Limited Progress:
The Status of Hispanic Americans in Science and Engineering

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Persons of Hispanic origin are a heterogeneous population with different cultural backgrounds and educational and labor force characteristics. They are also the fastest growing segment of the U.S. population and are projected to comprise 25% of the U.S. population by the middle of the 21st Century. But, Hispanic Americans lag behind non-Hispanic Americans at all levels of educational achievement and employment participation. And unless the college-going rate of Hispanics in the 18-to-24-year-old age group increases, the educational gap between Hispanic Americans and non-Hispanic Americans will continue to widen.

Since 1970, while Hispanic Americans have made strides in educational attainment, they still have substantial distance to travel before they reach parity with White non-Hispanics in terms of opportunities for preparation of science and engineering careers or for employment and advancement in those careers. This report will trace the accomplishments of Hispanic Americans thus far and provide data to show that progress has been limited with much work remaining before they become full participants in the American science and engineering enterprise.

Population

Hispanic American, Latino, and Hispanic all act as identifiers for people who trace their ancestry to countries in the western hemisphere where the Spanish language is spoken, and for those persons who currently make up the United States' fastest growing population category. A highly diverse group, numbering 31.4 million or 11.5 percent of the U.S. population in July 1999[1], Hispanics comprise several subgroups, with roots in various countries of Central America, including Mexico, Cuba, Puerto Rico, the Dominican Republic, El Salvador, Nicaragua, Guatemala, and Panama, as well as countries in South America.

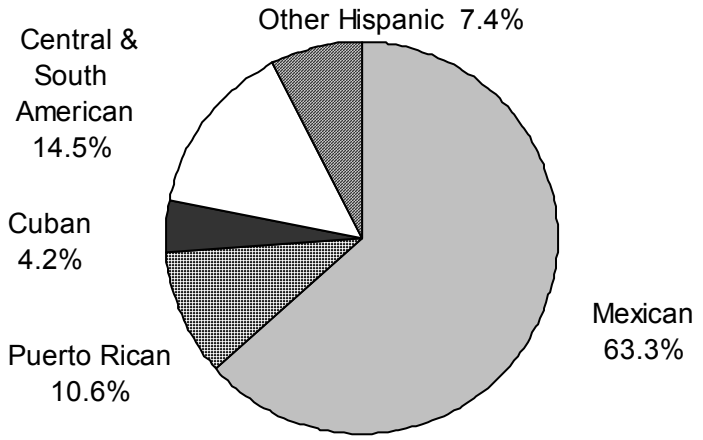
Although Hispanic-origin groups are bound and unified by a shared language, each subgroup's cultures and traditions, while overlapping may occur, are varied and divergent. Primarily Caucasian and Black, Hispanics can be of any race, tending to traditionally identify and align themselves with their group of geographic origin, rather than by race. It is this diverse composition of histories and cultural characteristics that make this group particularly hard for statisticians, policymakers, and others to amalgamate into a tidy population segment. To understand the Hispanic-origin groups as a whole, and their participation and subsequent impact on the science and engineering (S&E) enterprise, it is necessary to acknowledge each group's unique origin and demographic issues.

- The largest subgroup of Hispanic Americans are Mexican in origin, making up in 1997 over 63% of this population segment (see Figure 1) and number approximately 18.8 million.[2] Most reside in the Southwestern states of Texas, California, Arizona, New Mexico, and Colorado. Although often thought of as immigrants, many of these individuals are not immigrants, nor the descendants of immigrants, but were already living on land that had been part of northern Mexico until the end of the

[1] U.S. Census Bureau, Population Division, Population Estimates Program, July 1999.
[2] U.S. Bureau of the Census, Current Population Survey, March 1997.

Mexican War in 1848, when large southwestern sectors were ceded to the United States. Mexicans that continued living in these territories were eventually granted U.S. citizenship.

Figure 1: Hispanic Population in the U.S.



Source: U.S. Census Bureau, August 1998

- Puerto Ricans are the second largest subgroup of Hispanic Americans, representing 10.6% of all Hispanic Americans. The island of Puerto Rico became a U.S. possession in 1898 after four centuries of being a Spanish colony. Puerto Ricans were granted U.S. citizenship in 1917, and Puerto Rico became a commonwealth in 1952. In 1997, about 3.2 million Puerto Ricans lived in the United States, either in Puerto Rico or in the Northeastern states, with large numbers living in New York and New Jersey.

- Cuban Americans number about 1.3 million, constituting the third largest Hispanic American group at 4.2%. The Cuban American community has concentrated itself in Florida, especially in the Miami area. Many Cuban Americans can trace their arrival in the United States to the political upheaval following the Cuban Revolution of 1959 and the ascendancy to power of communist dictator Fidel Castro. These Cuban immigrants, mostly well-educated, were members of the middle and upper middle classes, and had acquired some functional knowledge of English. Later immigrants from Cuba were not so well-prepared educationally, and thus have not prospered as well either economically or politically.

- Since the 1970s, several civil wars, along with an economic turmoil in Latin American countries have brought substantial numbers of immigrants seeking economic betterment and safe harbor from political prosecution to the United States. This includes 800,000 Nicaraguans who fled a civil war in their native land, in addition to an influx of Dominicans looking to find jobs and avoid political unrest. Many such immigrants settled in cities and states with major metropolitan centers such as Washington, DC; New York City; and Los Angeles, California.

During the decade of the 1980s, the Hispanic population grew over seven times as fast as the rest of the American population. As a result, in a single decade, Hispanics increased their proportion of the U.S. population from 6.4% to 9%. This tremendous growth was the result of primarily two factors: a higher birth rate than the rest of the population and substantial immigration from Mexico, Central America, the Caribbean, and South America. This growth rate is expected to continue so that by 2050, Hispanic

Americans are projected by the U.S. Census Bureau to comprise 97 million persons, making this segment of the population the nation's largest minority group (Table 1)[3].

Table 1. U.S. Population Growth, 1998-2050

Population (millions)							
Population Group	**1998**	**2000**	**2010**	**2030**	**2050**	**% of Total Population**	**Growth 1998-2050**
Hispanic	30	31	41	66	97	24.6	223.3%
White	223	226	240	269	295	74.9	32.3%
Total U.S. Population	270	275	298	347	394	100	45.9%

Source: U.S. Department of Commerce, Bureau of the Census, P25-1130, 1999

School-Age Population

In 1995, Hispanic Americans comprised 13% of the school-age population ages 5 to 24. However, that proportion is projected to reach nearly 30%, up 222% by the middle of the 21st century. The number of whites ages 5-24 is projected to grow only 27% so that by 2050, their proportion of the school-age population ages 5-24 will drop to 71% from nearly 80% in 1995 (Table 2).[4]

Table 2. Projected Growth in School-Age Population, 1995-2050

School Age Population, Ages 5-24 (in thousands)						
Population Group	**1995**	**2000**	**2010**	**2030**	**2050**	**Growth 1995-2050**
Hispanic	9,706	11,509	14,167	22,111	31,300	222.00%
White	58,950	61,518	63,527	67,878	74,909	27.00%
Total U.S. Population	74,077	78,053	82,635	92,203	105,346	42.00%

Source: U.S. Department of Commerce, Bureau of the Census, 1998

The traditional pool from which our scientists and engineers have been drawn will change dramatically. The number of whites in the traditional school age group is declining, while the number of Hispanics is growing rapidly. Are we as a nation prepared to encourage these students to pursue science-based careers?

Median Age

The Hispanic population is "younger" than the non-Hispanic white population. Data from the Census Bureau show that 30.3% of Hispanics were less than 15 years old, compared with 21.3% of non-Hispanic whites in 1997. Conversely, about twice as many non-Hispanic whites were 55 years old and over, compared with Hispanics (21.3% and 10.6% respectively). The median age of the Hispanic population in 1999 based on estimates from the Census Bureau was 26.9 – about 11 years less than that of non-Hispanic whites (Table 3).[5]

[3] U.S. Bureau of the Census, Population Division, Population Estimates Program, 1999.
[4] U.S. Bureau of the Census, "Educational Attainment in the United States, March 1998 (Update)."
[5] U.S. Bureau of the Census, Pub No. P-25-1139, 1999.

Table 3. Median Age of U.S. Population, July 1999*

Group	Age
Total U.S. Population	35.7
Male	34.5
Female	36.9
Hispanic	26.9
Male	26.4
Female	27.4
White, Non-Hispanic	38
Male	36.9
Female	39.2

* Based on projections by the U.S. Bureau of the Census (Pub No. P-25-1139).

Since the most childbearing years tend to be in the twenties, it is clear why the U.S. Hispanic population continues to increase faster than other population groups.

Education Attainment

Despite significant progress, the educational attainment of Hispanic Americans is well below that of the rest of the population. One of the most notable improvements in educational attainment has been the drop in the proportion of Hispanics with very little formal education. The proportion of Hispanics ages 25 and over with less than a 5th grade education dropped from 12.3% in 1990 to 9.3% in 1998. Despite this progress, the proportion of Hispanics in 1998 with less than a 5th grade education is six times larger than that of whites (1.5%).

