

Preface: Latinos in Science

Until women and people of color are fully represented in the fields of science and engineering, society is losing out on the talents of a vast number of potential contributors. Academic institutions are losing out. Corporations are losing out. Individuals are losing out. We all lose out.

Carol B. Muller, Ph.D., Founder, Mentor Net

Latinos in STEM by
Refugio I. Rochin
UC Davis

1. What is STEM – how defined & measured
2. National Issues
3. National Interest Groups & Concerns
4. Doctoral Degrees – a measure of situation
5. Latino Doctorates – rates of progress
6. The Pipeline Perspective
7. The Need for Change in Perspective
8. Facts and Recommendations

- **We are interested in the trends of Latinas and Latinos in getting doctoral degrees and the general pattern of degree completion.**
- **What fields are preferred among U.S. Latinos with doctorates and what fields of S&E do females and males pursue?**
- **Are Latino doctorates U.S. citizens, Permanent Residents (e.g. “Green-carders), or Temporary Residents? What are the principle baccalaureate degree-granting institutions of those who complete their doctorates?**
- **We also provide a brief analysis of these data and attempt to identify both challenges and opportunities.**

STEM – Conceptual Framework

Science – lab related work

Technology – communication related work

Engineering – civil and manufacturing work

Mathematics – basic math, statistics,
analytical related work

NSF Classifies Doctorates in S&E, inclusive of STEM

- **Sciences**
 - Physical sciences
 - Chemistry
 - Physics and astronomy
 - Other physical sciences
 - Earth, atmospheric, & ocean sciences
 - Mathematics
 - Computer sciences
 - Biological & agricultural sciences
 - Biological sciences
 - Agricultural sciences
 - Psychology
 - Social sciences
- **Engineering**
 - Chemical
 - Civil
 - Electrical
 - Mechanical
 - Other engineering

NSF has separate classification scheme for Professional Doctorates, Including

- Doctor of Medicine (M.D.)
- Doctor of Dental Surgery (D.D.S.)
- Doctor of Veterinary Medicine (D.V.M.)
- Doctor of Osteopathy (O.D.)
- Doctor of Pharmacy (Pharm.D.)
- Doctor of Psychology (Psy.D.)
- Juris Doctor (J.D.), and other similar degrees

Note: NSF Revising Classification scheme to include these new categories among S&E.

- Communication, family and consumer science/ human science, and multidisciplinary/ interdisciplinary studies
- Neuroscience, formerly a health field for professional degrees
- Architecture, formerly classified with civil engineering.

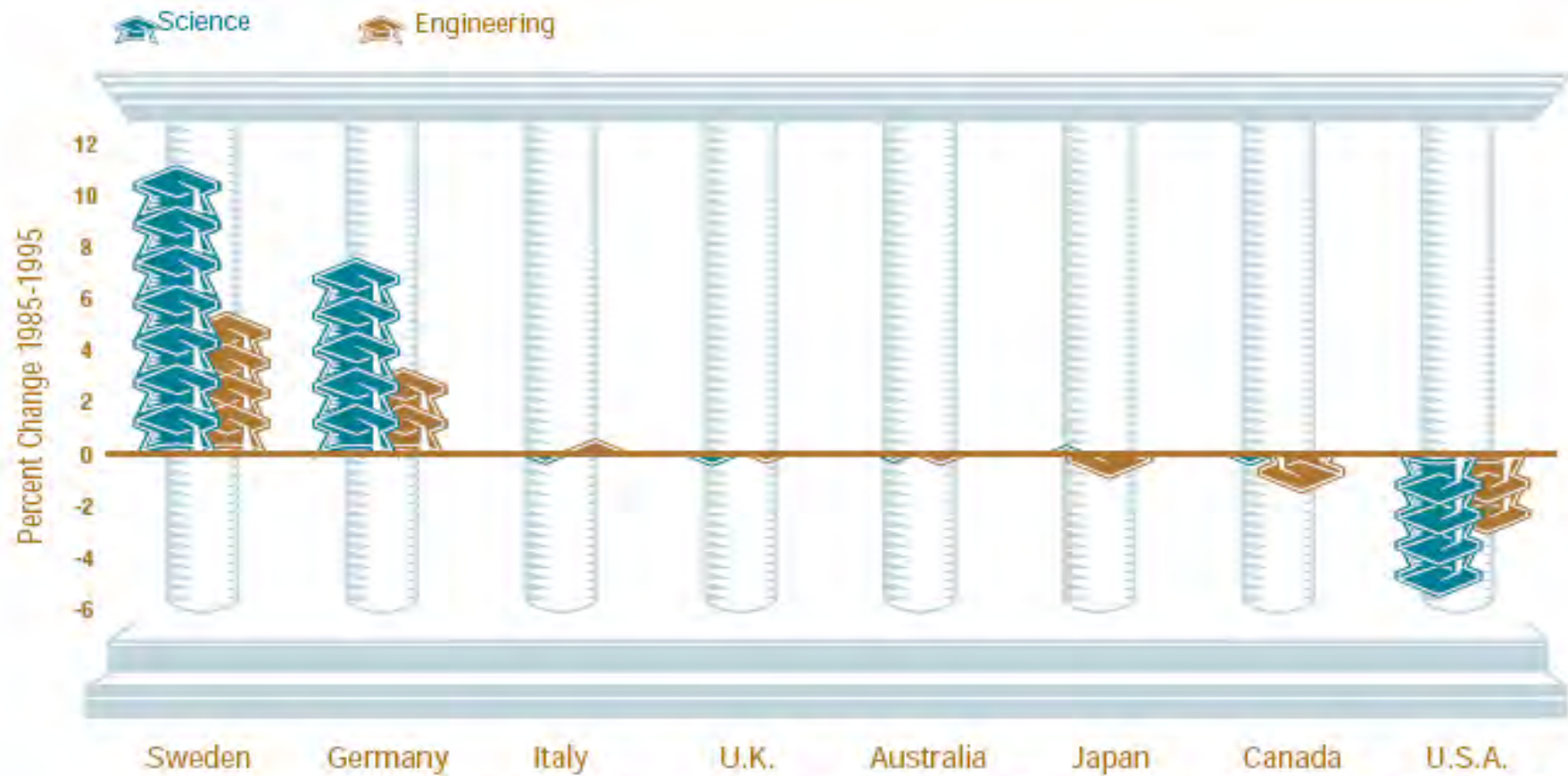
NATIONAL & GLOBAL INTERESTS IN STEM

Issues	Low visibility	Moderate concern	Major interest
1. Global Competition	Students in STEM	Science orgs, PCAST, College leaders	Corporate leaders
2. National Security	Public at large	College Leaders, PCAST	US Corporations; Science Orgs.
3. Shrinking & Aging Faculty	Corporate leaders	College leaders	Science orgs (AAAS, Sigma Xi)
4. Flat Enrollment in S&E	Students in STEM	NSF & NIH	College leaders & Corporate Leaders
5. Foreign Nationals in STEM	Corporate leaders	Science orgs, NIH-NIGMS, NIMH, ACE	SACNAS, SHPE, NACME, BEST, (URMs)
6. The Failing Pipeline	Corporate leaders	NSF & NIH	AAHHE, HSI's, ACE, SACNAS, SHPE

Global Competition

The Proportion of Science and Engineering Degrees Rose Abroad While Declining in the United States

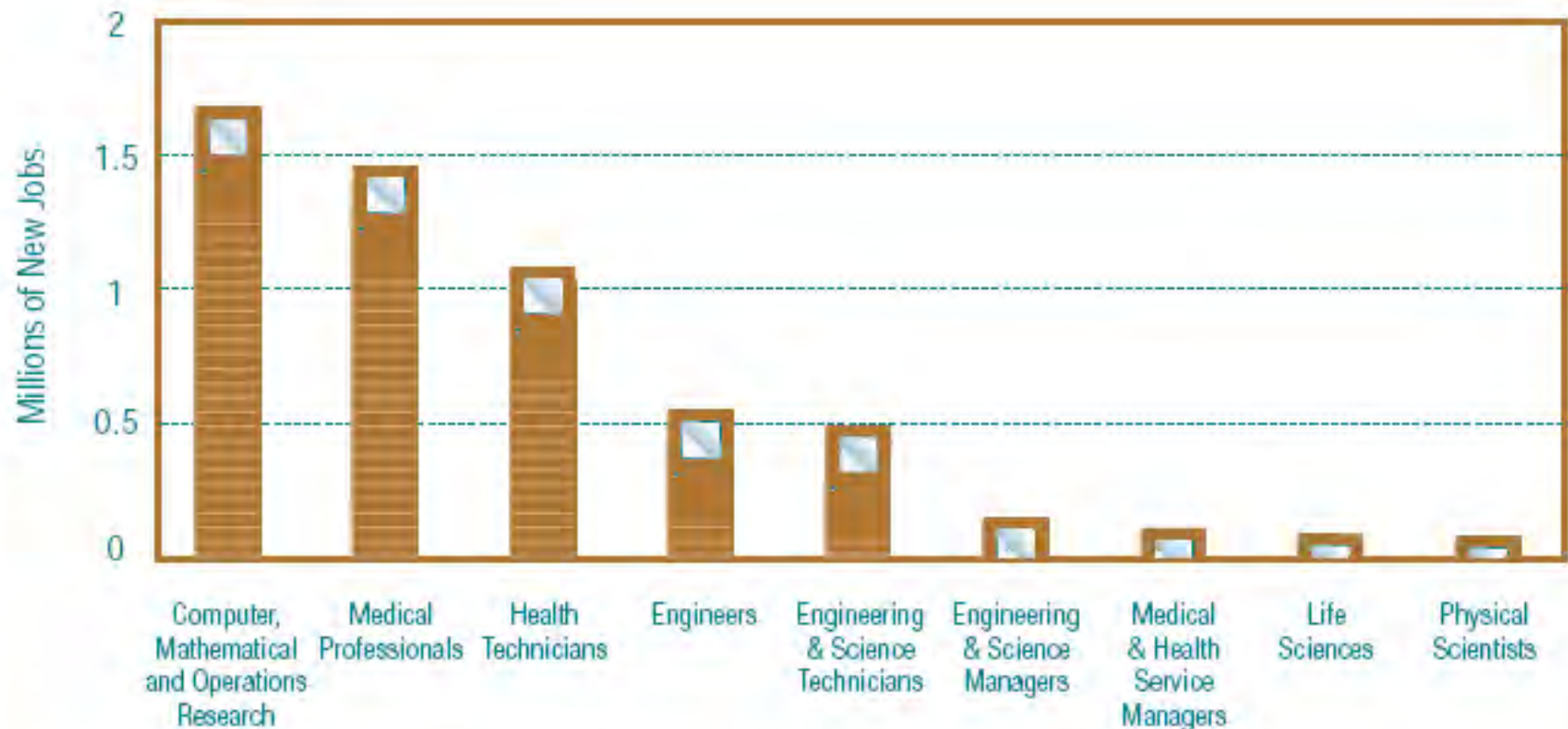
Change in Science and Engineering Degrees as a Percent of First University Degrees 1985-95



Source: NCES, *International Education Initiators: A Time Series Perspective, 1985-95*, February 2000.

