	18.3	8.5	S	7.1	40.1	S	9.9	S
American Indian/Alaska Native	270	S	S	S	S	S	S	S	S
Other	S	S	S	S	S	S	S	S	S
Doctorate granting	20,260	13.8	4.3	5.3	20.1	28.6	13.1	7.7	7.1
White	15,890	13.3	4.2	5.0	20.7	29.3	13.9	7.2	6.4
Asian	2,050	19.4	S	S	19.3	22.0	9.9	8.4	11.4
Black	1,180	14.7	S	S	16.6	31.2	13.3	13.7	S
Hispanic	850	S	S	16.7	16.4	22.2	10.3	S	10.7
American Indian/Alaska Native	190	S	S	S	S	S	S	S	S
Other	S	S	S	S	S	S	S	S	S
Medical schools and medical centers	4,370	34.6	3.0	30.6	7.7	8.0	4.6	S	8.4
White	3,260	36.7	3.8	25.0	8.5	8.8	S	S	8.6
Asian	740	29.2	S	57.0	S	S	S	S	S
Black	170	S	S	S	S	S	S	S	S
Hispanic	190	S	S	35.4	S	S	S	S	S
American Indian/Alaska Native	S	S	S	S	S	S	S	S	S
Other	S	S	S	S	S	S	S	S	S
Other institutions	2,380	23.3	S	4.5	9.1	27.3	10.1	S	20.8
White	1,840	25.5	S	S	S	26.4	12.0	S	19.8
Asian	330	S	S	S	S	S	S	S	S
Black	90	S	S	S	S	S	S	S	S
Hispanic	90	S	S	S	S	S	S	S	S
American Indian/Alaska Native	S	S	S	S	S	S	S	S	S
Other	S	S	S	S	S	S	S	S	S

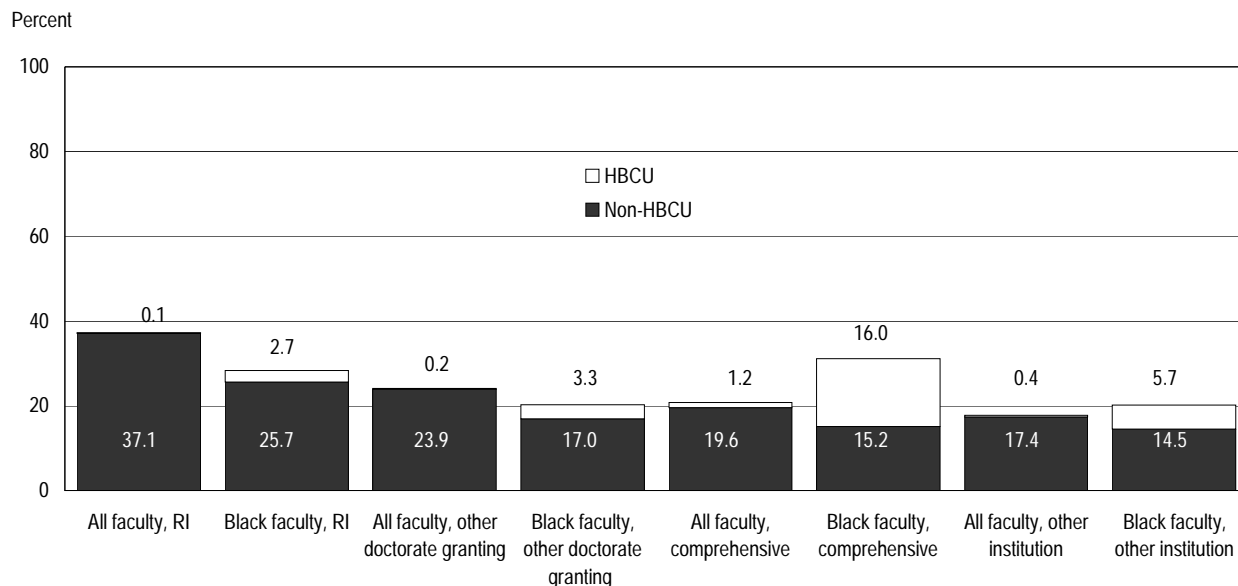
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NOTES: Numbers rounded to nearest 10. Detail may not add to total because of rounding. Faculty include full, associate, and assistant professors and instructors. Other race/ethnicity includes Native Hawaiian/other Pacific Islander and multiple race. The Carnegie classification used here is the 1994 version of the Carnegie Foundation for the Advancement of Teaching's classification of academic institutions.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients, 2003.



FIGURE 2. Faculty and black faculty with S&amp;E doctorates, by Carnegie classification of employer and HBCU status: 2003



HBCU=historically black colleges and universities.  
RI=Research I institution.

NOTES: Faculty include full, associate, and assistant professors and instructors. Other doctorate-granting institutions include medical schools. The Carnegie classification used here is the 1994 version of the Carnegie Foundation for the Advancement of Teaching's classification of academic institutions.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients, 2003.

with doctoral degrees from U.S. institutions. The term *faculty* in this report refers to full, associate, and assistant professors and instructors and includes adjunct faculty.

The Carnegie classification used in this InfoBrief is the 1994 version of the Carnegie Foundation for the Advancement of Teaching's classification of academic institutions. The 1994 classification system, although the data used for classification are from the early 1990s, better describes the different institutional characteristics for S&E than the subsequent 2000 version, which uses more aggregate categories. The 2005 version had not been released when this InfoBrief was written.

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