While the proportion of Hispanics 25 years and over with at least a high school diploma reached 55.4% in 1998, they still have a long way to go before they approach the proportion achieved by whites – 83.6% (Table 4).[6]

Table 4. Educational Attainment in 1998 for Population Age 25 and Over

	Percent Completed					
Population Group	**None to 4th Grade**	**5th to 8th Grade**	**9th to 12th Grade (No Diploma)**	**High School Graduate**	**Some College or Assoc. Degree**	**BA/BS or More**
Hispanic	9.3	19.3	15.9	26.8	17.6	11
Men	9.3	18.8	16.2	27.2	17.4	11.1
Women	9.2	25.8	15.7	26.4	17.9	10.9
White	1.5	5.7	9	33.9	24.8	25
Men	1.6	5.7	9	32	24.1	27.3
Women	1.5	5.7	9	36.6	25.4	22.8

Source: U.S. Department of Commerce, Bureau of the Census, 1998.

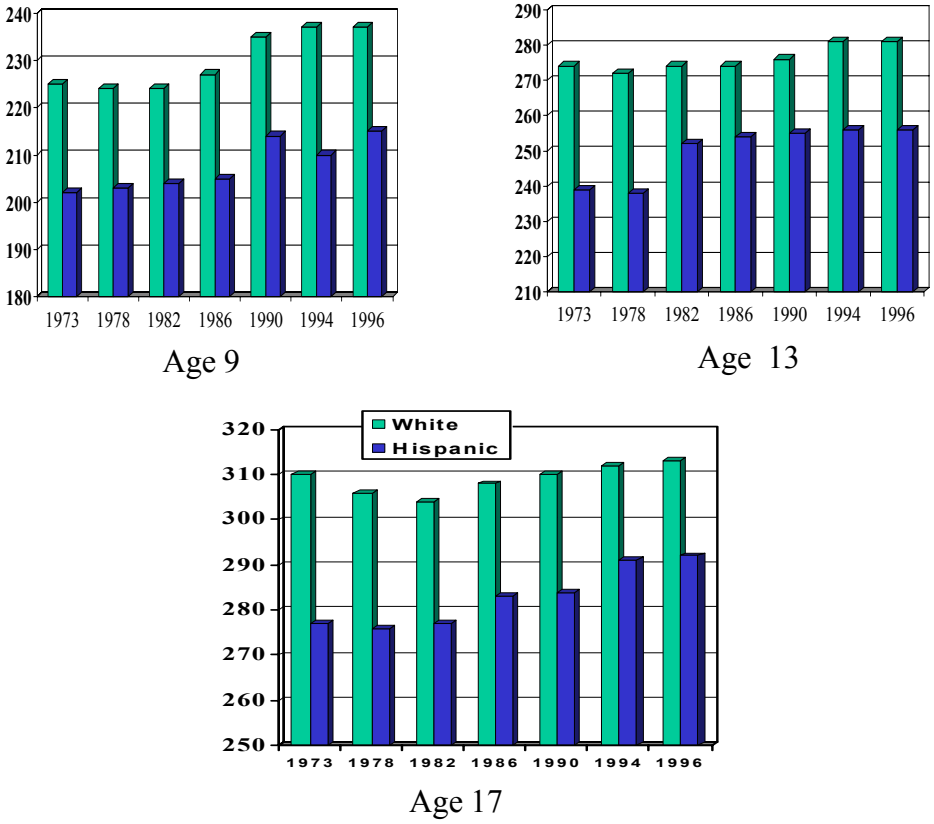
But, progress is occurring, and more Hispanics are advancing educationally.

[6] U.S. Bureau of the Census, "Educational Attainment in the United States: March 1998 (Update)."

Pre-College

Since 1973, the National Assessment of Educational Progress (NAEP) has been measuring the proficiency of 9-, 13- and 17-year old students in mathematics and science, among other subjects. Competence in both mathematics and science is an important outcome of education in an increasingly technological world. Knowledge of mathematics and the ability to apply scientific information is critical for success in scientific and engineering occupations. Between 1973 and 1996, mathematics proficiency scores improved 6.4% for Hispanic 9-year-olds, compared to a 5.3% improvement for white 9-year-olds. For 13-year-old Hispanic youth, mathematics proficiency rose 7.1% compared to only a 2.6% increase for white 13-year-olds. And among Hispanic 17-year-olds, scores increased 5.4% compared to less than a 1% rise for white young people (Figure 2). Nonetheless, Hispanic students regularly scored lower than their white counterparts during the past two decades on the mathematics achievement tests.

Figure 2. Trends in Mathematics Proficiency Scores by Race and Age, 1973-1996

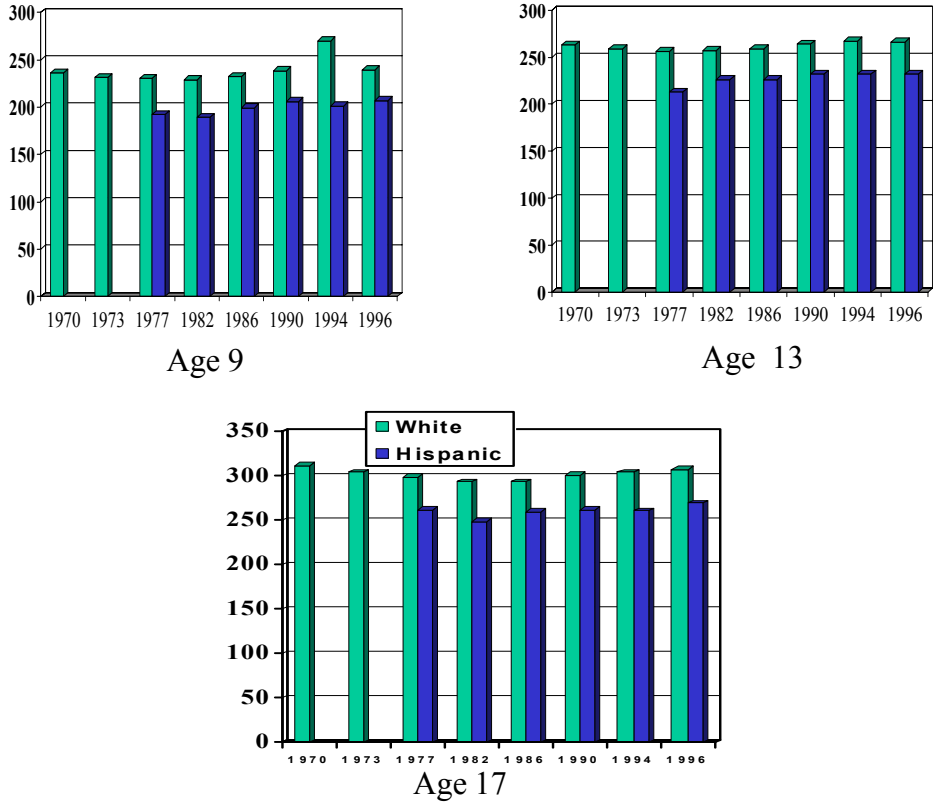


Source: U.S. Dept. Of Educ., NAEP, 1997.

In science, regardless of age group, Hispanic students score lower than do white students, but there has been some improvement. Hispanic 9-year-olds showed twice as much improvement in science achievement between 1977 and 1996 as did white students (7.8% vs. 3.9% respectively). An even greater improvement was achieved by 13-year-old Hispanics who raised their science proficiency 8.9%, compared to an increase of 3.8% for white students. However, 17-year-old Hispanic students fell further

behind in the 1973 to 1996 period (Figure 3). Average science proficiency scores rose only 2.6% for Hispanics, compared to 3.0% for whites. So, a racial gap in math and science scores remains.

Figure 3. Trends in Science Proficiency Scores by Race and Age, 1973-1996



Source: U.S. Dept. Of Educ., NAEP, 1997.

While the SAT verbal scores for all racial groups posted one-year increases from 1998 to 1999, the math average score for the 1.2 million graduates in the Class of '99 fell one point overall from 1998 to 1999, with all racial/ethnic groups dropping, except for whites, whose scores held steady. Over the 1989-1999 decade, average verbal and math scores rose for all but two racial/ethnic groups – Mexican Americans and Hispanic/Latinos. This is not an encouraging situation as we enter the 21st century, with Mexican Americans and Latinos already 74 and 64 points respectively below the average verbal score for whites and 72 and 64 points respectively below the average math score for whites.[7]

Undergraduates

The number of Hispanics enrolled as undergraduates increased nearly 160%, growing from 433,100 in 1980 to 1,125,900 in 1996. This compares with a rate of growth of only 3.6% for whites (from 8,480,780 to 8,783,900). However, by 1997, Hispanics still represented only 9.0% of total undergraduate enrollment, compared to nearly 71% for whites (Table 5).

[7] The College Board, *College-Bound Students, 1999*, Table 4.