New Jobs – Limited Supply of Domestic Workers

Six Million Job Openings Are Projected for Technically Trained Talent
Projected Number of Job Openings by Technical Field, New Jobs, and Net Replacements, 1998-2008



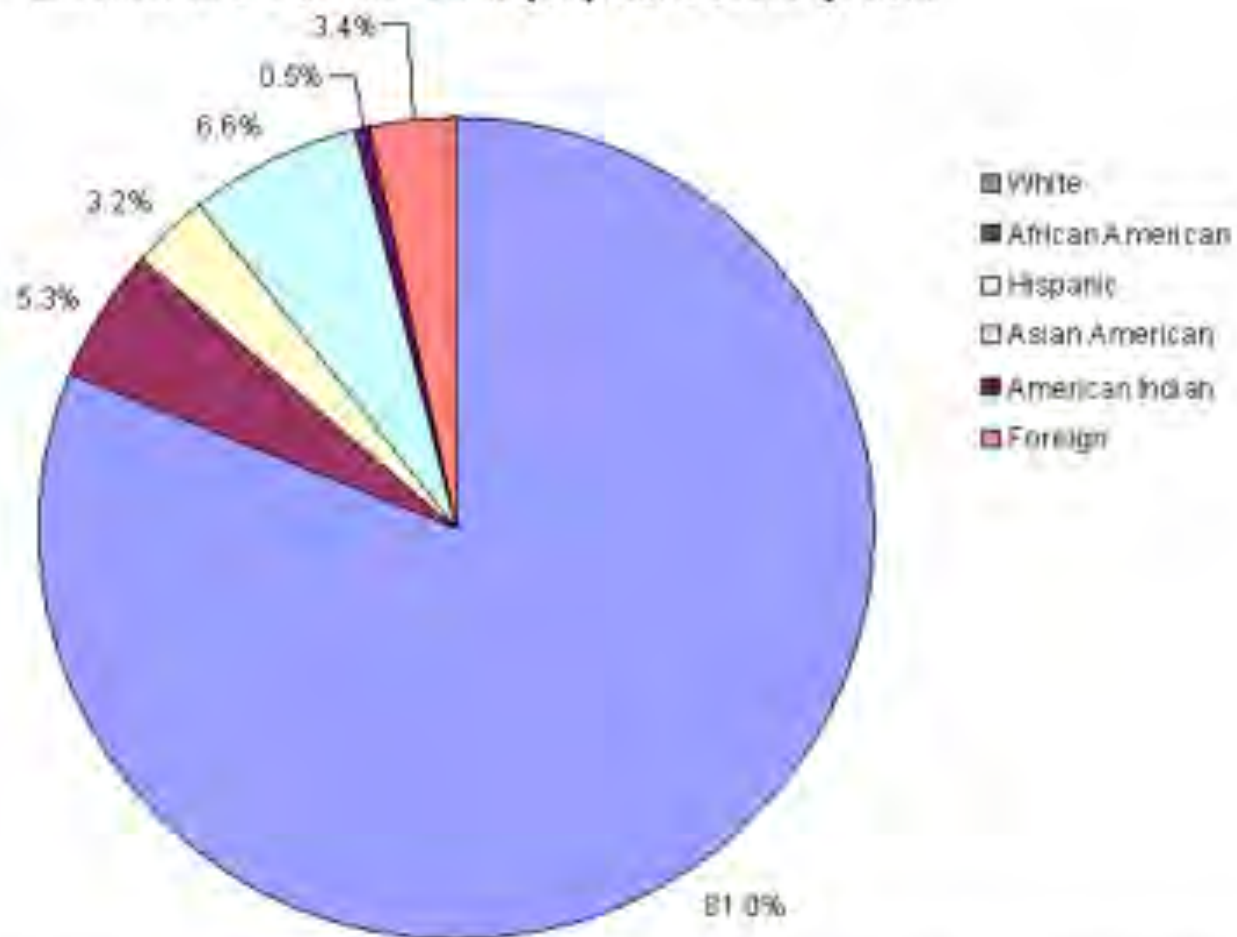
Source: Bureau of Labor Statistics, www.bls.gov

Science & Engineering Professionals by Race/Ethnicity 2001 (rounded)

	Total	African American	Asian	Caucasian	Hispanic	Native American
Doctorate	593,700*	3.6%	17.6%	76.7%	2.1%	0.0%
Master's Degree	1,155,700*	3.1%	16.5%	76.9%	3.3%	0.2%
Bachelor's Degree	3,223,700*	7.2%	12.6%	76.2%	3.7%	0.3%
Associate's Degree	657,000*	11.6%	5.7%	80.0%	2.1%	0.5%
High School Diploma	1,657,000*	11.3%	4.4%	77.8%	5.5%	1.0%
Grand Total	7,287,100*					

Source: Current Population Survey, April 2001

Distribution of Full-Time Faculty, by Race/Ethnicity: 2003



Despite increases, the share of all full-time faculty who were minority grew by only 3.7 percentage points between 1991 and 2003, to 15.6 percent.

Most Identify the STEM Crisis in terms of global competitive edge & talent

Does the country have enough scientists and engineers to compete in the increasingly high-tech global economy?

Is there a deficit of high-tech workers to sustain American production and leadership in market share.

As the demographics unfold, American leaders become increasingly concerned that US domestic youth is under-prepared for STEM related college education & careers.

Corporations take a global view and see the labor market as the best and the brightest from any part of the world.

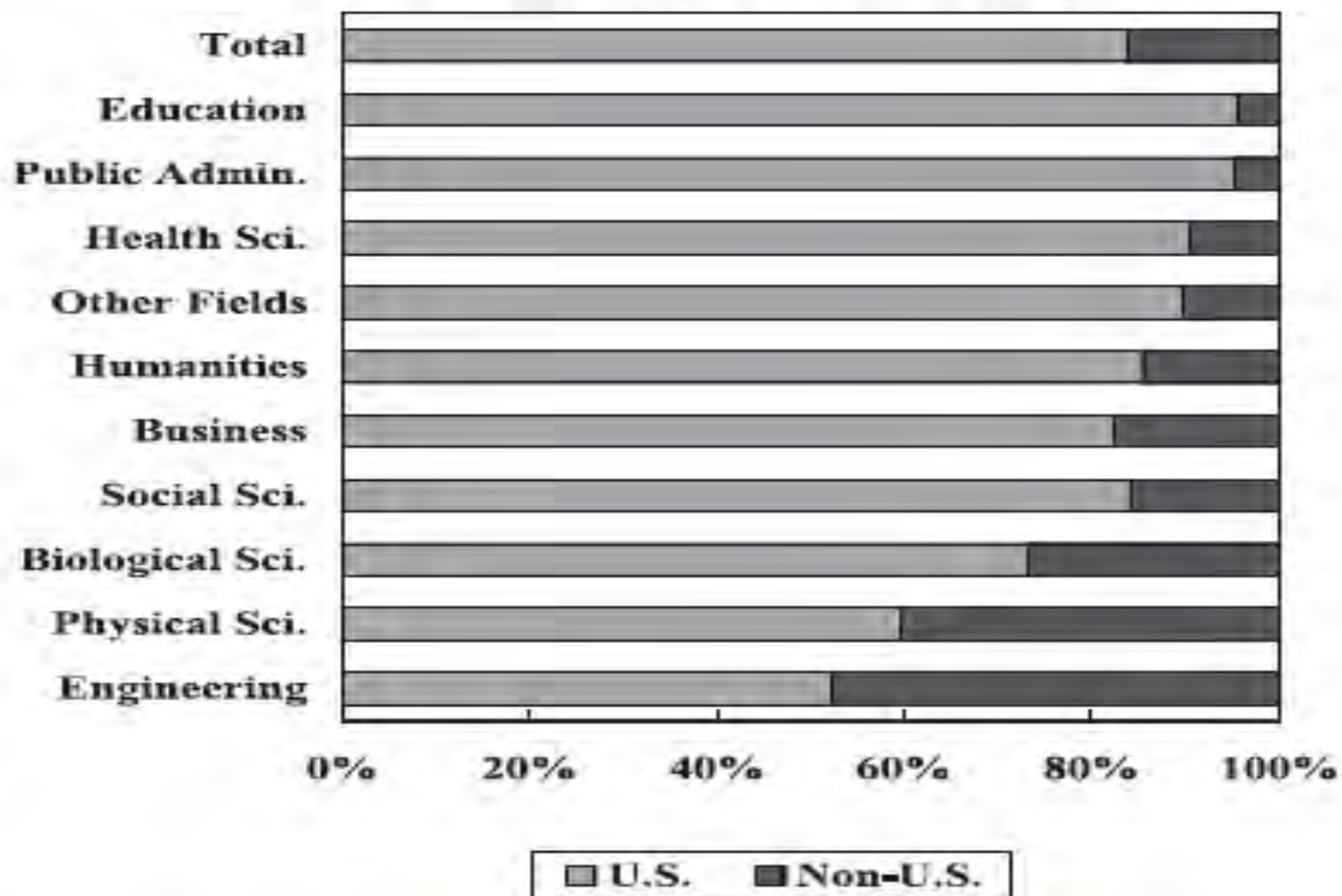
America's top tier of research universities take the corporate view and admit the best and the brightest from any part of the world.

Top tier research universities guide the national agenda for federal priorities for STEM curriculum & research.

Federal priorities govern federal funds for STEM to Departments of Health, Energy, Defense, Agriculture, CDC, NSF and National Institutes of Health. [Trillion of \$\$\$]

Federal budgets include relatively miniscule amounts for developing the pipeline of America's minority groups.

Fall 2005 graduate enrollment by field and citizenship



U.S. and Non-U.S. Citizens Enrolled in Graduate Programs by Selected Fields, Fall 2005.

Major Field	Total	U.S. Citizens and		Non-U.S. Citizen	
		Permanent Residents		Temporary Residents	
Total	1,517,976	1,154,534	84%	221,878	16%
Biological Sciences*	68,952	48,373	73%	17,711	27%
Business	219,953	150,115	83%	31,550	17%
Education	306,704	271,648	96%	12,182	4%
Engineering	108,086	53,642	52%	48,649	48%
Health Sciences	111,846	92,477	91%	9,577	9%
Humanities & Arts	100,678	79,478	86%	13,309	14%
Physical Sciences	105,170	59,365	60%	40,188	40%
Public Administration and Services	54,309	47,663	95%	2,358	5%
Social Sciences	115,345	88,798	84%	16,609	16%
Other Fields**	104,933	86,949	90%	9,778	10%

Number and Percent of Total U.S. and Hispanic professors in degree-granting institutions, by gender and selected characteristics: Fall - 2003

Full-time Instructional Faculty	Total in U.S. Degree Granting Institutions	Full-time Hispanic Male faculty/staff	Full-time Hispanic Female faculty/staff	Total Hispanic
Full Professor	194,000	1,800	800	2,600
Percent at Professor	100	0.01	0.01	0.02
Associate Professor	150,000	1,700	1,300	3,000
Percent at Associate	100	0.01	0.01	0.02
Assistant Professor	158,000	2,300	1,900	4,200
Percent at Assistant	100	0.02	0.01	0.03
Total No. Professors	502,000	5,800	4,000	9,800
Percent of Total	100	0.01	0.01	0.02
Under Age 45	248,000	5,200	4,600	9,800
Percent Under 45	100	0.02	0.02	0.04
Age 45 - 64	400,000	3,200	2,400	5,600
Percent 45-64	100	0.01	0.01	0.02

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2003.

Three Forces Changing Our Nation's Future, ETS Paper

(02/05/2007)

America is in the midst of a perfect storm that, if unaddressed, will continue to feed on itself, further dividing us socially and economically, jeopardizing American competitiveness and threatening our democratic institutions. The convergence of the three forces has serious implications for future generations and could turn the American dream into an American tragedy. They include:

1. Inadequate literacy skills among large segments of the population,
2. The continuing evolution of the economy and the nation's job structure, and
3. An ongoing shift in the demographic profile of the nation, powered by the highest immigration rates in almost a century

US Talent Pool for STEM: Deep But Not Fully Tapped (CPST 11/04/09)

According to Lisa Frehill, Executive Director of the Commission on Professionals in Science and Technology:

“Maintaining the U.S. technological edge depends on our ability to recruit and retain engineers from our deep talent pool. While we have seen incredible progress in women’s participation in some key areas, women’s low level of representation in computer science and engineering needs to be a matter of national concern. The dismal representation of Hispanics in the STEM workforce will also a big problem for the U.S. in the future, because of the projected growth for this group.”

Frehill Continued

Key findings shown in Frehill report:

Under-represented minorities account for an increasing share of the U.S. population, currently accounting for 34% of the 18-24 year old population.

Despite gains, one in four Hispanic males fail to complete high school, the highest rate of non-completion of any U.S. group.

For both women and under-represented minorities, representation declines as the degree level increases: Only 26% of STEM doctoral degrees were awarded to women and 6% to under-represented minorities in 2006.