Table 5. Undergraduate Enrollment Trends Among Hispanics and Whites
(in thousands)

	1980	1990	1993	1994	1995	1996	1997
Total	10,469.1	11,959.1	12,324.0	12,262.6	12,231.7	12,259.4	12,450.6
Men	4,997.4	5,379.8	5,483.7	5,422.1	5,401.1	5,411.1	5,468.5
Women	5,471.7	6,579.3	6,840.3	6,840.5	6,830.6	6,848.4	6,982.1
Hispanic							
Total	433.1	724.6	918.1	968.3	1,012.0	1,065.6	1,125.9
Men	211.2	326.9	409.2	429.4	444.2	464.0	486.7
Women	221.8	397.6	508.9	538.9	567.8	601.6	639.3
White							
Total	8,480.7	9,272.6	9,100.4	8,916.0	8,805.6	8,730.9	8,783.9
Men	4,054.9	4,184.4	4,067.0	3,963.1	3,918.1	3,890.7	3,899.3
Women	4,425.8	5,088.2	5,033.4	4,953.0	4,887.5	4,840.2	4,884.6
Percentage Distribution							
Hispanic							
Total	4.1	6.1	7.4	7.9	8.3	8.7	9.0
Men	4.2	6.1	7.5	7.9	8.2	8.6	8.9
Women	4.1	6.0	7.4	7.9	8.3	8.8	9.2
White							
Total	81.0	77.5	73.8	72.7	72.0	71.2	70.6
Men	81.1	77.8	74.2	73.1	72.5	71.9	71.3
Women	80.9	77.3	73.6	72.4	71.6	70.7	70.0

Source: U.S. Department of Education, *Digest of Education Statistics: 1998* and *Fall Enrollment Survey 1997*.

Hispanic women continued to enroll in greater numbers in undergraduate programs than did Hispanic men, outnumbering them 4,884,600 to 3,899,300. As a result, Hispanic women increased their proportional advantage over Hispanic men in their pursuit of higher education.

In 1996, Hispanics earned only 6.2% or 71,015 out of a total of 1,142,028 baccalaureates awarded that year to U.S. residents and permanent residents. However, that was an increase of nearly 72% from the 41,361 they earned only seven years earlier in 1989. During that 7-year period, the number of degrees earned by white, non-Hispanics rose by only 5.2% - from 840,326 to 884,128 (Table 6).[8]

And there is reason for optimism for the participation of Hispanics in science and engineering. While their representation among the science and engineering baccalaureate population was about the same as among all baccalaureates in 1996 – earning 6.1% of the baccalaureates in science and engineering – they made significant progress over the 1989-1996 period. They increased their production of baccalaureates in science and engineering by 78.5% compared to only a 10.6% growth rate for white, non-Hispanics.

By specific discipline, Hispanics again outpaced whites. In the natural sciences, Hispanics increased the number of degrees earned at a rate more than three times as fast as did whites – 53% compared to only about a 17% gain for whites. In engineering, the total number of bachelor's degrees dropped 5.8% between 1989 and 1996, with whites experiencing a decline of nearly 14%, compared to a

[8] National Science Foundation, *Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1989-96,* March 1999.

Table 6. Earned Bachelor's degrees by Field and Selected Ethnicity, 1989-1996

Field	1989	1990	1991	1992	1993	1994	1995	1996
U.S. Citizens and Permanent Residents, Total								
Total S&E	325,108	333,475	344,061	364,695	374,633	381,451	385,055	391,074
Engineering	61,875	59,786	57,604	57,675	58,165	58,422	58,520	58,304
Sciences	263,233	273,689	286,457	307,020	316,468	323,029	326,535	332,770
Natural sciences	104,928	100,908	101,039	106,739	111,656	117,843	124,297	131,065
Physical science [1]	16,724	15,608	15,799	16,469	16,927	17,812	18,652	19,167
Math. science	14,771	14,150	14,206	14,259	14,318	13,869	13,166	12,643
Computer science	28,828	25,629	23,373	22,880	22,273	22,185	22,367	22,225
Biological science	36,076	37,173	39,288	42,842	46,660	51,058	55,523	60,633
Agricultural science	8,529	8,348	8,373	10,289	11,478	12,919	14,589	16,397
Social sciences	158,305	172,781	185,418	200,281	204,812	205,186	202,238	201,705
Social science	109,862	119,288	127,216	136,902	138,391	136,273	130,579	128,893
Psychology	48,443	53,493	58,202	63,379	66,421	68,913	71,659	72,812
Non-S&E [2]	678,606	702,123	734,279	756,830	772,274	767,463	752,369	750,954
Grand total	1,003,714	1,035,598	1,078,340	1,121,525	1,146,907	1,148,914	1,137,424	1,142,028
White, non-Hispanics								
Total S&E	266,862	270,225	278,190	292,614	297,171	297,616	294,773	295,082
Engineering	50,081	47,494	45,162	45,026	44,853	44,687	43,726	43,098
Sciences	216,781	222,731	233,028	247,588	252,318	252,929	251,047	251,984
Natural sciences	84,578	80,210	80,111	84,133	87,401	91,196	94,575	98,707
Physical science [1]	14,238	13,055	13,145	13,678	13,941	14,616	14,952	15,088
Math. science	12,287	11,765	11,649	11,723	11,669	11,089	10,343	9,823
Computer science	21,711	18,918	17,349	16,844	16,155	15,816	15,532	15,470
Biological science	28,404	28,814	30,264	32,506	35,080	37,942	40,628	43,680
Agricultural science	7,938	7,658	7,704	9,382	10,556	11,733	13,120	14,646
Social sciences	132,203	142,521	152,917	163,455	164,917	161,733	156,472	153,277
Social science	91,697	98,385	104,783	111,389	111,154	106,863	100,558	97,372
Psychology	40,506	44,136	48,134	52,066	53,763	54,870	55,914	55,905
Non-S&E [2]	573,464	586,461	614,173	628,839	634,432	620,508	598,012	589,046
Grand total	840,326	856,686	892,363	921,453	931,603	918,124	892,785	884,128
Hispanics								
Total S&E	13,327	13,918	15,351	17,391	18,442	20,529	22,190	23,791
Engineering	2,561	2,511	2,566	2,733	2,961	3,143	3,651	3,731
Sciences	10,766	11,407	12,785	14,658	15,481	17,386	18,539	20,060
Natural sciences	4,417	4,357	4,705	4,892	5,034	5,648	6,119	6,764
Physical science [1]	563	522	533	546	599	733	800	872
Math. science	373	413	480	482	470	543	536	585
Computer science	1,195	1,085	1,215	1,173	1,096	1,135	1,307	1,280
Biological science	2,090	2,119	2,264	2,477	2,652	2,901	3,090	3,521
Agricultural science	196	218	213	214	217	336	386	506
Social sciences	6,349	7,050	8,080	9,766	10,447	11,738	12,420	13,296
Social science	4,197	4,645	5,334	6,519	6,860	7,748	7,877	8,260
Psychology	2,152	2,405	2,746	3,247	3,587	3,990	4,543	5,036
Non-S&E [2]	28,034	29,946	33,676	35,616	39,403	42,154	44,501	47,224
Grand total	41,361	43,864	49,027	53,007	57,845	62,683	66,691	71,015

[1] "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, and chemistry.

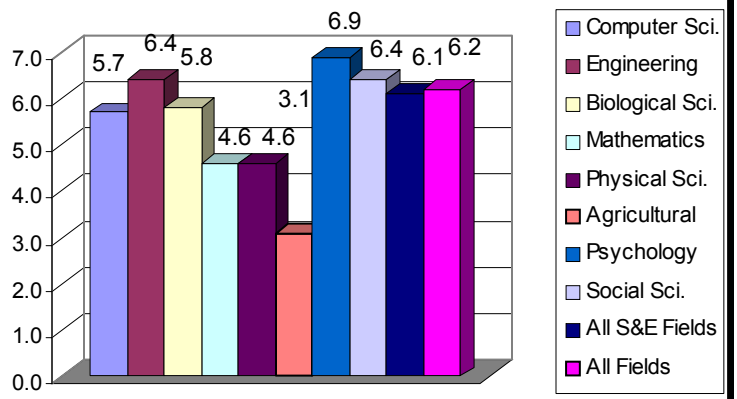
[2] Non-S&E refers to non-science and non-engineering.

Source: Tabulations by National Science Foundation; data from Department of Education, National Center for Education Statistics, IPEDS Completions Survey, 1989-1996

growth of 46% for Hispanics. But Hispanics still only earned 3,731 (6.4%) bachelor's degrees in engineering in 1996 out of a total pool of 58,304 (Table 6)[9].

By individual science and engineering field in 1996, the proportion of baccalaureates earned by Hispanics ranged from a high of 6.9% in psychology to a low of 3.1% in the agricultural sciences, with most of their share by discipline ranging around 5.7% to 6.5%, with the exception of mathematics and physical science which was 4.6% (Figure 4).

Figure 4. Hispanics as Percent of Total S&E Baccalaureates (U.S. Citizens & Permanent Residents), 1996



Source: National Science Foundation

Hispanic women earned a higher proportion of bachelor's degrees in comparison to their male counterparts, earning nearly three out of every five baccalaureates awarded in all fields in 1996. In science and engineering, while Hispanic women earned over half (51.3%) of all bachelor's degrees granted to Hispanics in 1996, they were more heavily concentrated in the social sciences, earning 61% of the bachelor's degrees awarded. In engineering, they earned only 22.4% (834) of the 3,731 baccalaureates granted to Hispanics. But they are approaching parity in the natural sciences, earning 48% of the 5,764 bachelor's degrees awarded to Hispanics in 1996.