Latinas/os at the Center of Concern

“Half of the U.S. population growth into the next decade is expected to come from new immigrants, which will have a dramatic impact on the composition of the workforce, as well as on the general population,” ETS 2007

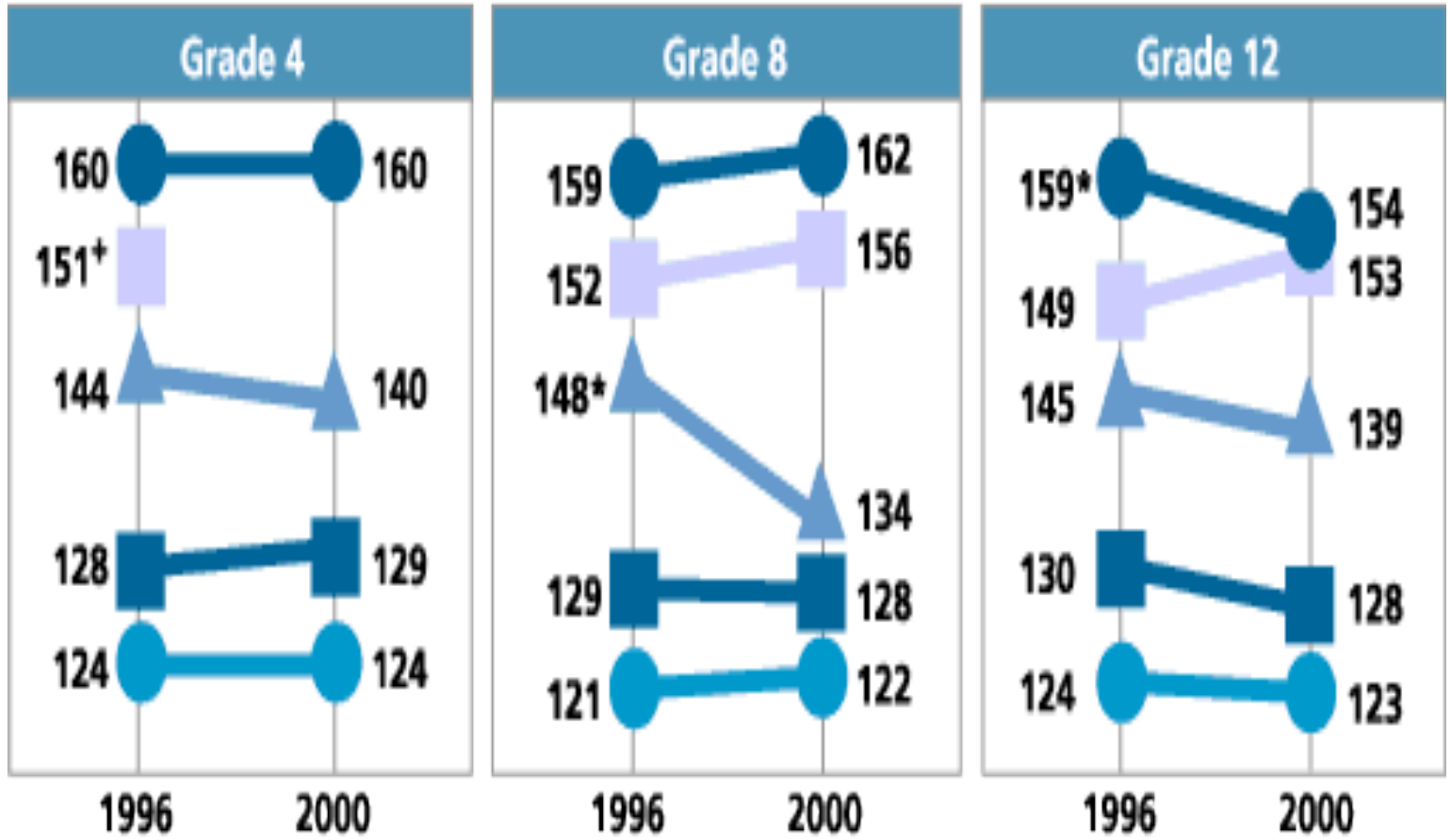
“While immigrants come from diverse backgrounds with varying levels of education, we should recognize that 34 percent of new immigrants arrive without a high school diploma, and of those, 80 percent cannot speak English well, if at all.”

The Pipeline Perspective

American leaders examine the progress of students through K-12 and estimate the future of STEM teaching and research in terms of preparation in math and science.

No Child Left Behind is the current response to advancing more students towards STEM degrees and careers.

Science Scores of U.S. Students, by Race/Ethnicity



● White ■ Asian/Pacific Islander ▲ American Indian ■ Hispanic ● Black

According to Chapa & De La Rosa [*Journal of Hispanic Higher Education*, July 2006]:

- The educational 'pipeline' for Latinos is rife with massive leaks...In 2000 Latino individuals accounted for 12.5% of the total population and 17.5% of the college-age population; however, only 10.8% of the high school graduates were Latino, 9.9% of the associate degree recipients were Latino, and only 6.6% of all bachelor's degrees and 3.8% of all doctorates were Latino individuals.
- The comparison between the overall Latino student population and the very small numbers of these with PhDs will truly make the pipeline seem much more like a pipette (2006).

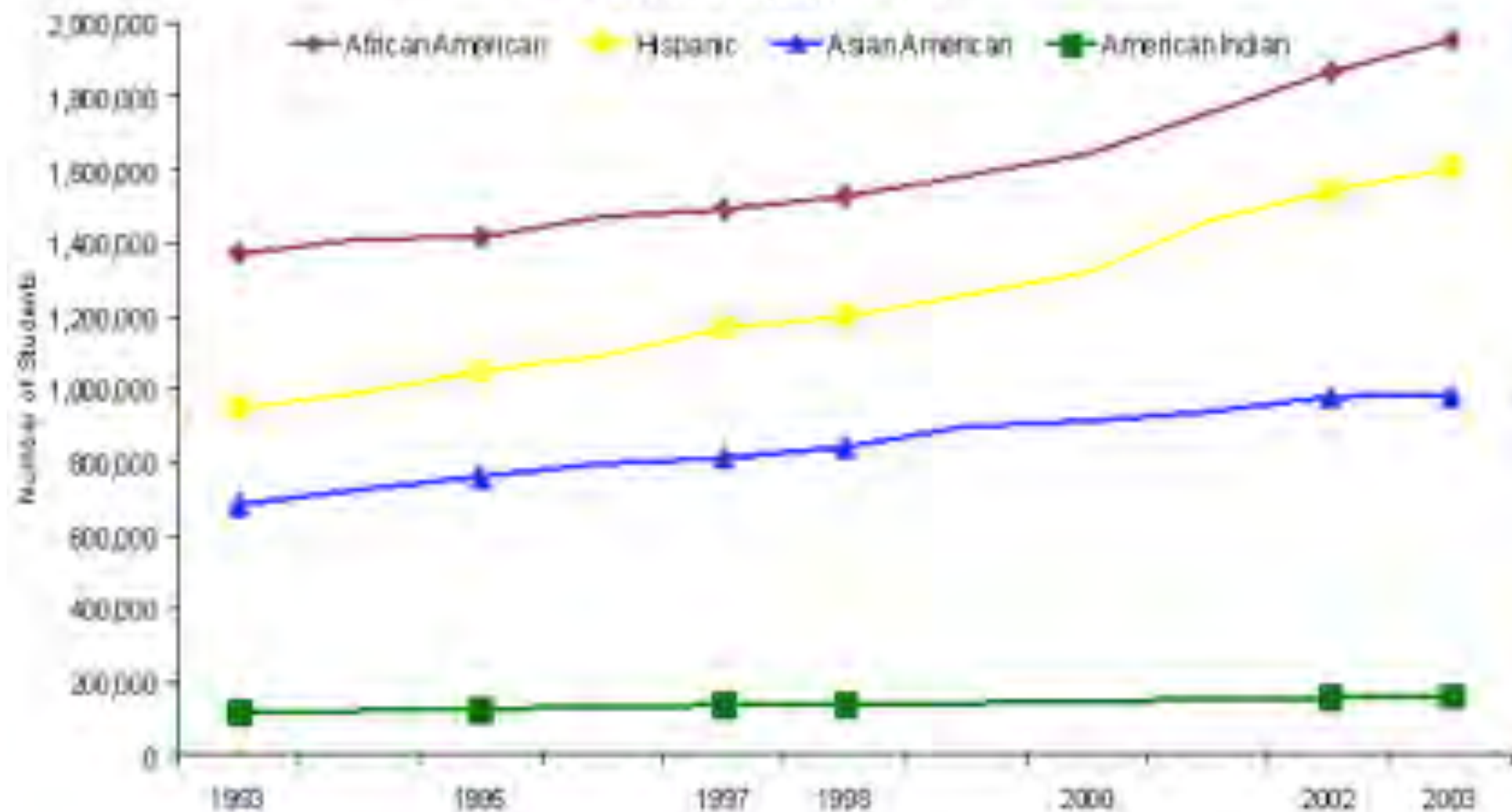
Latino Trends

College Degrees

STEM enrollment

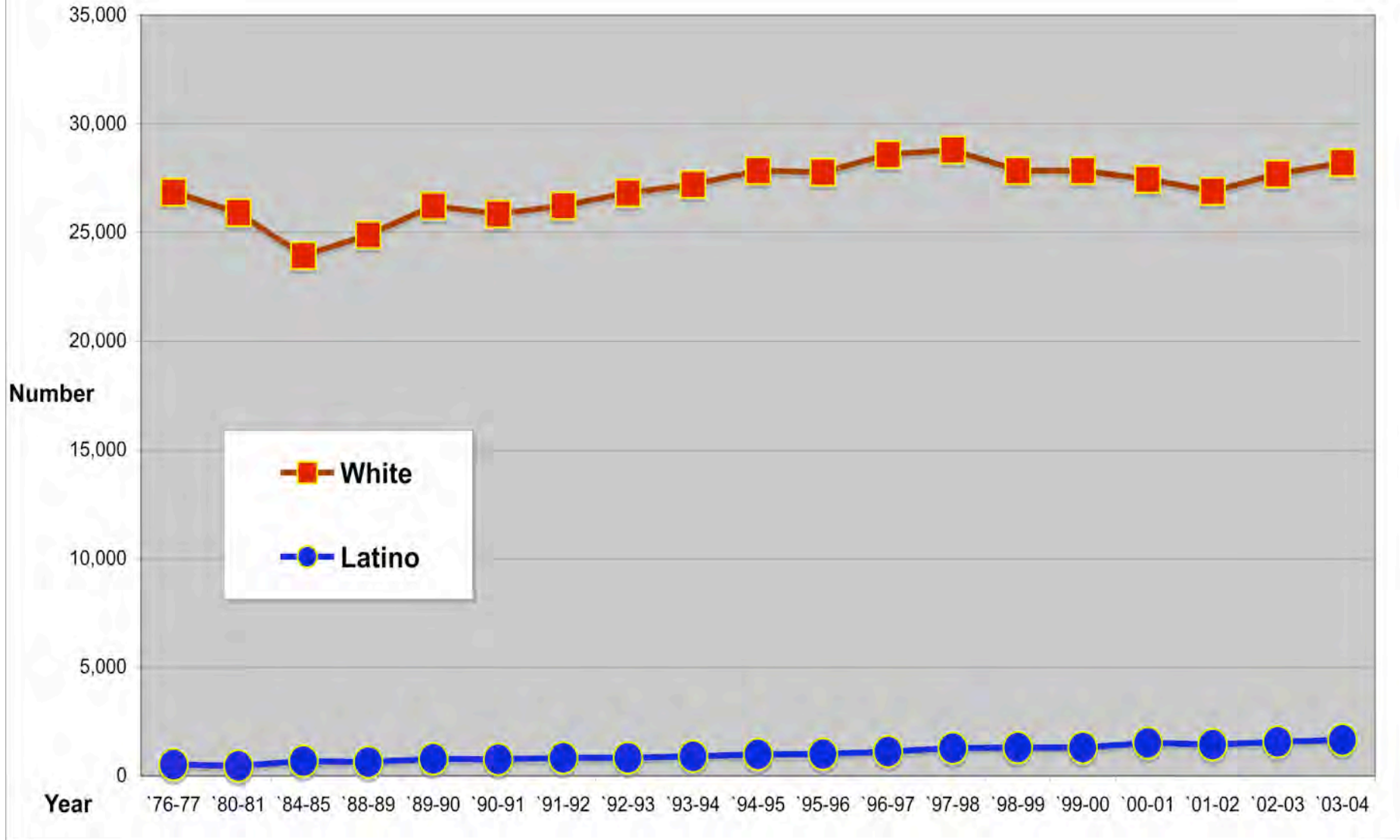
Doctoral Degrees in STEM

Minority Enrollment in Higher Education, by Race/Ethnicity:
Selected Years, 1993 to 2003

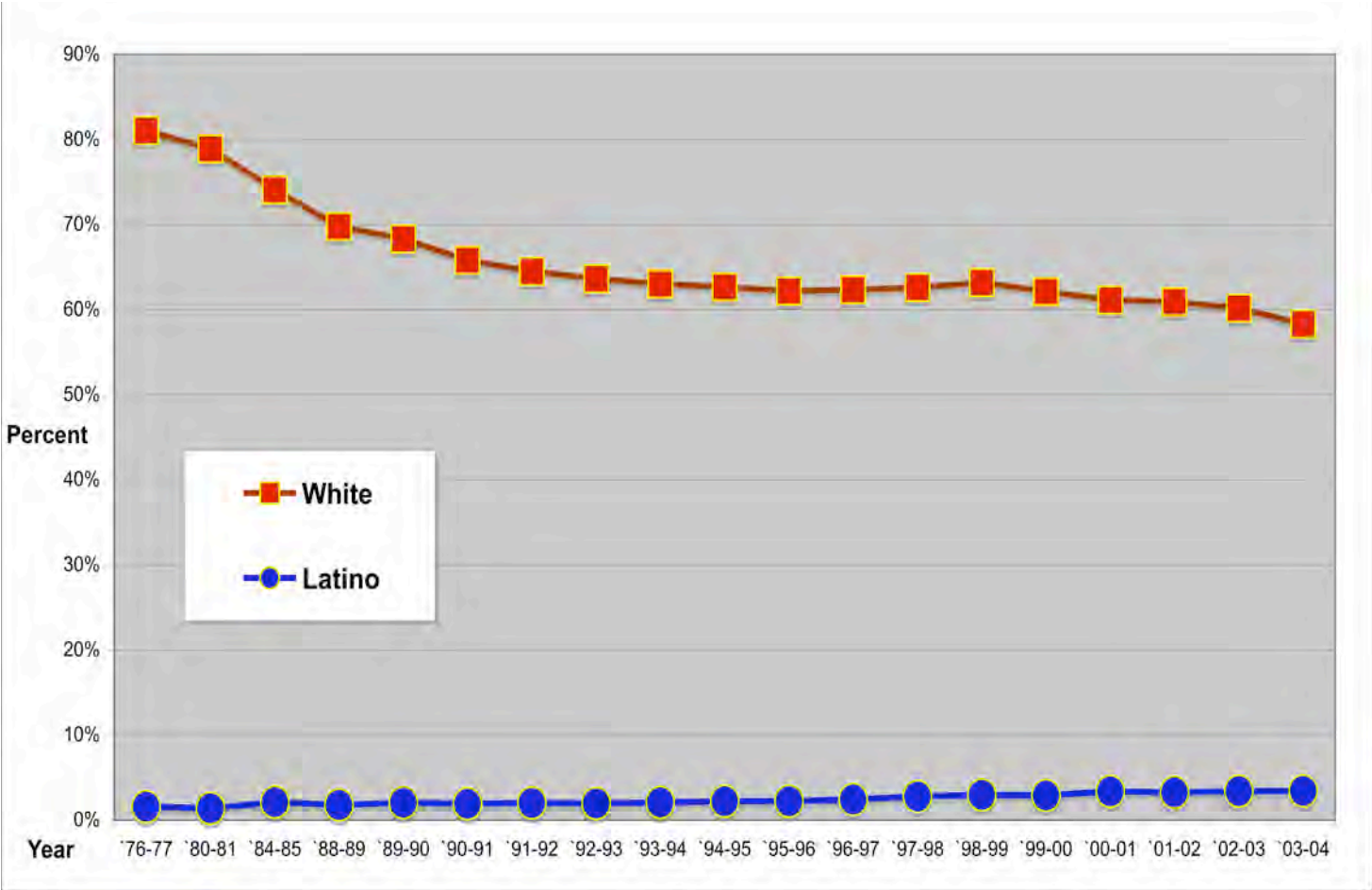


In the 10-year period between 1993 and 2003, African-American enrollment in higher education rose by 42.7 percent, to total more than 1.9 million students. Growth in Hispanic enrollment led all racial/ethnic groups, increasing by 653,317 students, or 68.8 percent.

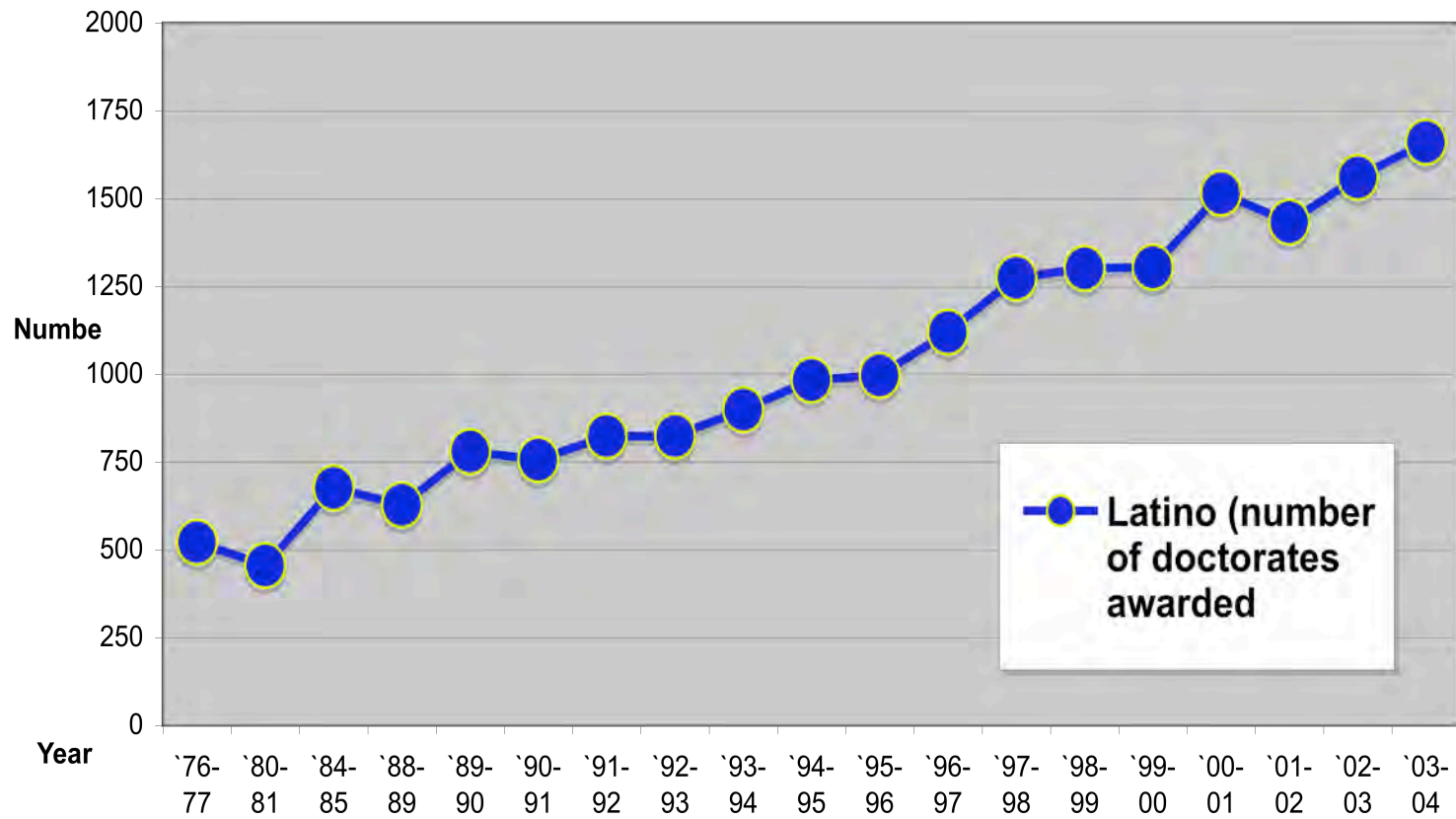
Number of doctoral degrees awarded to White and Latino graduates by degree-granting institutions in the United States (1976-77 through 2003-04)



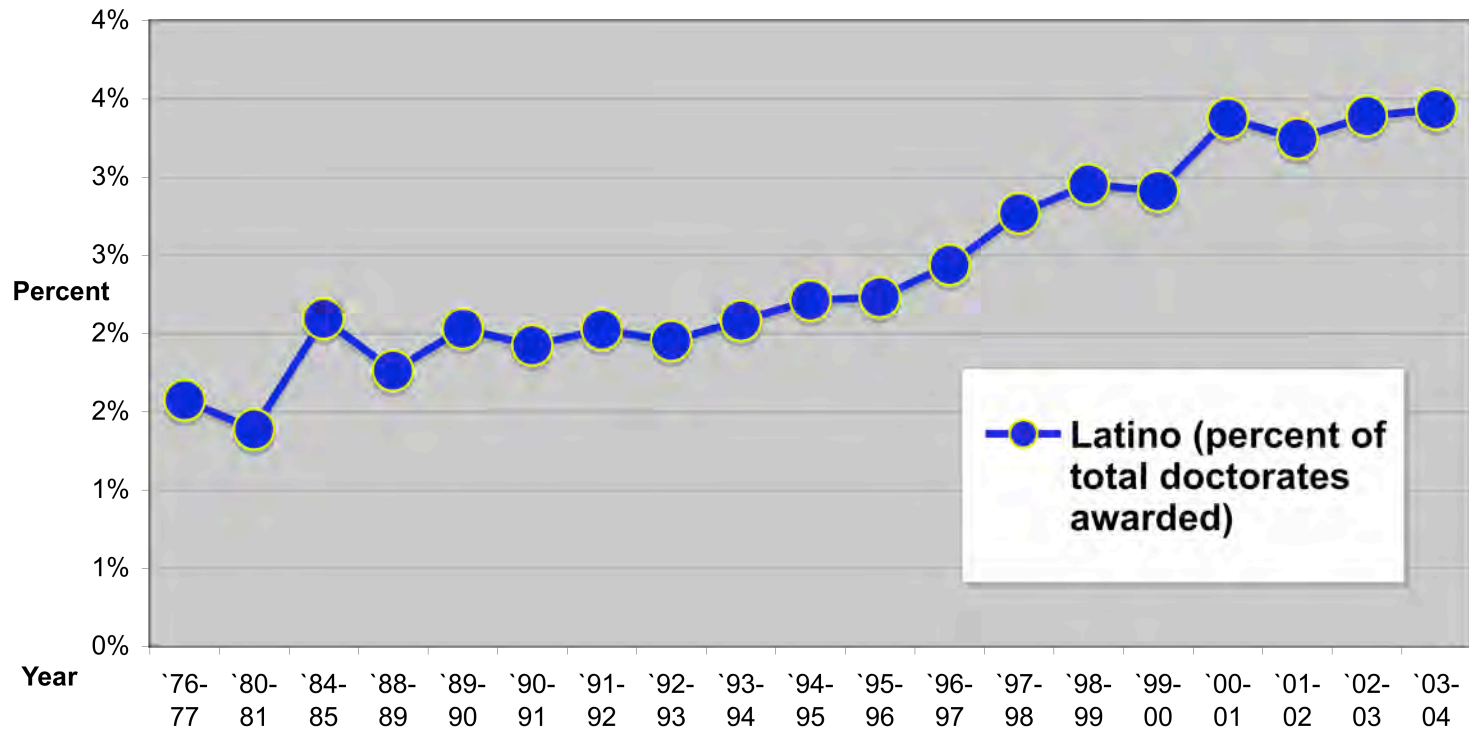
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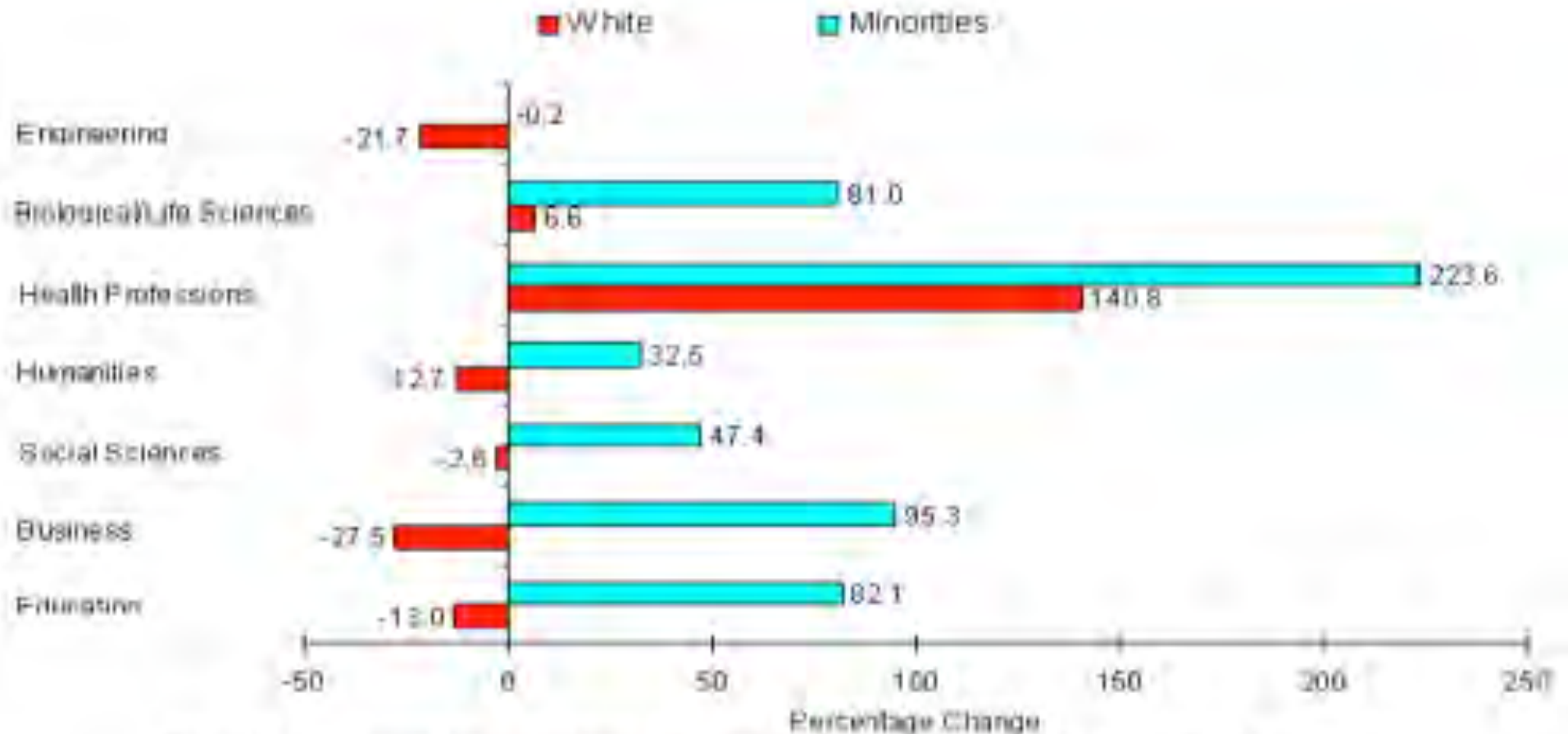
TRENDS – Latina/o Doctorates: 1976-2004