Hispanics tend to go to institutions in regions of the country where they are most concentrated, including California, Texas and Puerto Rico. This is shown by the top institutions conferring bachelor's degrees to Hispanic Americans in selected fields of science and engineering (Table 7). The role that institutions in Puerto Rico play in providing higher education to Hispanics appears to be lessening. In 1996, only 15.2% of Hispanics earned their science and engineering baccalaureates from institutions in Puerto Rico and that percentage has been declining every year since 1989, when 22.9% of Hispanics earned their science and engineering baccalaureates from institutions in Puerto Rico. However, institutions in Puerto Rico still play a major part in awarding bachelor's degrees in some fields, particularly engineering. In 1996, nearly one-quarter (24.5%) of all engineering degrees earned by Hispanics were conferred by institutions in Puerto Rico.[10]

[9] National Science Foundation, *Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1989-96*, March 1999.

[10] National Science Foundation, *Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1989-96*, March 1999.

Table 7. Top Three Institutions Conferring Bachelor's Degrees to Hispanic Americans, Selected Fields, 1996

Field	Institution	Degrees Conferred
Total S&E	University of Puerto Rico, Mayaguez Campus	1,200
	University of Puerto Rico, Rio Piedras Campus	742
	Florida International University	703
Engineering	University of Puerto Rico, Mayaguez Campus	611
	Universidad Politecnica de Puerto Rico	288
	Florida International University	113
Physical Sciences	University of Puerto Rico, Mayaguez Campus	74
	University of Puerto Rico, Humacao Univ. College	50
	Inter American Univ of Puerto Rico Arecibo Campus	37
Mathematics and Statistics	University of Texas - Pan American	28
	University of Texas at Austin	18
	CUNY York College	17
Computer Science	Florida International University	59
	Inter American U of Puerto Rico San German Campus	40
	University of Puerto Rico, Rio Piedras Campus	35
	CUNY Bernard M. Baruch College	35
Life Sciences	University of Puerto Rico, Mayaguez Campus	325
	University of Puerto Rico, Medical Sciences Campus	272
	The Pontificial Catholic University of Puerto Rico	244
Social Sciences	University of California - Los Angeles	364
	University of California - Berkeley	231
	University of Puerto Rico, Rio Piedras Campus	223
Psychology	Florida International University	198
	University of Puerto Rico, Rio Piedras Campus	145
	CUNY Hunter College	96

Source: National Science Foundation WebCASPAR Database System.

The Graduate Years

Graduate enrollment continued on an upward pace from 1982 through 1993, then declined 3.7% from 1994 through 1998 for all U.S. citizens and permanent residents. Hispanics went against the overall trend and increased their numbers in graduate school just as they had at the undergraduate level, but at a much slower pace. In 1993, Hispanics were 4% of the graduate school population in science and engineering and increased their proportion by another percentage point in the ensuing five years reaching 5.0% by 1998, although their numbers in graduate education in science and engineering grew by 18.2% from 15,967 to 18,879 (Table 8). However, they made more progress in some fields than others.

Table 8. Graduate Enrollment of Hispanics Compared with Total Enrollment of U.S. Citizens and Permanent Residents, 1982-1998

Year	Engineering	Physical Sciences	Math. Sciences	Computer Sciences	Life Sciences	Psychology	Social Sciences	Totals
1982	1,095	496	290	249	1,921	1,471	2,914	8,627
Total	58,629	21,272	12,631	15,439	90,740	38,679	63,954	314,501
1983	1,441	563	330	285	2,555	1,814	3,021	10,233
Total	63,626	21,829	12,405	17,880	89,738	39,472	58,670	317,226
1984	1,491	535	292	293	2,462	1,903	2,810	10,047
Total	64,809	22,051	12,251	19,266	91,035	39,544	56,964	319,648
1985	1,481	599	262	488	2,780	1,611	2,679	10,138
Total	67,169	22,040	12,218	22,272	90,978	39,229	56,621	324,081
1986	1,602	629	270	453	2,769	1,707	2,508	10,175
Total	69,929	22,218	12,139	23,291	91,756	39,739	56,186	328,254
1987	1,730	591	266	551	2,963	1,665	2,540	10,533
Total	70,576	22,099	12,379	23,274	91,087	41,073	56,696	329,365
1988	1,719	624	328	516	3,172	1,722	2,585	10,876
Total	67,603	21,890	12,652	23,243	91,785	42,316	56,417	327,365
1989	1,707	680	305	542	3,267	1,751	2,745	11,206
Total	67,346	21,843	12,564	22,788	94,252	43,897	58,830	332,588
1990	1,886	642	351	565	3,347	2,160	2,822	12,014
Total	69,426	21,609	13,210	23,351	97,393	46,349	62,461	345,108
1991	2,124	649	349	631	3,661	2,365	3,024	13,053
Total	72,233	21,985	13,318	22,988	101,590	49,355	65,021	358,073
1992	2,463	680	376	706	4,117	2,371	3,604	14,625
Total	76,595	22,543	13,878	24,163	108,529	51,551	70,102	379,704
1993	2,694	747	415	696	4,628	2,562	3,939	16,052
Total	77,591	23,066	13,866	24,269	116,249	52,676	73,603	394,115
1994	2,861	675	369	633	4,600	2,485	4,000	15,967
Total	76,039	22,740	13,516	23,064	123,263	52,211	74,375	397,984
1995	2,808	732	400	664	5,258	2,799	4,237	17,264
Total	71,732	21,992	12,700	22,638	128,619	51,554	74,745	396,838
1996	2,935	743	425	701	5,410	3,002	4,237	17,834
Total	68,194	21,159	12,254	22,737	129,623	51,236	73,512	391,228
1997	2,811	784	427	723	5,530	3,098	4,371	18,151
Total	64,563	20,194	11,185	23,088	129,845	51,198	71,309	383,510
1998	2,912	831	454	754	5,724	3,315	4,499	18,879
Total	62,242	19,812	11,048	23,693	130,246	50,861	68,941	378,705

SOURCE: NSF WebCASPAR Database System, 1999.

In the physical sciences, total enrollment of U.S. citizens and permanent residents declined by about 13%, but enrollment of Hispanics in graduate programs in the physical sciences increased by 23% (from 675 to 831). Despite this gain, Hispanics still are only 4.2% of total graduate enrollments in the physical sciences.

In the life sciences, the enrollment of Hispanics increased at a rate over four times as fast as the overall growth. Total graduate enrollment in the life sciences increased 5.7%, compared to a increase of 24.4% for Hispanics. However, Hispanics are still only 4.4% of total enrollment in the life sciences at the graduate level.

In computer sciences, while graduate enrollment for all U.S. citizens and permanent residents rose about 2.7%, enrollment of Hispanics increased over 19% (from 633 to 754). Hispanics still remain a small fraction of the graduate school enrollment in computer science – 3.2%.

In engineering, while there was a decline in overall graduate enrollment of 18% (from 76,039 to 62,242), the enrollment of Hispanics in engineering at the graduate level increased 1.8% (from 2,861 to 2,912 - Table 8)[11]

Hispanic Serving Institutions (HSIs) are always changing since they must fulfill eight stipulations of the Higher Education Act, Title III, Section 316, including being a public or other nonprofit institution that has at least 25% Hispanic undergraduate full-time equivalent student enrollment. Additionally, they must provide at least a two-year program acceptable towards a degree and provide assurances that not less than 50% of its Hispanic students are low-income individuals and first generation college students, among other rules. Therefore, because of these definitions, the institutions designated as HSIs change from year to year. Among the top 50 institutions enrolling Hispanic graduate students in science and engineering in 1997, 11 were designated as HSIs in 1996. Most of the top 50 schools are in Puerto Rico, Florida, Texas and California. Puerto Rican institutions enroll 12% of all Hispanic graduate science and engineering students.

Graduate Degrees

Hispanics are earning more master's degrees in all fields. During the 1989-96 period, they nearly doubled their output of master's degrees (from 8,133 to 15,394). And while the gain in science and engineering was not as high, it was still substantial – 72% (from 1,585 to 1,730). In comparison, white students recorded a 17.9% gain in S&E master's degrees, and an overall increase of 23.5%. By specific discipline, in engineering the increase in the number of master's degrees earned by Hispanics was nearly 60%, compared to about a 6% gain for white students. Despite this growth, Hispanics still only earned 748 master's degrees in engineering, compared to 13,573 for whites. In the natural sciences, although Hispanics increased the number of master's degrees by 52.5% over the seven-year period 1989-96, they still only earned 3.1% of all master's degrees conferred in the natural sciences in 1996 to U.S. citizens and permanent residents (Table 9)[12].

[11] National Science Foundation, WebCASPAR Data Base. 1999.

[12] National Science Foundation, *Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1989-967,* March 1999.