Doctoral degrees (Percent) awarded to Latino graduates by degree-granting institutions in the United States (1976-77 through 2003-04)

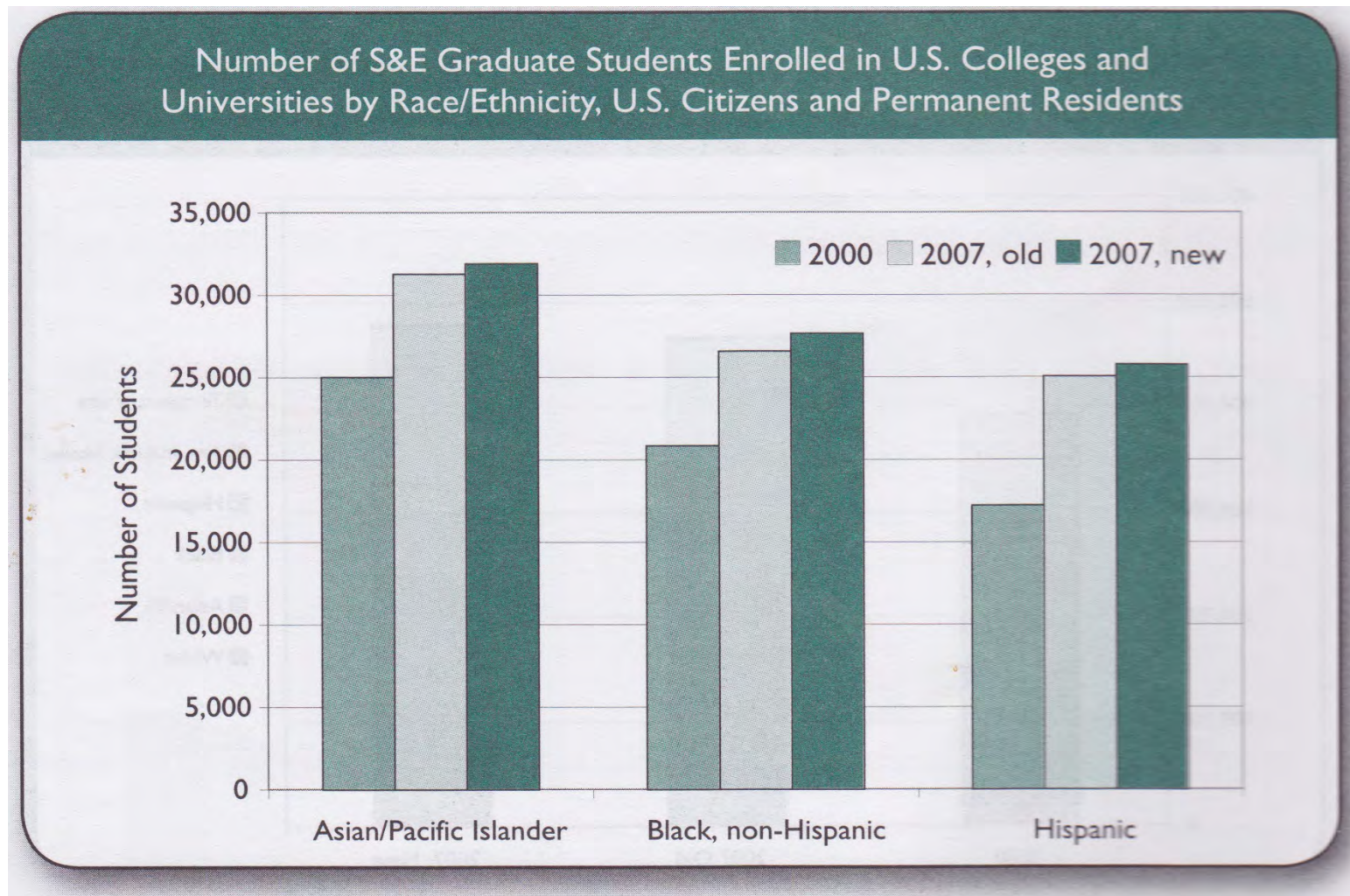


Percentage Change in Number of Doctoral Degrees Awarded in Selected Fields, by Race & Ethnicity: 1993-94 to 2003-04

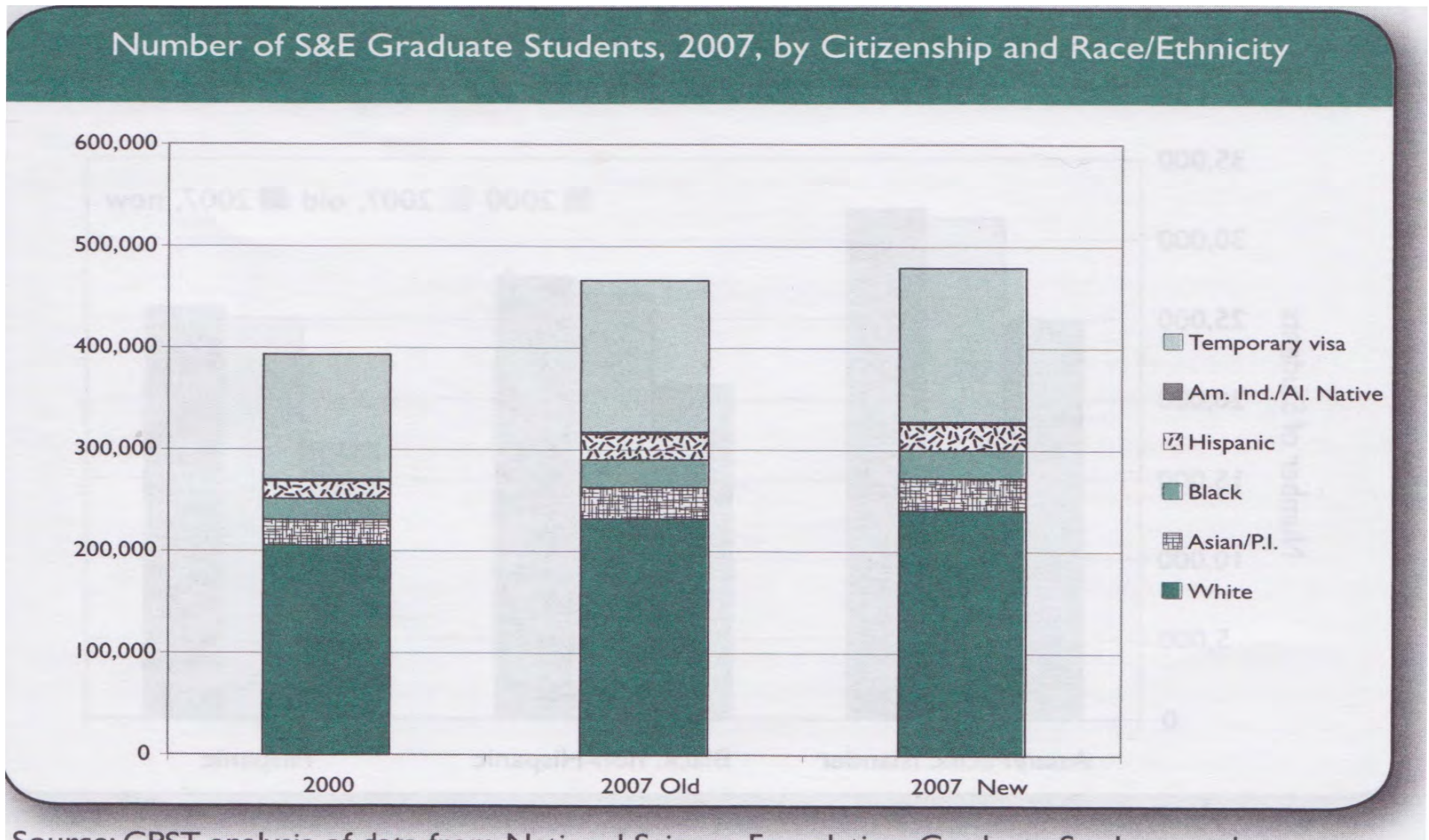


The decline in doctoral degrees conferred in these fields is the result of significant declines in whites earning degrees in humanities and engineering.

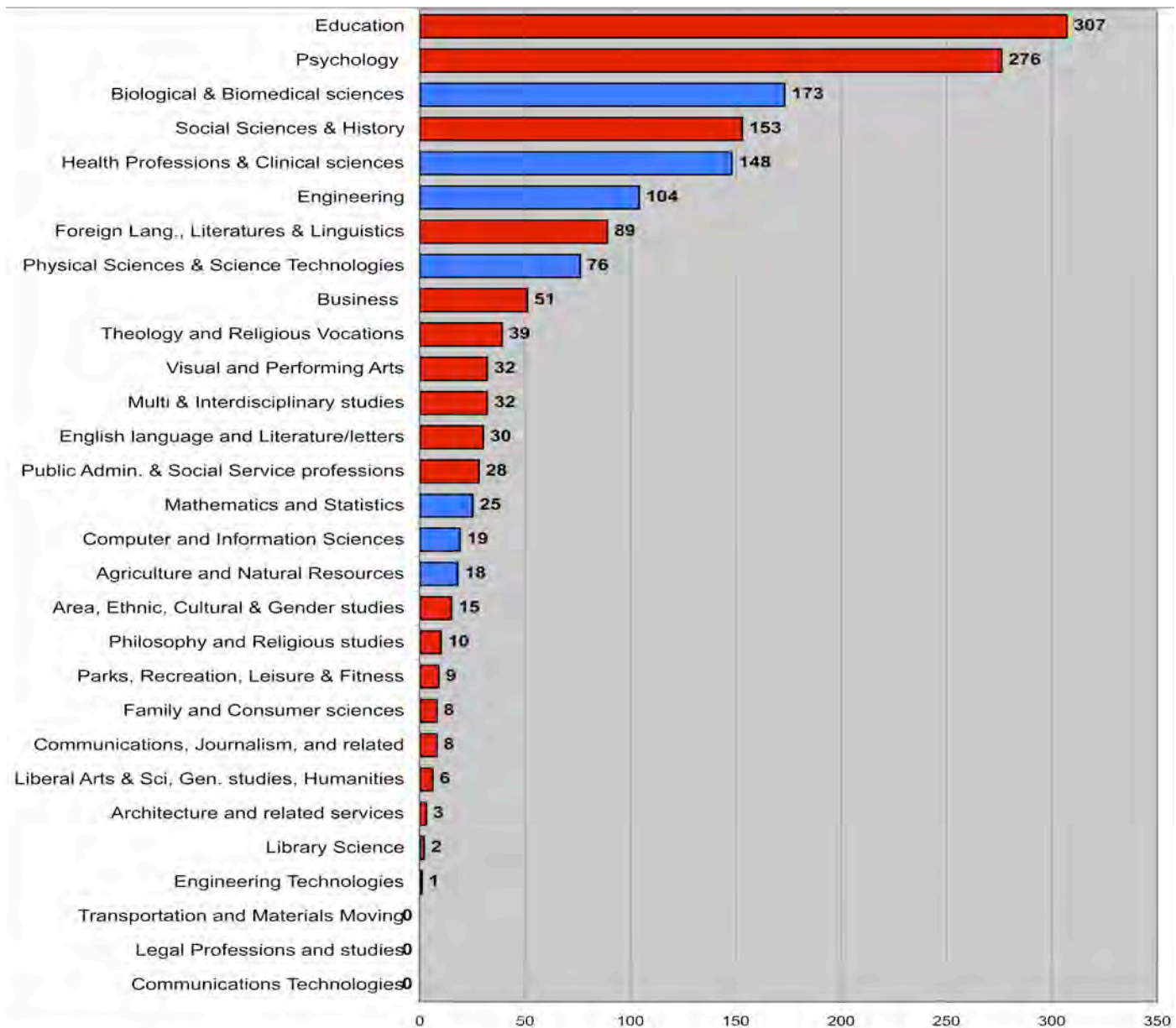
NSF data for 2007 show U.S. minority groups (excluding foreign students). The chart shows that their numbers has increased since 2000, which is important as Asians and Hispanics are the two fastest-growing racial/ethnic groups in the U.S.