Table 9. Earned Master's Degrees, by Field and Selected Races, 1989-1996

Field	1989	1990	1991	1992	1993	1994	1995	1996
U.S. citizens and permanent residents, total								
Total S&E	55,190	55,890	55,779	58,177	61,265	65,201	67,110	68,151
Engineering	16,988	16,746	16,487	17,111	18,539	19,350	18,921	18,762
Sciences	38,202	39,144	39,292	41,066	42,726	45,851	48,189	49,389
Natural sciences	20,167	19,963	18,935	19,459	19,651	20,451	20,957	22,028
Physical science [1]	4,465	4,047	3,778	3,814	3,763	3,918	3,980	4,119
Mathematical science	2,454	2,649	2,573	2,907	2,946	3,013	3,034	2,956
Computer science	6,957	7,080	6,505	6,361	6,388	6,509	6,452	6,352
Biological science	4,317	4,164	4,057	4,021	3,949	4,284	4,543	5,230
Agricultural science	1,974	2,023	2,022	2,356	2,605	2,727	2,948	3,371
Social sciences	18,035	19,181	20,357	21,607	23,075	25,400	27,232	27,361
Social science	9,642	10,258	10,872	11,629	12,387	13,487	13,695	13,938
Psychology	8,393	8,923	9,485	9,978	10,688	11,913	13,537	13,423
Non-S&E [2]	223,737	234,455	245,108	256,378	265,599	277,301	283,562	292,531
Grand total	278,927	290,345	300,887	314,555	326,864	342,502	350,672	360,682
White, non-Hispanic								
Total S&E	43,945	44,450	44,513	45,649	47,975	50,711	51,417	51,791
Engineering	12,832	12,859	12,635	12,752	13,920	14,469	13,821	13,573
Sciences	31,113	31,591	31,878	32,897	34,055	36,242	37,596	38,218
Natural sciences	16,080	15,742	15,005	15,136	15,322	15,524	15,789	16,672
Physical science [1]	3,766	3,401	3,129	3,067	3,078	3,145	3,179	3,326
Mathematical science	2,032	2,169	2,068	2,336	2,354	2,379	2,342	2,227
Computer science	4,786	4,851	4,637	4,407	4,464	4,286	4,205	4,113
Biological science	3,679	3,501	3,353	3,251	3,144	3,453	3,589	4,080
Agricultural science	1,817	1,820	1,818	2,075	2,282	2,261	2,474	2,926
Social sciences	15,033	15,849	16,873	17,761	18,733	20,718	21,807	21,546
Social science	7,958	8,360	8,900	9,523	9,923	10,758	10,700	10,807
Psychology	7,075	7,489	7,973	8,238	8,810	9,960	11,107	10,739
Non-S&E [2]	186,377	192,424	203,011	211,413	217,693	223,202	226,020	230,922
Grand total	230,322	236,874	247,524	257,062	265,668	273,913	277,437	282,713
Hispanics								
Total S&E	1,585	1,587	1,736	1,806	2,092	2,514	2,585	2,730
Engineering	468	446	468	488	581	719	711	748
Sciences	1,117	1,141	1,268	1,318	1,511	1,795	1,874	1,982
Natural sciences	444	431	494	503	574	680	665	677
Physical science [1]	92	98	96	93	114	114	129	127
Mathematical science	34	51	85	66	78	75	75	91
Computer science	144	118	128	149	162	169	198	173
Biological science	126	120	136	146	151	138	167	191
Agricultural science	48	44	49	49	69	184	96	95
Social sciences	673	710	774	815	937	1,115	1,209	1,305
Social science	313	341	383	396	474	557	553	596
Psychology	360	369	391	419	463	558	656	709
Non-S&E [2]	6,548	6,908	7,948	8,450	9,279	10,663	11,320	12,664
Grand total	8,133	8,495	9,684	10,256	11,371	13,177	13,905	15,394

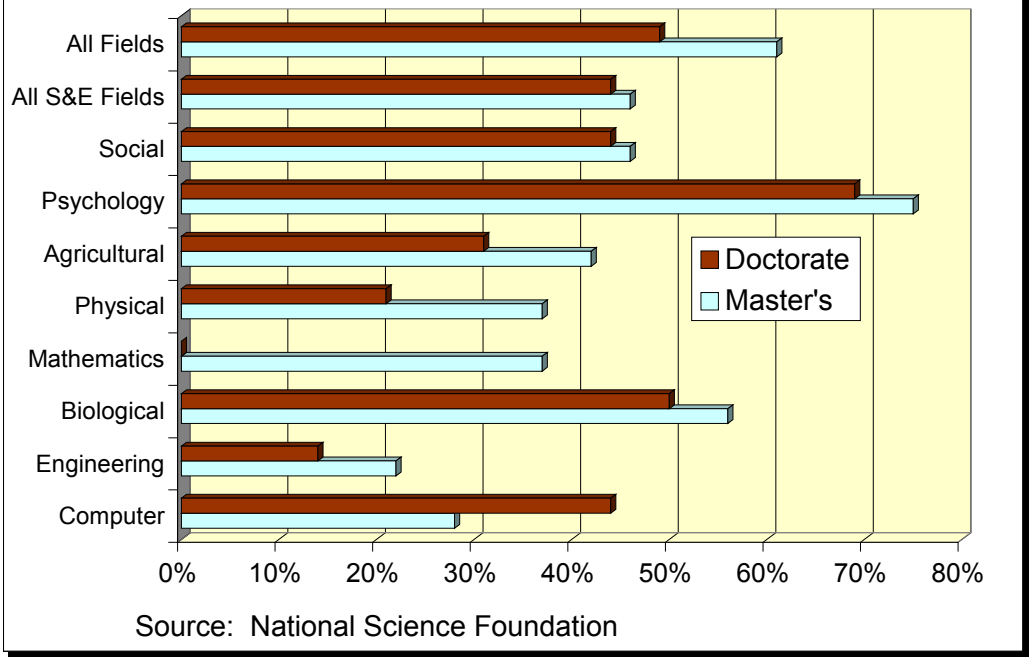
[1] "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, and chemistry.

[2] Non-S&E refers to non-science and non-engineering.

Source: Tabulations by National Science Foundation; data from Dept. of Education, IPEDS Completions Survey, 1989-1996

While Hispanic women hold an edge over Hispanic men in total master's degrees earned (61% vs. 39%), in all science and engineering fields combined, Hispanic men hold an edge (54% for men vs. 46% for women) as shown in Figure 5.

Figure 5. Percent Women among Hispanic Graduates, S&E, 1996



Source: National Science Foundation

There are some notable exceptions to this. Hispanic women dominate in psychology, earning three out of every four master's degrees conferred and also earn 55% of all master's degrees conferred in the biological sciences.

It is important to point out that despite the gains made by Hispanics in earning master's degrees in all fields, but particularly in science and engineering, they still have much distance to travel before approaching any kind of parity with whites or Asian Americans.

The number of doctoral degrees in science and engineering awarded to U.S. citizens and permanent residents dropped for the second consecutive year in 1998 to 18,125, although it had increased 28% (from 14,592 to 18,628) in the eight-year period 1989 to 1996 (Table 10). The biggest reason for this drop in total doctorates in science and engineering awarded to U.S. citizens and permanent residents is the dramatic decline in the number of PhDs earned by Asian Americans, which has plummeted 40% from 1996 (from 3,091 to 2,140). In contrast, during the 1989-98 period, the number of Hispanics earning doctorates in science and engineering nearly doubled from 382 to 752. It appears that the progress that was made at the undergraduate level is finally showing up at the graduate level. Despite the higher growth rate, Hispanics still only earned 3.3% of the doctorates awarded in science and engineering in 1996.

Table 10: Number of Earned Doctoral Degrees by Field by Race/Ethnicity, 1989-98

Field	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Total S&E	14,592	15,364	15,914	15,942	16,573	18,187	18,996	18,628	18,250	18,125
Engineering	2,229	2,346	2,474	2,520	2,697	3,053	3,342	3,383	3,303	3,021
Sciences	12,363	13,018	13,440	13,422	13,876	15,134	15,654	15,245	14,947	15,104
Natural sciences	7,453	7,768	8,032	8,035	8,191	9,306	9,749	9,226	8,997	9,030
Physical science [1]	2,678	2,876	2,918	2,898	2,834	3,402	3,435	3,126	3,082	2,994
Mathematical science	428	422	518	507	590	657	771	646	619	666
Computer science	396	403	451	489	509	543	616	513	513	551
Biological science	3,300	3,380	3,525	3,568	3,752	4,088	4,329	4,365	4,234	4,279
Agricultural science	651	687	620	573	506	616	598	576	549	540
Social sciences	4,910	5,250	5,408	5,387	5,685	5,828	5,905	6,019	5,950	6,074
Social science	2,173	2,258	2,390	2,401	2,524	2,692	2,721	2,793	2,842	2,815
Psychology	2,737	2,992	3,018	2,986	3,161	3,136	3,184	3,226	3,108	3,259
Non-S&E [2]	10,435	11,239	11,516	12,048	12,135	12,707	13,063	12,878	12,612	12,789
Grand total	25,027	26,603	27,430	27,990	28,708	30,894	32,059	31,506	30,862	30,914
White, non-Hispanics										
Total S&E	12,501	13,170	13,323	13,326	13,737	13,889	13,902	13,999	13,717	13,929
Engineering	1,726	1,840	1,837	1,880	2,025	2,020	2,090	2,260	2,267	2,160
Sciences	10,775	11,330	11,486	11,446	11,712	11,869	11,812	11,739	11,450	11,769
Natural sciences	6,488	6,789	6,885	6,822	6,836	7,003	6,966	6,786	6,734	6,940
Physical science [1]	2,326	2,502	2,525	2,458	2,366	2,529	2,386	2,337	2,352	2,369
Mathematical science	369	372	419	425	476	479	535	478	473	522
Computer science	319	339	355	378	410	401	453	356	357	406
Biological science	2,904	2,975	3,041	3,068	3,146	3,107	3,119	3,171	3,140	3,226
Agricultural science	570	601	545	493	438	487	473	444	412	417
Social sciences	4,287	4,541	4,601	4,624	4,876	4,866	4,846	4,953	4,716	4,829
Social science	1,834	1,893	1,949	1,988	2,069	2,136	2,119	2,212	2,215	2,199
Psychology	2,453	2,648	2,652	2,636	2,807	2,730	2,727	2,741	2,501	2,630
Non-S&E [2]	9,069	9,708	9,862	10,299	10,315	10,705	10,817	10,686	10,096	10,224
Grand total	21,570	22,878	23,185	23,625	24,052	24,594	24,719	24,685	23,813	24,153
Total Hispanics										
Total S&E	382	468	492	513	542	548	571	623	653	752
Engineering	47	54	60	71	66	66	77	98	97	110
Sciences	335	414	432	442	476	482	494	525	556	642
Natural sciences	172	212	212	228	249	274	255	255	290	315
Physical science [1]	68	85	81	88	92	98	86	85	83	70
Mathematical science	11	10	9	12	16	13	15	10	18	27
Computer science	4	5	12	8	7	7	6	16	17	14
Biological science	71	89	95	102	114	131	127	131	146	169
Agricultural science	18	23	15	18	20	25	21	13	26	35
Social sciences	163	202	220	214	227	208	239	270	266	327
Social science	70	93	98	81	96	75	94	97	97	120
Psychology	93	109	122	133	131	133	145	173	169	207
Non-S&E [2]	312	369	375	396	431	482	490	482	530	559
Grand total	694	837	867	909	973	1,030	1,061	1,105	1,183	1,311

Table 10: Number of Earned Doctoral Degrees by Field by Race/Ethnicity, 1989-98 (cont.)

Field	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Puerto Ricans										
Total S&E	93	115	99	120	112	131	137	142	172	171
Engineering	7	6	9	13	10	10	13	22	23	17
Sciences	86	109	90	107	102	121	124	120	149	154
Natural sciences	49	62	43	56	57	64	57	59	76	71
Physical science [1]	20	29	17	23	18	26	23	15	25	16
Mathematical science	4	2	0	2	1	1	1	3	4	7
Computer science	0	2	3	1	1	4	0	5	6	2
Biological science	18	24	23	27	27	28	30	32	37	43
Agricultural science	7	5	0	3	10	5	3	4	4	3
Social sciences	37	47	47	51	45	57	67	61	73	83
Social science	16	21	27	16	21	14	23	13	16	14
Psychology	21	26	20	35	24	43	44	48	57	69
Non-S&E [2]	83	95	92	109	120	132	132	109	139	128
Grand total	176	210	191	229	232	263	269	251	311	299
Mexican Americans										
Total S&E	95	104	126	120	122	145	150	149	159	223
Engineering	14	13	14	10	12	15	19	28	19	30
Sciences	81	91	112	110	110	130	131	121	140	193
Natural sciences	33	47	53	52	47	70	58	61	67	99
Physical science [1]	13	14	19	16	14	28	17	28	18	26
Mathematical science	2	3	3	4	4	4	6	2	3	6
Computer science	0	0	0	3	1	2	3	1	2	3
Biological science	12	22	26	24	24	30	28	28	42	54
Agricultural science	6	8	5	5	4	6	4	2	2	10
Social sciences	48	44	59	58	63	60	73	60	73	94
Social science	17	19	24	21	21	20	25	22	25	41
Psychology	31	25	35	37	42	40	48	38	48	53
Non-S&E [2]	83	86	106	99	130	163	140	144	141	198
Grand total	178	190	232	219	252	308	290	293	300	421
Other Hispanics										
Total S&E	194	249	267	273	308	272	284	332	322	358
Engineering	26	35	37	48	44	41	45	48	55	63
Sciences	168	214	230	225	264	231	239	284	267	295
Natural sciences	90	103	116	120	145	140	140	135	147	145
Physical science [1]	35	42	45	49	60	44	46	42	40	28
Mathematical science	5	5	6	6	11	8	8	5	11	14
Computer science	4	3	9	4	5	1	3	10	9	9
Biological science	41	43	46	51	63	73	69	71	67	72
Agricultural science	5	10	10	10	6	14	14	7	20	22
Social sciences	78	111	114	105	119	91	99	149	120	150
Social science	37	53	47	44	54	41	46	62	56	65
Psychology	41	58	67	61	65	50	53	87	64	85
Non-S&E [2]	146	188	177	188	181	193	218	229	250	233
Grand total	340	437	444	461	489	465	502	561	572	591

[1] In this report, "Physical science" includes earth, atmospheric, and ocean sciences, as well as physics, astronomy, & chemistry

[2] Non-S&E refers to non-science and non-engineering.

Source: National Science Foundation, "Science and Engineering Doctorate Awards: 1998," October 1999

This growth was evident in most fields. In 1998, Hispanic Americans earned 110 doctorates in engineering, 134% more than the 47 they earned in 1989. In mathematics, they earned 27 PhDs, 145% more than the 11 they earned ten years earlier. A similar situation occurred in computer science where they increased their numbers from 4 to 14. In the biosciences, the number of PhDs earned grew by 138%, from 71 to 169 and in psychology, Hispanics more than doubled the number reaching 207 in 1998. Only in the physical sciences was there an actual drop from 59 to 54. But again, despite this progress, Hispanic Americans represent only a small fraction of total doctorates earned in these fields.

At the doctorate level, Hispanic men have an advantage over Hispanic women. In 1998, men earned 57% of all doctorates awarded in science and engineering. Hispanic men maintain this advantage over their female counterparts in every field in science and engineering except psychology (where women hold a big advantage) and social sciences.

Doctorates are the only level in which the Hispanic population can be broken out. As shown in Table 10, of the 752 PhDs awarded to Hispanics in science and engineering in 1998, Puerto Ricans earned 22.7% (171), Mexican Americans 29.7% (223) and the remaining 47.6% (358) were earned by "Other Hispanics". A similar breakout occurs regardless of individual field examined.

The baccalaureate origin institutions of Hispanics somewhat reflects their geographic concentration. Twenty-six of the top 50 baccalaureate-origin institutions of Hispanic doctorate recipients are in Puerto Rico, California, Florida and Texas. Table 11 shows the top three institutions conferring graduate degrees to Hispanic Americans in selected science and engineering fields for 1996.

Financial Support in Graduate School

Support for doctorate recipients in the sciences and engineering usually takes the form of fellowships and assistantships, primarily from federal sources, augmented at times by student loans or personal funds. In 1997, more than half (54%) received the majority of their support from fellowships or teaching and research assistantships, while about a third (35%) reported that their personal or family resources were the primary sources used to finance their doctoral studies. However, this varied by field as well as by sex and racial/ethnic category. For example, among all science and engineering PhD recipients in 1997, there was little difference in support for Hispanics and whites, with 51% of Hispanics and 52% of whites receiving support in the form of fellowships or assistantships. However, in the physical sciences, there were substantial differences, with 65% of Hispanics receiving fellowships or assistantships compared to 80% of whites (Table 12).

Table 11. Top Three Institutions Conferring Graduate Degrees to Hispanic Americans, Selected Fields, 1996

Field	Institution	Degrees Conferred
Master's Degrees		
Total S&E	University of PR Medical Sciences Campus	218
	University of PR Mayaguez Campus	101
	University of Phoenix	84
Engineering	Stanford University	39
	Universidad Politecnica de Puerto Rico	38
	University of PR Mayaguez Campus	37
Physical Sciences	University of PR Mayaguez Campus	74
	University of PR Humacao University College	50
	Inter American U of PR Arecibo Campus	37
Math & Statistics	University of Texas - Pan American	28
	University of Texas at Austin	18
	CUNY York College	17
Computer Science	University of Phoenix	10
	Pace University of New York Campus	7
	University of Miami	6
Life Sciences	University of PR Medical Sciences Campus	214
	University of PR Mayaguez Campus	41
	Barry University	34
Doctorate Degrees		
Total S&E	Caribbean Center for Advanced Studies	42
	University of PR Rio Piedras Campus	21
	Texas A&M University Main Campus	21
Engineering	Texas A&M University Main Campus	5
	Georgia Institute of Technology, Main Campus	5
	Unviersity of California, Berkeley	4
Physical Sciences	University of PR Rio Piedras Campus	7
	University of California, San Diego	6
	Texas A&M University Main Campus	6
Math & Statistics	University of Northern Colorado	1
	University of New Mexico, All Campuses	1
	University of California, Santa Barbara	1
Computer Science	Nova Southeastern University	2
	University of Texas at Austin	1
	Univeristy of California-Davis	1
Life Sciences	University of Wisconsin-Madison	6
	Univerity of Texas Health Science Center-Houston	5
	Univeristy of Arizona	5

Source: National Science Foundation WebCASPAR Database System.