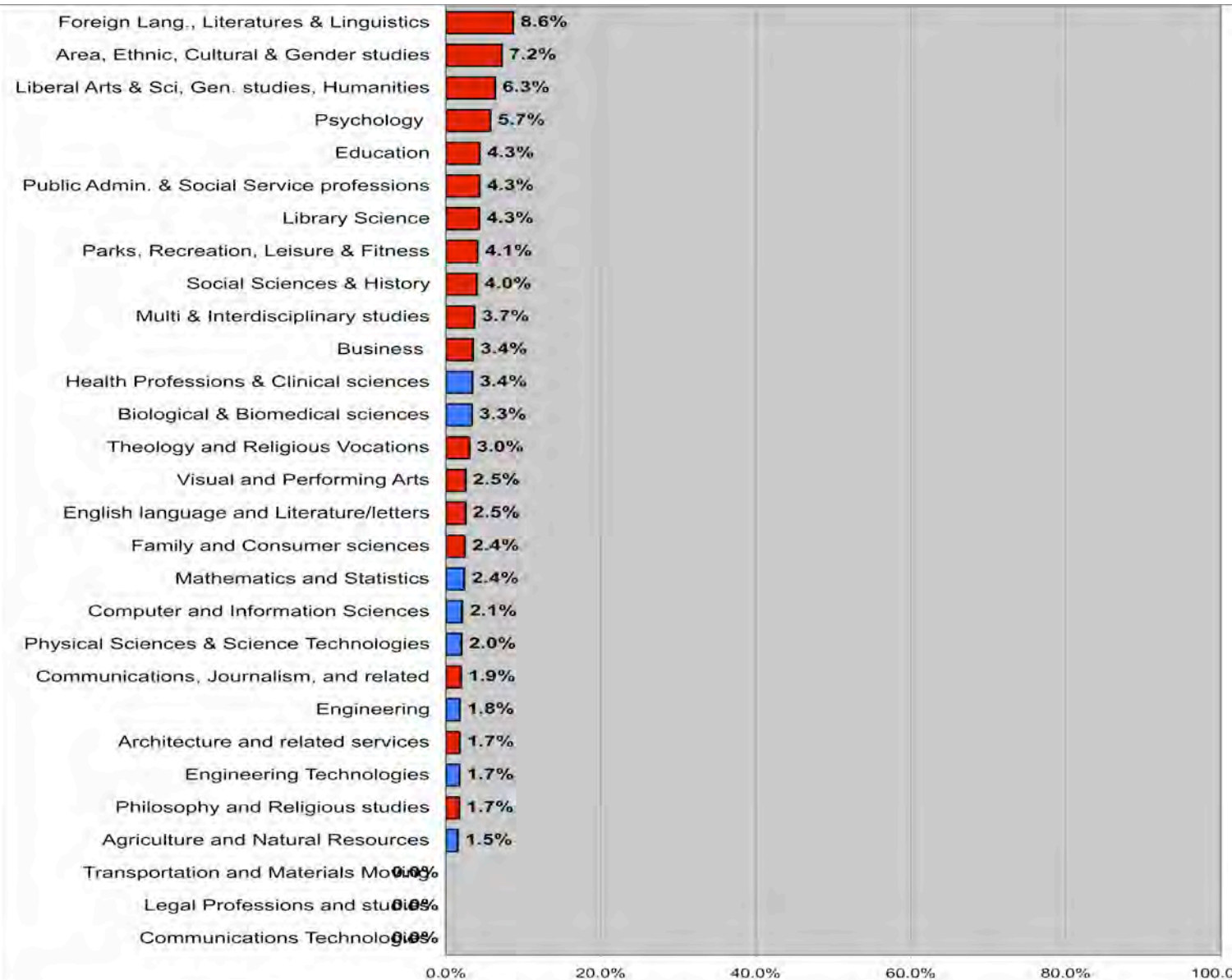
NSF Data Showing Increase in graduate S&E enrollment from 486,287 in 2006 to 502,375 (Old Classification) and to 516,199 using new classification.



LATINA-LATINO DOCTORATES: 2003-04

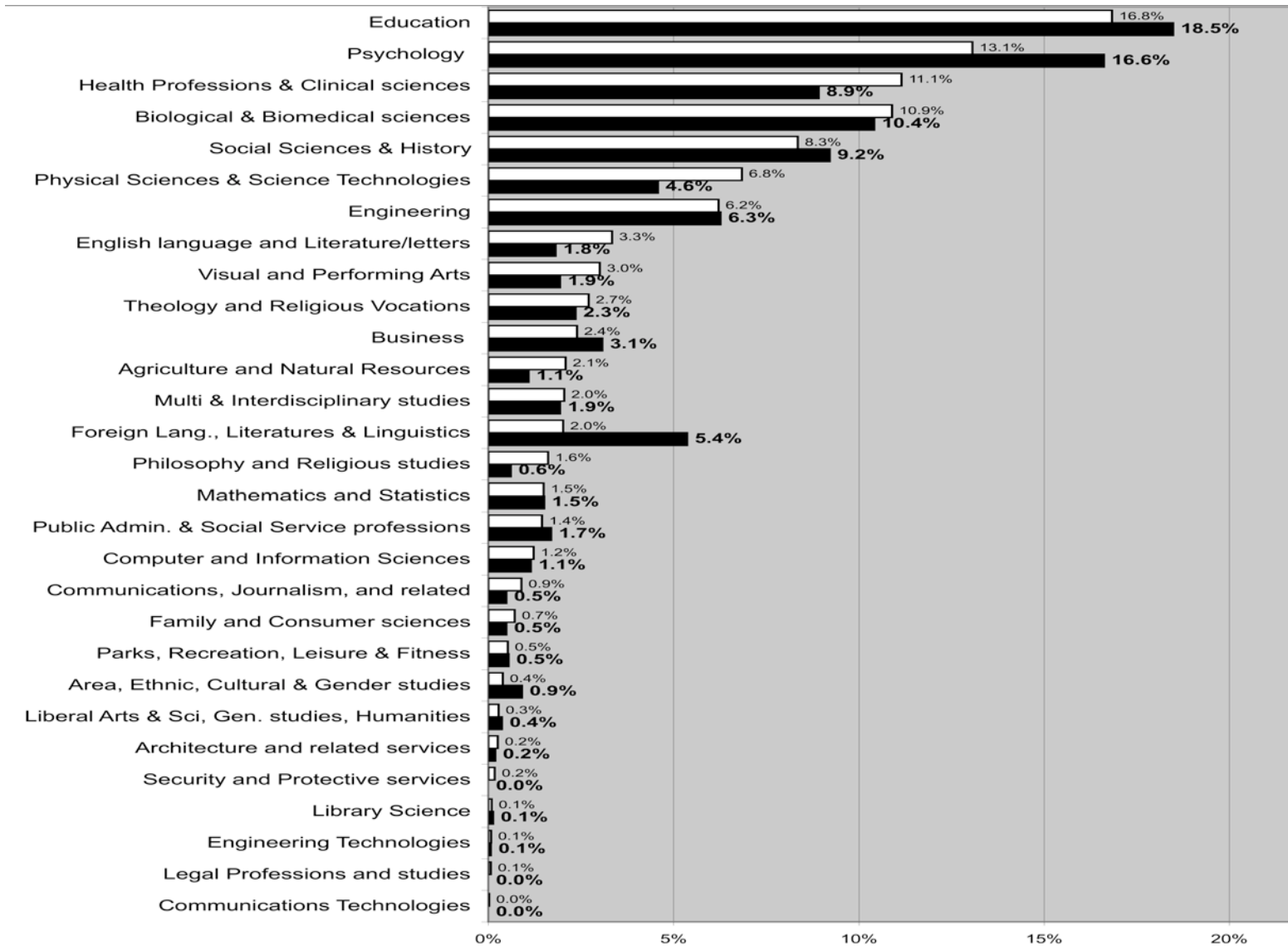


Percent of U.S. doctoral degrees awarded to Latino graduates (2003-04)



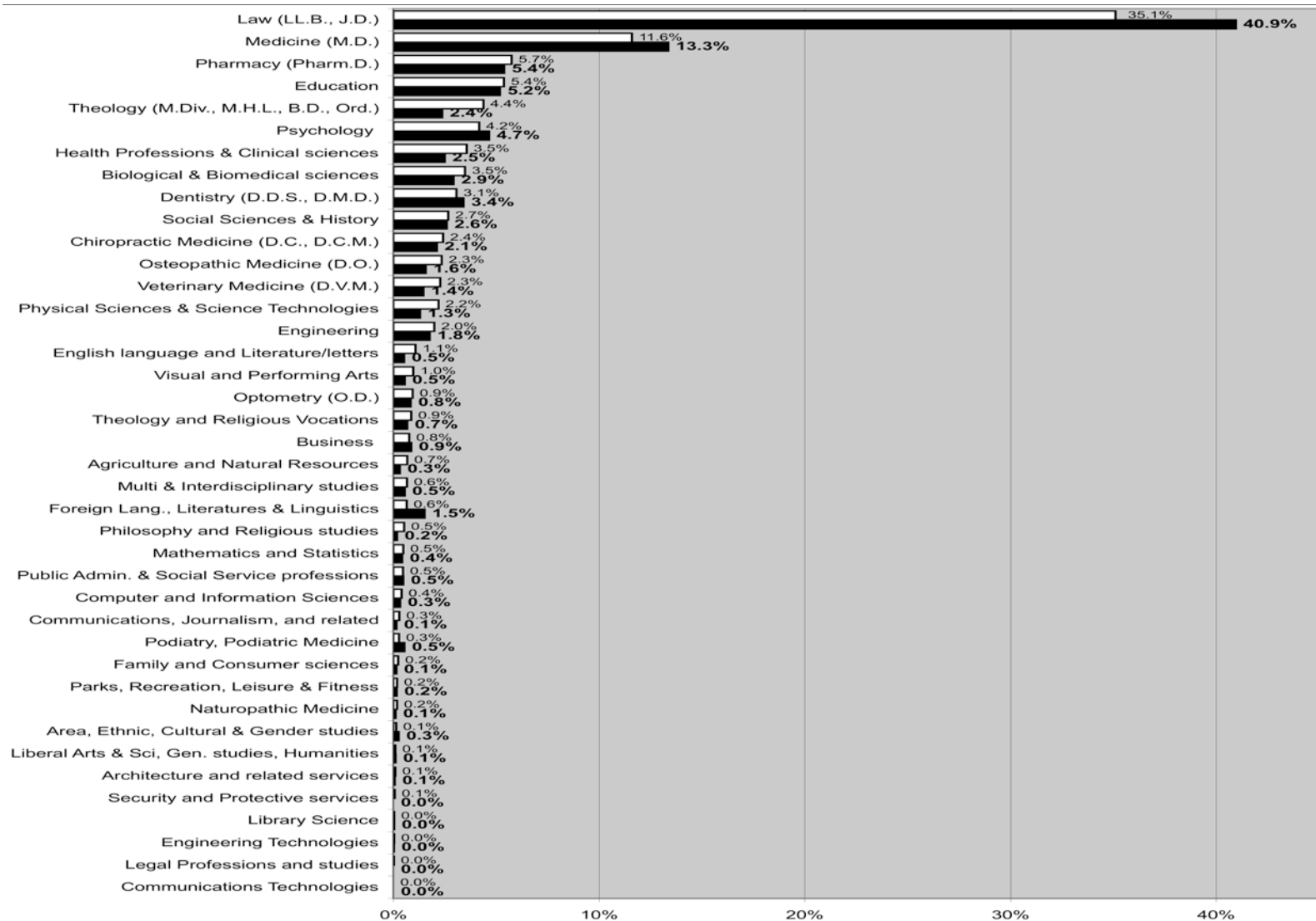
Comparison of "within-major" percents of doctoral degrees Awarded to Latino and White graduates (2003-04)*

*Does not include Medicine. Law, similar doctorates



Latino and White Doctorates, United States (2003-04)*

Comprehensive of all doctorates, including Medicine, Law, etc.



Hispanic Doctorates in S&E

Hispanic Doctorates and field of science ¹	1996 ²	2000 ²	2004 ²	2005 ²
1	1,113²	1,310²	1,299²	1,426²
Science and engineering combined total ²	626 ²	730 ²	718 ²	799 ²
0	0	0	0	0
Science total for Hispanic Doctorates ²	527 ²	648 ²	630 ²	710 ²
... Agricultural sciences ²	13 ²	29 ²	16 ²	18 ²
... Biological sciences ²	131 ²	174 ²	192 ²	227 ²
... Computer sciences ²	16 ²	14 ²	13 ²	12 ²
... Earth, atmospheric, and ocean sciences ²	19 ²	16 ²	11 ²	18 ²
... Mathematics ²	11 ²	15 ²	26 ²	24 ²
... Physical sciences ²	67 ²	77 ²	62 ²	74 ²
..... Astronomy ²	2 ²	3 ²	6 ²	3 ²
..... Chemistry ²	36 ²	51 ²	43 ²	55 ²
..... Physics ²	29 ²	23 ²	13 ²	16 ²
... Psychology ²	173 ²	211 ²	172 ²	188 ²
... Social sciences ²	97 ²	112 ²	138 ²	149 ²

The top ten doctorates by White and Hispanic, 2003-04

Includes all doctorates, not just S&E.

White Ranking of Top Ten	Latino Ranking of Top Ten
<p>¶</p> <p>1)→ Law (LLB, JD)¶</p> <p>2)→ Medicine (M.D.)¶</p> <p>3)→ Pharmacy (Pharm.D.)¶</p> <p>4)→ Education¶</p> <p>5)→ Theology (M.Div., M.H.L., B.D., Ord.)¶</p> <p>6)→ Psychology¶</p> <p>7)→ Health Professions & Clinical sciences¶</p> <p>8)→ Biological & Biomedical sciences¶</p> <p>9)→ Dentistry (D.D.S., D.M.D.)¶</p> <p>10)→ Social Sciences & History○</p>	<p>¶</p> <p>1)→ Law (LLB, JD)¶</p> <p>2)→ Medicine (M.D.)¶</p> <p>3)→ Pharmacy (Pharm.D.)¶</p> <p>4)→ Education¶</p> <p>5)→ Psychology¶</p> <p>6)→ Dentistry (D.D.S., D.M.D.)¶</p> <p>7)→ Biological & Biomedical sciences¶</p> <p>8)→ Social Sciences & History¶</p> <p>9)→ Health Professions & Clinical sciences¶</p> <p>10)→ Theology (M.Div., M.H.L., B.D., Ord.)¶</p> <p>○</p>

Actual & Projected Enrollment of Hispanics in Higher Education (In thousands, base year 1996)

• Actual	Total	Hispanic	Net Change by year	
			Total	Hispanic
• 1996	14,368	1,166		
• 1997	14,502	1,218	134	52
• 1998	14,507	1,257	5	39
• 1999	14,791	1,319	284	63
• 2000	15,312	1,462	521	143
• 2001	15,928	1,561	616	99
• 2002	16,612	1,662	684	101
• 2003	16,900	1,716	288	54
• 2004	17,272	1,810	372	94
• Projected				
• 2005	17,429	1,842	157	32
• 2006	17,648	1,898	219	56
• 2007	17,916	1,959	268	61
• 2008	18,202	2,026	286	67
• 2009	18,480	2,097	278	71
• 2010	18,746	2,171	266	74
• 2011	18,956	2,244	210	73
• 2012	19,182	2,319	226	75
• 2013	19,439	2,401	254	82
• 2014	19,682	2,487	243	86
• 2015	19,874	2,569	192	82

Doctoral Degrees & Implications

Latinos pursue doctoral degrees and schooling that parallels White, non-Hispanic youth.

Latinos are increasing in numbers and progress is notable in doctoral degree numbers.

What's correlated with this pattern?

Problem of Persistence, Not Drop-out or Course Failure

Figure 37
Persistence of Degree Seeking 1989-90 Beginning Students
at Four-Year Institutions After Five Years, by Race/Ethnicity



Increasing the Success of Minority Students in Science and Technology by ACE

African American and Hispanic students begin college interested in majoring in science, technology, engineering and math (STEM) fields at rates similar to those of white and Asian-American students, and persist in these fields through their third year of study, but do not earn their bachelor's degrees at the same rate as their peers.

African American and Hispanic students majoring in STEM fields who persisted beyond the third year did not drop out, but were still enrolled and working toward a degree after six years.

A statistical analysis showed that majoring in STEM fields did not affect student persistence.

Instead, the variables strongly related to persistence for all students, regardless of major or race/ethnicity were full-time attendance, hours worked while enrolled, and rigor of high school curriculum.

ACE: key differences between students who earned a bachelor's degree by spring 2001 in a STEM field and those who did not.

Completers were better prepared for postsecondary education because a larger percentage took a highly rigorous high school curriculum.

Nearly all completers were younger than 19 when they entered college in 1995-96 compared with 83.9 percent of non-completers.

Completers were more likely to have at least one parent with a bachelor's degree or higher.

Completers came from families with higher incomes.

Non-completers were more likely to work 15 hours or more a week.

American Council on Education (*Item no: 311293*)

African American and Hispanic students begin college interested in majoring in science, technology, engineering and math (STEM) fields at rates similar to those of white and Asian-American students, and persist in these fields through their third year of study, but do not earn their bachelor's degrees at the same rate as their peers, according to a new analysis conducted by the American Council on Education (ACE).

The analysis further finds that the majority of the African American and Hispanic students majoring in STEM fields who persisted beyond the third year did not drop out, but were still enrolled and working toward a degree after six years.

American Council on Education [continued]

“Our analysis seems to dispel the commonly held belief that African American and Hispanic students aren’t interested in majoring in STEM fields,” said Eugene Anderson, associate director of the Center for Policy Analysis at ACE and co-author of the report.

“We find that these students do pursue these majors and persist beyond the third year, but are not earning enough credits each year to attain a degree within six years.”

Increasing the Success of Minority Students in Science and Technology, in ACE series, with data from a longitudinal study conducted by the U.S. Department of Education’s National Center for Education Statistics which tracked 12,000 undergraduates who entered college in the fall of 1995.

American Council on Education - Key Findings

In the 1995-96 academic year, 18.6 percent of African-American students and 22.7 percent of Hispanic students began college interested in majoring in STEM fields compared with 18 percent of white students and 26.4 percent of Asian-American students.

By the spring of 1998, students in each racial/ethnic group continued to study STEM fields at nearly the same rates (56 percent of African Americans and Hispanics, 57 percent of whites and Asian Americans).

By the spring of 2001, 62.5 percent of African Americans and Hispanics majoring in STEM fields attained a bachelor's degree compared with 94.8 percent of Asian Americans and 86.7 percent of whites.

Additional ACE Findings

Although persistence rates of African American and Hispanic students majoring in STEM fields were below the overall persistence rates for these students in all fields, a statistical analysis showed that majoring in STEM fields did not affect student persistence. Instead, the variables strongly related to persistence for all students, regardless of major or race/ethnicity were full-time attendance, hours worked while enrolled, and rigor of high school curriculum.

“Positive and negative predictors of degree completion are not specific to the STEM fields, and the strategies for increasing minority student degree completion in the STEM fields are the same for increasing success in any other major.”

Research on Persistence

Report by Shulock and Moore (February 2007) argues that “access-oriented policies” have the unintended consequence of inhibiting degree completion. Those policies are presented in five clusters:

“Four of the policy clusters **involve finance**, broadly defined to include laws and regulations that affect how much funding each college receives, **how colleges can use their funds**, **the fees students pay**, and **the conditions of student financial aid eligibility**.

A fifth set of policies **influences how students are advised and counseled** to choose courses and make academic decisions.

These policies are especially influential for under-prepared students.” (2007, p.10).

Undergraduate Baccalaureates of S&E Doctorates

In the NSF's report on the undergraduate origins of S&E doctorates (1996), only about 325 universities in the United States provided doctorate-level education in science and engineering (S&E), but a broad base of institutions provided students their foundation in science or engineering.

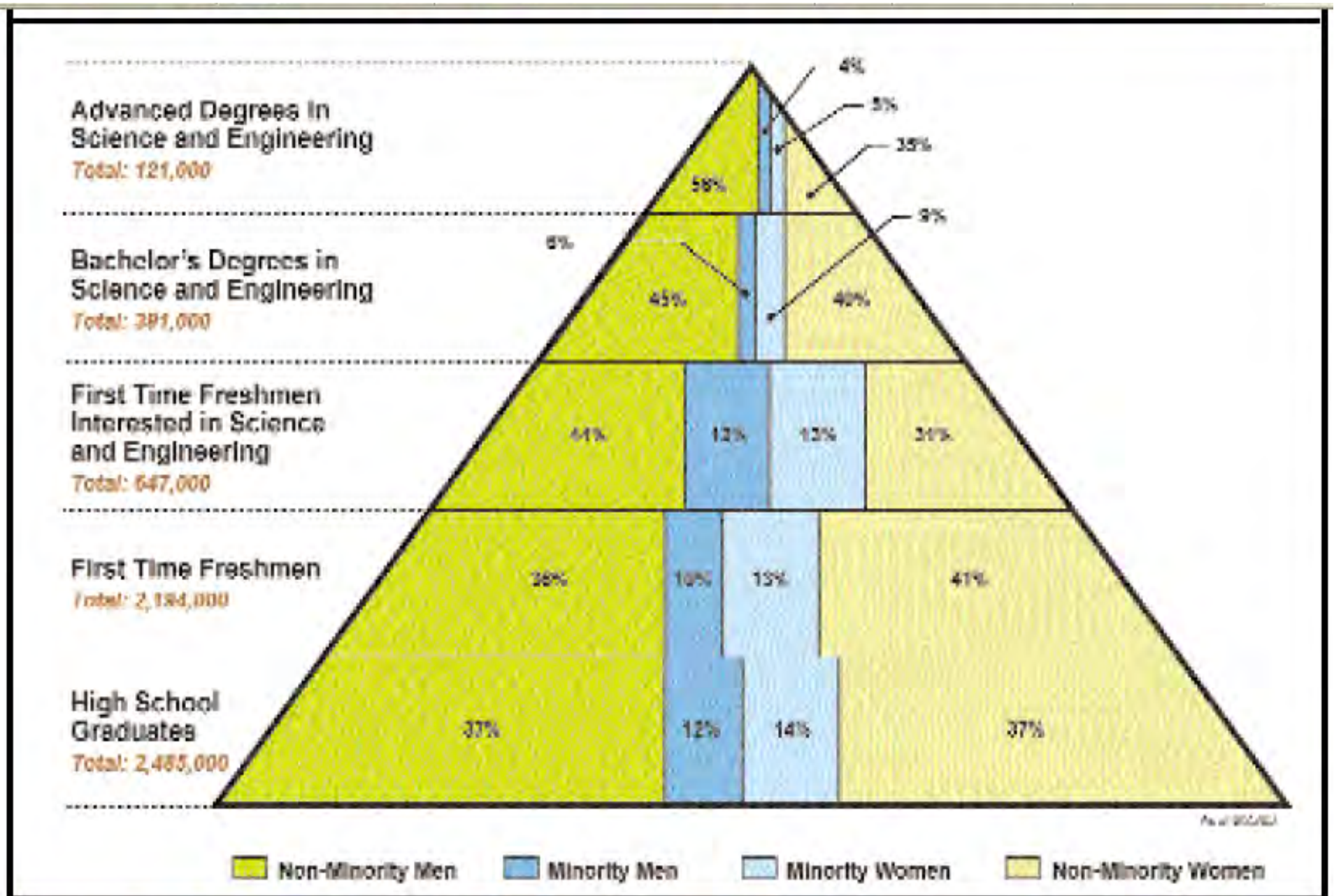
- Almost 2,200 4-year colleges that offer undergraduate S&E degrees;
- About 1,400 2-year schools that offer S&E instruction and/or training in S&E technologies;
- Over 23,000 high schools that provide mathematics and science courses; and
- Numerous high schools, colleges, and universities in foreign countries that educate the many students who came to the United States for their graduate degrees.