Table 12. Percent of Hispanics Receiving Support by Selected Fields

Field	
Physical Science	
Hispanic	65%
White	80%
Total	79%
Mathematics and Computer	
Hispanic	64%
White	64%
Total	64%
Life Sciences	
Hispanic	81%
White	71%
Total	71%
Engineering	
Hispanic	68%
White	72%
Total	72%
All S&E	
Hispanic	51%
White	52%
Total	52%

Source: NORC, University of Chicago, Summary Report 1997

Years to Doctoral Degree

Hispanics tend to be older than white doctorates at the time of the receipt of their degree. For example, 58% of whites at the time of their doctorate were between the ages of 26 and 35, compared to 51% of Hispanics.

Overall, between 6-10 years is both the median and average number of years for all graduate students to complete their education between receipt of the bachelor's and doctoral degrees in science and engineering. However, it takes some groups longer than others to obtain the PhD. There was little difference in median time lapse from receipt of the baccalaureate to receipt of the PhD by race. For whites who were U.S. citizens, the median registered time lapse was 7.4, while for Hispanics, it was 7.5.

Hispanics in the Labor Force

Despite the improving numbers in preparing for careers in science and engineering, it is slow moving for Hispanics to make some penetration into the U.S. S&E workforce. In 1997, of the 12,530,700 persons in the science and engineering workforce, nearly 85% (10,585,600) were actually employed in science and engineering. And, of those employed in S&E, only 3.5% or 371,500 were Hispanics, while 83.9% were whites. This proportion is up slightly from the 3.1% of the total employed science and engineering workforce who were Hispanics in 1993, according to data obtained from the National Science Foundation SESTAT Database. Not surprisingly, the proportion of Hispanics decreased as the degree

level increased. The proportion of Hispanics employed in science and engineering was 3.8% at the baccalaureate level, 3.1% at the master's, but only 2.7% at the doctorate level.[13]

The proportion of Hispanics employed in science and engineering varied somewhat by field of degree. Hispanics were more likely to be social and behavioral scientists and less like to be computer/math scientists, life scientists and physical scientists. Overall, only 2.5% of the physical, life, computer or mathematical scientists were Hispanics, compared to 4.1% of the social scientists. However, 3.5% of the 1.9 million engineers were Hispanics (Table 13).

Table 13: Employed U.S. Scientists and Engineers by Field of Highest Degree Attained, Sex and Race/Ethnicity, 1997

All Degree Fields	Employed S&Es, Total	Race/Ethnicity			
		White	% White	Hispanic	% Hispanic
All Degree Fields	**10,585,600**	**8,877,600**	**83.9**	**371,500**	**3.5**
S&E Degree Fields	7,704,000	6,390,800	83.0	282,800	3.7
Sciences	5,794,800	4,841,700	83.6	212,800	3.7
Computer/math sciences	1,003,300	802,200	80.0	29,300	2.9
Computer/info sciences	543,800	410,700	75.5	19,200	3.5
Mathematical sciences	459,500	391,500	85.2	10,100	2.2
Life/related sciences	1,204,700	1,022,500	84.9	39,200	3.3
Agricultural/food sciences	218,700	195,600	89.4	5,700	2.6
Biological sciences	889,100	737,200	82.9	30,700	3.5
Environmental life sciences	96,900	89,800	92.7	2,800	2.9
Physical/related sciences	619,200	521,800	84.3	16,500	2.7
Chemistry, except biochemistry	275,100	217,700	79.1	8,400	3.1
Earth sci., geology & ocean.	146,900	136,200	92.7	3,500	2.4
Physics/astronomy	144,100	121,400	84.2	2,900	2.0
Other physical sciences	53,000	46,600	87.9	1,700	3.2
Social/related sciences	2,967,600	2,495,200	84.1	127,800	4.3
Economics	402,800	340,100	84.4	13,900	3.5
Political science	558,700	471,000	84.3	26,000	4.7
Psychology	1,112,800	948,100	85.2	50,000	4.5
Sociology/anthropology	558,600	456,000	81.6	24,000	4.3
Other social sciences	334,800	280,000	83.6	13,900	4.2
Engineering	1,909,200	1,549,000	81.1	70,000	3.7
Aerospace	77,400	69,000	89.1	2,600	3.4
Chemical	138,400	108,900	78.7	4,800	3.5
Civil	322,300	261,600	81.2	14,900	4.6
Electrical	582,100	450,400	77.4	20,800	3.6
Industrial	105,400	84,000	79.7	5,000	4.7
Mechanical	386,100	323,600	83.8	13,000	3.4
Other	297,500	251,500	84.5	8,900	3.0
Non-S&E Degrees	2,881,700	2,486,800	86.3	88,700	3.1

Note: Scientists & engineers includes all persons who have ever received a bachelor's degree or higher in a science or engineering field, plus those holding a non-S&E bachelor's or higher degree who are employed in a S&E occupation during the 1993, 1995, or 1997 SESTAT surveys.

SOURCE: National Science Foundation, 1997 SESTAT Database.

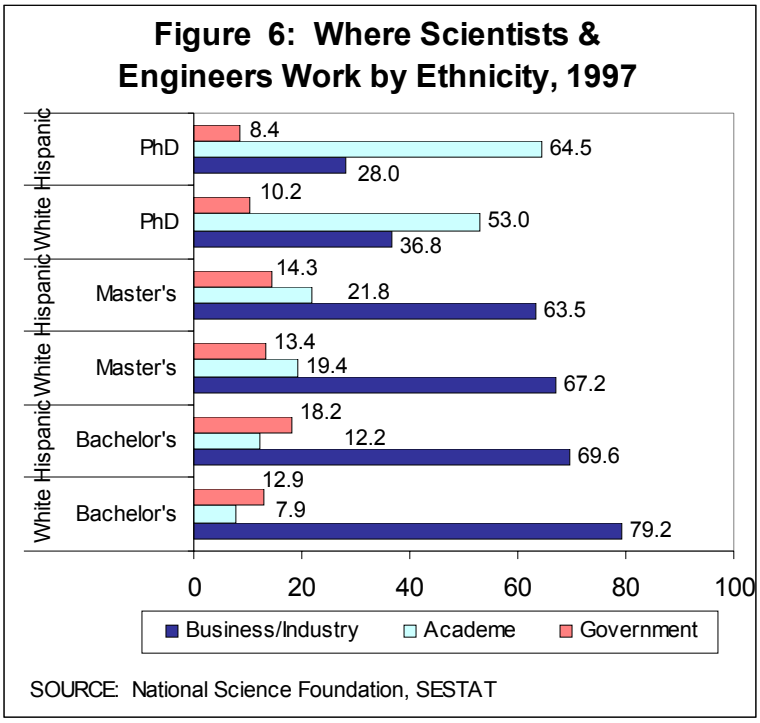
[13] National Science Foundation, SESTAT Database, 1999.

In 1997, of the 580,300 employed doctoral scientists and engineers who had received their doctorate in science or engineering, only 15,000 (or 2.6%) were Hispanics. And, this proportion varies by field of degree, ranging from a low of 2.0% of the physical scientists to a high of 3.3% for life scientists. Hispanics were 2.2% of the 98,200 PhD engineers.

Only about half of all Hispanic women participate in the labor force, compared with nearly 80 percent of Hispanic men and 57 percent of all women. Overall in 1992, 66.6 percent of Hispanics ages 16 and over, and 66.3 percent of non-Hispanics, were in the labor force. However, the apparent parity masks substantial difference by sex, ethnicity, age, and education.

Very few scientists and engineers, regardless of field, were unemployed in 1997. Overall, the unemployment rate for scientists and engineers was 1.9%. This compares with a rate of 2.7% for Hispanics and 1.7% for whites. Nearly nine out of every ten employed Hispanic scientists and engineers who were working were employed full-time, about the same percentage as whites. The remainder of the employment pool were either retired or voluntarily out of the labor force.

Business/industry is the principal employment sector for scientists and engineers. However, there is some variation among the racial/ethnic groups. Overall, 70% of all scientists and engineers are employed in business and industry, compared to 63% of the Hispanics and 78% of the whites. Hispanics are employed in higher proportions than are whites in academe and government – 21% of Hispanics compared to 17% of whites are employed in academic institutions while 16% of Hispanics and 13% of whites are employed in government. These percentages varied somewhat by degree level (Figure 6), as well as field with engineers and computer scientists more likely to work in industry.



Hispanic scientists and engineers are very similar to white scientists and engineers in their work activities. Both are more likely to be working in research and development (53% and 55% respectively) and management and sales (43% and 44% respectively), and less likely to be teaching (12% each).

Hispanic scientists and engineers are generally younger than their white colleagues. Nearly a third of all Hispanic scientists and engineers are in the 30-39 age range, compared with 24% of whites. On the other hand, nearly a third of white scientists and engineers are over the age of 50 compared to slightly more than 18% of Hispanic scientists and engineers.