BEST Report “A Bridge for All”

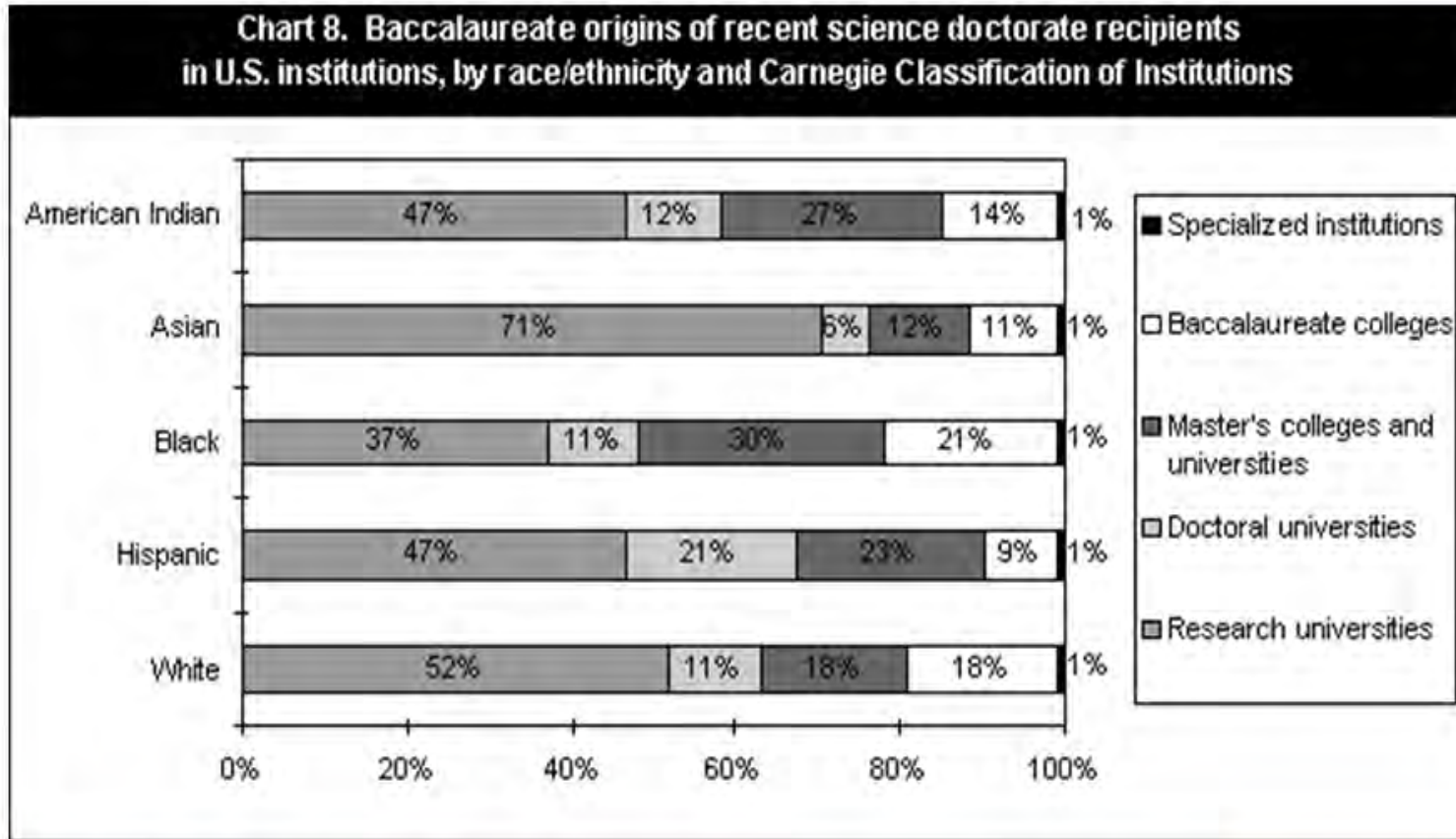
A pyramid of education “milestones” (Figure 1-1) captures the scope of the challenge. The sorting process in science, engineering and technology reduces the size of the talent pool at each successive phase of education, eliminating African Americans, Hispanics and Native American in disproportionate numbers. The higher up the educational ladder one goes, the more their participation rate declines.

The imbalance is further reflected in degrees attained. In 2000, one-third of all African American, Hispanic or Native American undergraduates earned a bachelor’s degree in a technical discipline,

Education Milestones by Race/Ethnicity/Gender



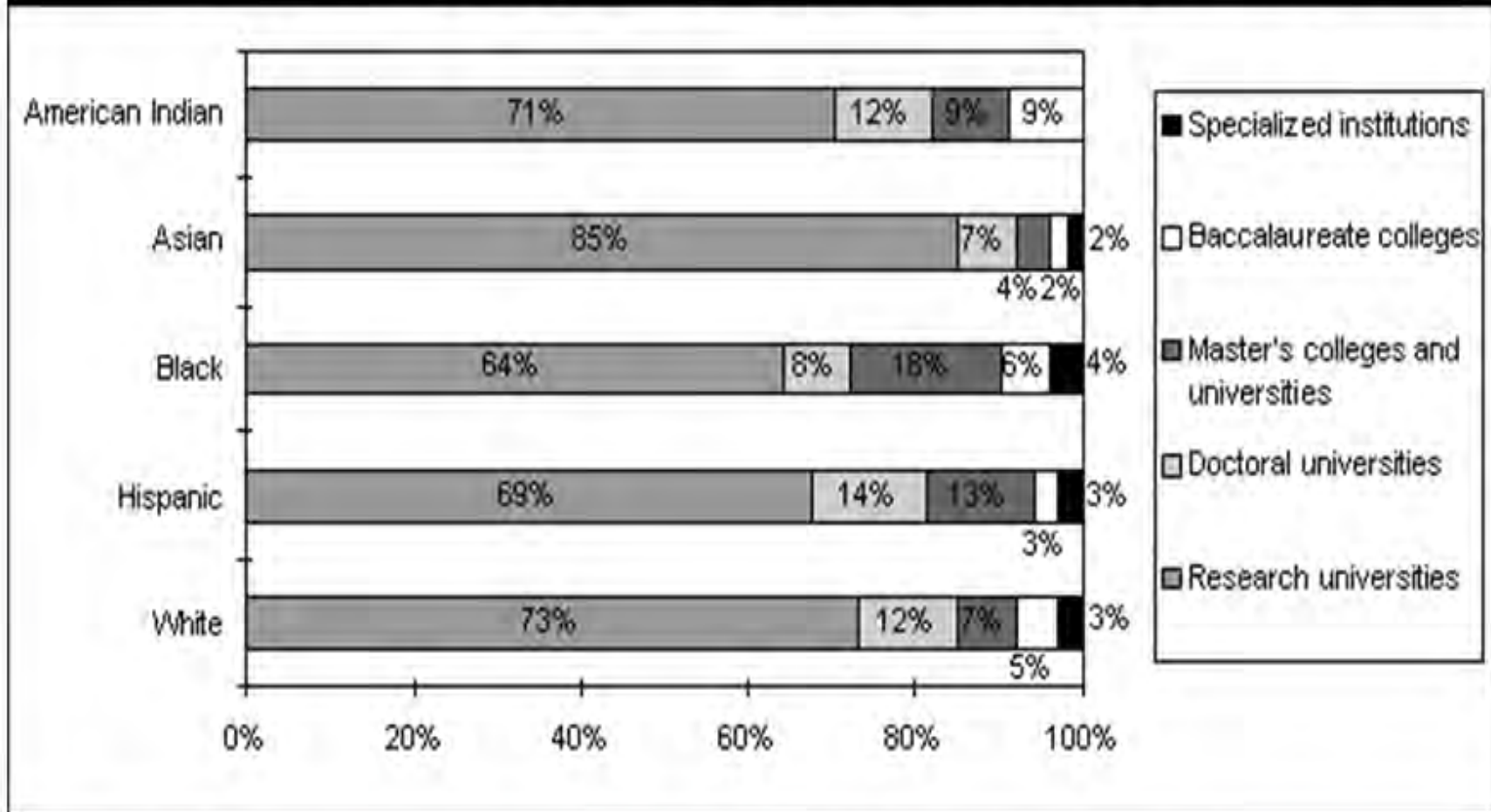
Undergraduate Baccalaureates of Latino Doctorates in S&E



NOTES: See Technical Notes for more information on the Carnegie Classification. Percentages may

More on Latino Doctorates in Engineering

Chart 9. Baccalaureate origins of recent engineering doctorate recipients in U.S. institutions, by race/ethnicity and Carnegie Classification of Institutions



NOTES: See Technical Notes for more information on the Carnegie Classification. Percentages may not add to 100 due to rounding.

NSF WebCASPAR 2007 data show the top 20 degree granting schools for URMs using the new inclusive definition of STEM.

URM Participation in STEM, Broad Definition of STEM

Rank	Institution	Underrepresented Minorities			Grand Total			%URM
		Female	Male	Total	Female	Male	Total	
1	Florida International University	898	629	1,527	1,190	895	2,085	73.2%
2	University of Phoenix	920	418	1,338	4,156	2,721	6,877	19.5%
3	University of PR Mayaguez Campus	563	586	1,149	564	591	1,155	99.5%
4	University of Florida	612	416	1,028	2,499	2,137	4,636	22.2%
5	University of California – Los Angeles	576	337	913	2,853	2,088	4,941	18.5%
6	University of Texas – Pan American	581	330	911	654	395	1,049	86.8%
7	University of PR Rio Piedras Campus	550	269	819	550	269	819	100.0%
8	University of South Florida	527	279	806	1,957	1,245	3,202	25.2%
9	San Diego State University	434	273	707	1,477	1,078	2,555	27.7%
10	University of Texas at Austin	356	347	703	1,819	2,281	4,100	17.1%
11	University of Central Florida	427	250	677	1,789	1,253	3,042	22.3%
12	California State University – Northridge	448	201	649	1,169	757	1,926	33.7%
13	University of Texas at El Paso	365	278	643	461	408	869	74.0%
14	University of Texas at San Antonio	358	279	637	626	545	1,171	54.4%
15	University of Houston	373	264	637	935	913	1,848	34.5%
16	Florida Atlantic University	389	204	593	982	565	1,547	38.3%
17	Florida State University	327	260	587	1,370	1,295	2,665	22.0%
18	California State University – Fullerton	408	157	565	1,169	552	1,721	32.8%
19	North Carolina Agricultural & Tech State Univ	323	241	564	349	272	621	90.8%
20	Howard University	409	154	563	461	201	662	85.0%

NSF WebCASPAR 2007 data show the top 20 degree granting schools for URM's using a definition of STEM excluding psychology, social sciences and interdisciplinary sciences.

URM Representation in STEM: Natural/Physical Sciences and Engineering

Rank	Institution	Underrepresented Minorities			Grand Total			%URM
		Female	Male	Total	Female	Male	Total	
1	University of PR Mayaguez Campus	460	524	984	461	529	990	99.4%
2	University of Phoenix	540	356	896	3,095	2,548	5,643	15.9%
3	Florida International University	433	383	816	579	569	1,148	71.1%
4	University of Texas Pan American	341	233	574	390	285	675	85.0%
5	University of Texas at El Paso	270	232	502	350	350	700	71.7%
6	University of Florida	262	229	491	1,251	1,240	2,491	19.7%
7	Universidad Politecnica de Puerto Rico	86	286	372	86	286	372	100.0%
8	University of Central Florida	211	154	365	912	748	1,660	22.0%
9	University of Texas at San Antonio	161	192	353	283	382	665	53.1%
10	Florida Atlantic University	219	133	352	542	358	900	39.1%
11	Florida Agricultural & Mechanical University	229	112	341	237	125	362	94.2%
12	University of Texas at Austin	152	188	340	935	1,411	2,346	14.5%
13	Howard University	234	96	330	274	133	407	81.1%
14	University of South Florida	182	145	327	795	694	1,489	22.0%
15	University of Miami	216	104	320	442	294	736	43.5%
16	North Carolina Agricultural & Tech State Univ.	167	134	301	189	156	345	87.2%
17	Texas A&M University Main Campus	131	161	292	1,110	1,443	2,553	11.4%
18	New Mexico State University, All Campuses	129	134	263	297	314	611	43.0%
19	Inter American U of PR San German Campus	128	133	261	128	133	261	100.0%
20	SUNY at Stony Brook, All Campuses	152	102	254	655	683	1,338	19.0%

What to do?

“The challenge now is to move traditionally underrepresented students in the STEM fields toward timely degree completion by supporting these students—both academically and financially—throughout their undergraduate careers,” [Anderson].

- * Increase opportunities for sciences research experiences for students, undergraduate and graduate, from underrepresented groups.
- * Facilitate the establishment, development and enhancement of science experiences and research capabilities in with students
- * Foster educational and research partnerships/ collaborations/exchanges between and among: minority serving institutions, traditional majority serving institutions (i.e., 2- and 4-year colleges, universities) research centers, professional and industrial organizations.

The ACE analysis identified a Goal for higher education:

“The challenge now is to move traditionally underrepresented students in the STEM fields toward timely degree completion by supporting these students—both academically and financially—throughout their undergraduate careers.”

Call to Action:

- * Identify groups that will push the STEM agenda forward in the nation.
- * Develop Action Items and identify specific partnerships between education segments, local government and industry that will champion a strategic plan for advancing more through STEM.

Also notable in the data from 2004 to 2005, according to the Council of Graduate Schools, are increases for black and Hispanic graduate students in selected science and technology fields where their numbers have been extremely low. Black enrollment was up 11 percent in engineering and Hispanic enrollment was up 16 percent in the biological sciences, for instance.

The study also confirmed reports previously conducted by the council projecting a rebound for international graduate enrollments. First-time enrollment of foreign graduate students was up 4 percent in 2005, the first increase in four years. Total international enrollment was down slightly (-1 percent), but it had been falling by larger percentages in recent years. Foreign enrollment levels are crucial for certain fields, as non-American students make up 48 percent of those in engineering programs and 40 percent in the physical sciences.