Hispanic scientists and engineers earned the most working in the business/industry sector regardless of degree level, although the differential was most pronounced at the doctorate level. For example, Hispanic scientists and engineers with a PhD reported a median annual salary of $70,000 working in business and industry – 34% more than the $50,000 median salary for Hispanic S&Es working in four-year colleges/universities but only 3% more than the $65,000 they earned working in the federal government. By specific occupation, Hispanic scientists and engineers reported the highest salaries working as managers/administrators (as did whites – $55,000 and $64,000 respectively). Hispanic scientists and engineers working as computer/math scientists approached the nearest salary parity with whites – earning 93.3% of what whites did (Table 14).

Table 14: Median Annual Salaries of U.S. Scientists and Engineers by Occupation, Degree Level and Ethnicity, 1997

Occupation	All Degrees			Bachelor's		Master's		PhD	
	White	Hispanic	Hisp. Salary as % of White	White	Hispanic	White	Hispanic	White	Hispanic
All occupations	$50,000	$44,000	88.0	$45,500	$40,000	$54,000	$50,000	$63,400	$55,000
S&E Occupations	55,000	50,000	90.9	53,000	49,500	60,000	55,000	62,000	55,900
Scientists	52,300	48,000	91.8	50,000	46,000	54,000	50,000	60,000	52,000
Computer/math scientists	56,800	53,000	93.3	55,000	50,000	61,000	59,500	65,000	55,000
Life/related scientists	45,000	40,000	88.9	36,000	33,000	42,000	33,000	59,000	55,000
Physical/related scientists	50,000	41,300	82.6	42,800	34,000	52,000	47,500	66,000	58,400
Social/related scientists	45,000	40,000	88.9	25,000	22,500	42,000	45,000	55,000	48,600
Engineers	60,000	54,000	90.0	56,700	52,000	65,000	58,500	73,900	66,100
Managers/administrators	64,000	55,000	85.9	60,000	49,500	70,000	60,000	85,000	65,000
Other Non-S&E occup.	40,000	36,000	90.0	35,000	30,200	42,000	39,000	53,000	52,000

National Science Foundation, 1997 SESTAT Database.

While whites working in science and engineering occupations report higher salaries regardless of occupation, part of the disparity could be attributed to field concentrations and level of degree.

Faculty

Despite education and employment gains, faculty at American colleges and universities remain predominantly white, with little change in faculty diversity occurring over the past decade, according to data from the Higher Education Research Institute (HERI) at UCLA[14]. In 1998-99, 91.7% of the total 440,850 faculty were white, compared with 90.4% of faculty in 1989. It is not possible to make comparisons in the 1989-1998 decade for Hispanic faculty since data were not collected for "other Latino" in the 1989-90 faculty survey conducted by HERI. However, in 1998-99, Hispanic faculty comprised 2.7% of total faculty (Table 15). In addition, the low percentage of minority faculty among recent faculty hires suggests that higher education is not making much headway in diversifying their faculty (Table 15).

[14] Higher Education Research Institute, University of California Los Angeles, *The American College Teacher: National Norms for the 1998-99 Faculty Survey*, 1999.

Table 15: Racial/Ethnic Background of All Faculty and Recent Hires (Percentages)

Race/Ethnicity	All Faculty		Faculty hired in the Past 2 Years	
	1989	1998	1989	1998
White/Caucasian	90.4	91.7	87.2	87.9
Mexican American/Chicano	0.8	1	0.8	1.3
Puerto Rican American	0.4	0.4	0.8	0.5
Other Latino	N/A	1.3	N/A	1.3
African American	4	2.6	5	3.7
Asian American	3.2	3.3	3.6	4
American Indian	0.9	2	1	2.1
Other	2.1	2	3.3	2.2

Note: Percentages may total more than 100.0 if respondent marked more than one item.

Other Latino was not listed as a category in the 1989-90 faculty survey.

Source: Higher Education Research Institute, UCLA, The American College Teacher: National Norms for the 1998-99 HERI Faculty Survey.

The findings of the Higher Education Research Institute reinforced data collected by the National Center for Education Statistics for fall 1995. Of the 550,822 full-time instructional faculty in institutions of higher education, 12,942 or 2.4% were Hispanics, little difference from 1993, when 2.3% of the total full-time instructional faculty was Hispanic. Hispanic men made very little progress. In 1995, they represented 2.2% of all male full-time faculty, nearly the same as in 1993 when 2.1% of all male full-time faculty were Hispanic. Hispanic women more than doubled their proportion to 2.7% in 1995 from 1.3% in 1993. While Hispanics achieved a 70% gain (from 1,455 to 2,470) in the number of full professorships held from 1985 to 1995, they still only accounted for 2,470 or 1.6% of the 159,333 full professors in 1995. Hispanic women showed a 84% growth rate in the number of faculty holding the rank of full professor, but still only accounted for 558 (2%) of the 28,393 full female professors. Hispanic men increased the number of full professorships by 59% during the 1985-1995 decade, but still only accounted for 1.5% of all full male professors.

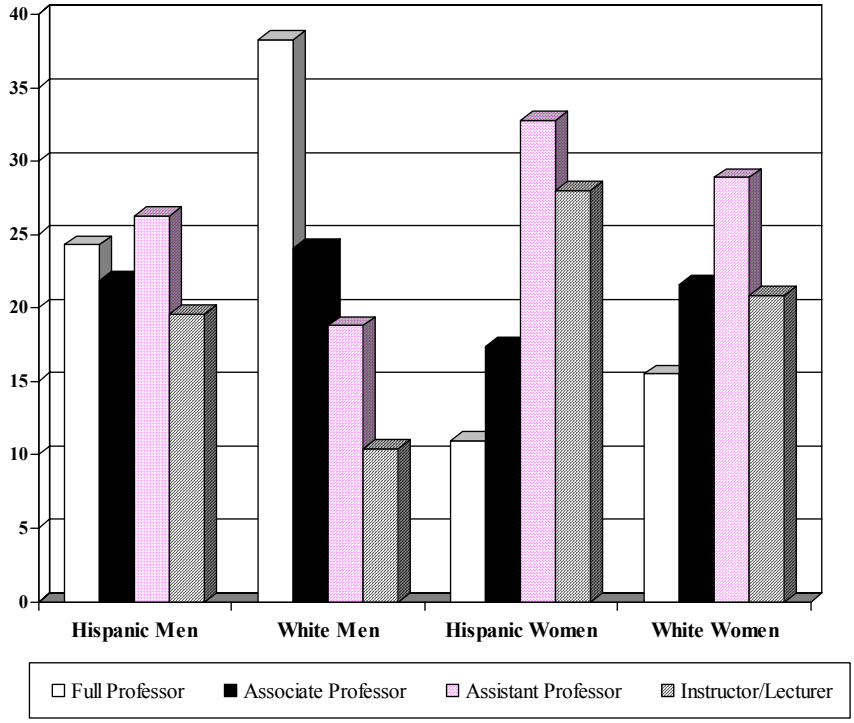
In 1995, of the total full instructional faculty, 28.9% were full professors, but only 19.1% of Hispanics held this rank, and while 12.1% of the total were instructors, a larger proportion 19.6% of Hispanics were at this level (Figure 7).[15]

The numbers are about the same in the science and engineering workforce. In 1997, of the 143,200 ranked doctoral scientists and engineers who were employed full-time as faculty in four-year colleges and universities, 4,000 or 2.8% were Hispanics. And of the 65,100 faculty who had achieved full professorships, only 2.0% or 1,300 were Hispanics.

Among full-time ranked science and engineering faculty, 32.5% of Hispanics (1,300 out of 4,000) compared with 48% (57,200 out of 120,500) had achieved the rank of full professor. Some of these differences can be attributed to differences in age, with Hispanics scientists and engineers younger on average than white scientists and engineers.

[15] National Center for Education Statistics, *Digest of Education Statistics, 1998* and *1990.*

Figure 7: Distribution of Hispanic and White Full-time Faculty by Rank and Gender, 1995



Source: U.S. Department of Education, *Digest of Education Statistics: 1998*

Hispanics also were less likely to be tenured than were whites (48% vs. 57%). However, a higher percentage of Hispanics than whites were in tenure-track positions (28% vs. 16%). Hispanic men were over four times as likely to be full professors as their female counterparts. Over 31% of Hispanic men who were full-time doctoral faculty were full professors, compared to only 7% of Hispanic women. Further, Hispanic faculty are often clustered in limited areas, such as Chicano studies, rather than being spread across an institution.

Just as was true for African Americans, finding and retaining Hispanic faculty is and will continue to be a challenge since the gains in the number of Hispanic PhD graduates in science and engineering is too small to make much difference to the anticipated additions to the faculty pool in the coming years. Thus not much of a difference in the proportional make-up of S&E faculty will occur.

Summary and Conclusion

The rapid growth of the Hispanic population – particularly that from Mexico and Central America – has not yet been accompanied by a comparable increase in educational attainment. Progress has been limited, particularly at the higher education levels. Hispanic influence is likely to profoundly change the predominantly English-speaking culture of the United States. Spanish is already the second most widely spoken language in the United States, and Hispanic influences are increasingly noticeable. Therefore, it is imperative that these groups take their rightful place in an increasingly diverse U.S. population. If the United States is to continue its prosperity, it must utilize all of its talented citizenry.