

PHYSICS UNDERGRADUATE ENROLLMENTS AND DEGREES

Results from the 2007 Survey of Enrollments and Degrees

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focus on series

ENROLLMENTS AND DEGREES

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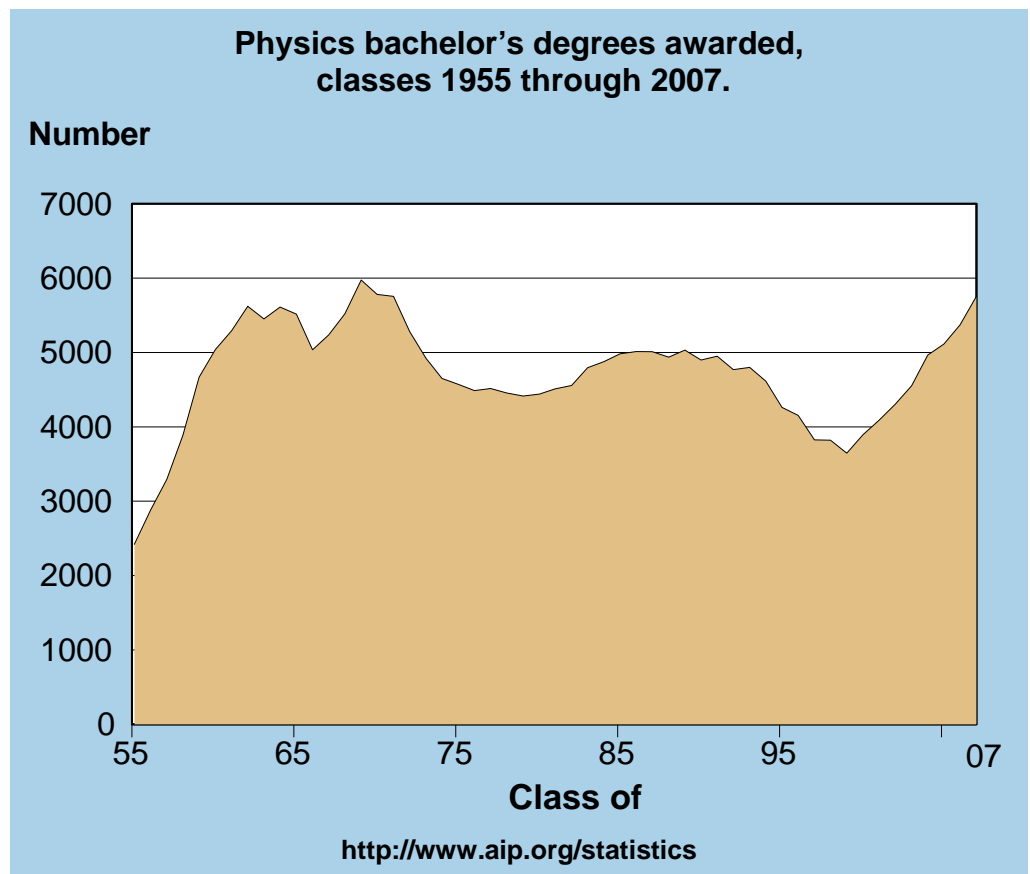
[Astronomy Enrollments and Degrees \(Nov 2009\)](#)

Physics Undergraduate Enrollments and Degrees (Jan 2010)

[Physics Graduate Enrollments and Degrees \(Jan 2010\)](#)

In the United States, the number of physics bachelor's awarded has been rising steadily for 8 consecutive years, increasing by 58%. This surge in bachelor's degrees awarded follows steady declines during the 1990's and brings physics bachelor's degree production to its highest level in almost 40 years.

Figure 1



The number of physics bachelor's degrees awarded in the class of 2007 is approaching an all time high with 5,755 degrees conferred.

The total number of physics degree granting departments remains fairly stable from year to year. Eight of the 188 PhD-granting physics departments and one of the master's-granting departments do not have an undergraduate degree program.

Thirty-seven of the physics departments also offer a degree in astronomy. These departments are asked to report their astronomy enrollment and degree data separately from their physics data. The data concerning astronomy students at these departments are published in a separate astronomy "focus on" where it is combined with the data from an additional 38 departments that offer degrees only in astronomy.

Table 1

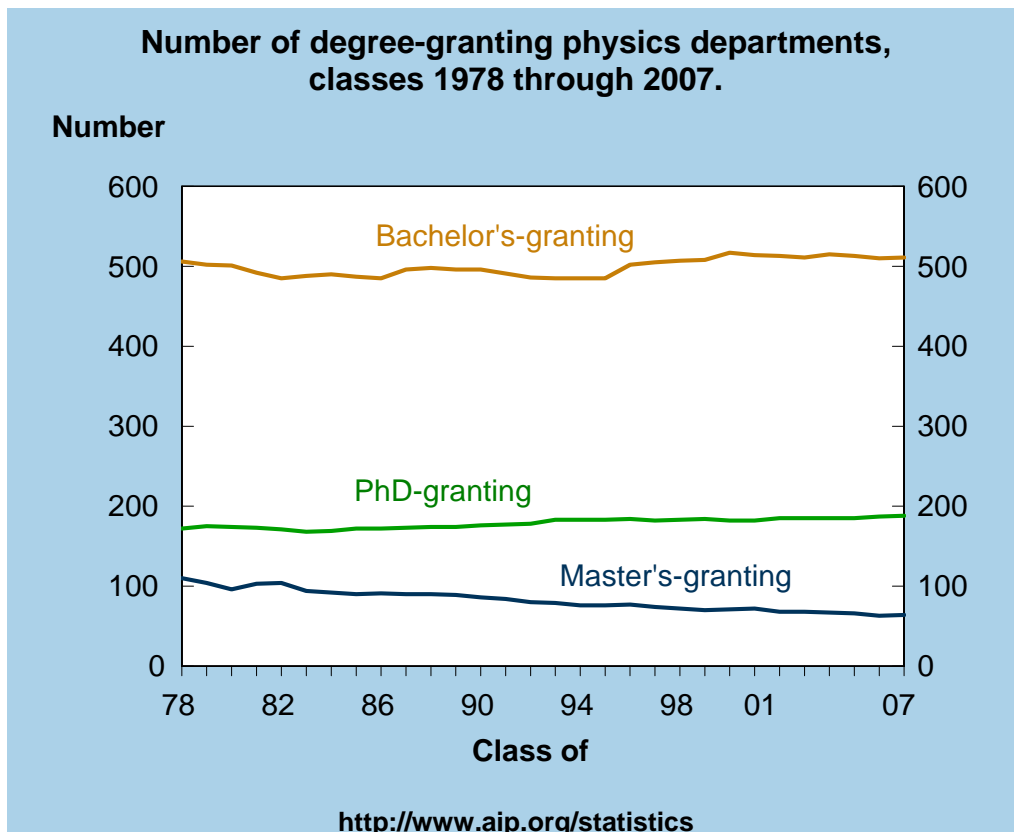
**Number of degree-granting physics departments,
academic year 2006-07.**

Highest physics degrees offered	Number of Depts.	Percent of Depts.
Bachelor's-granting	511	67
Master's-granting	64	8
PhD-granting	188	25
Total	763	100%

Two-thirds of degree-granting physics departments offer the bachelor's as their highest degree.

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

Figure 2



During the last decade there has been virtually no net change in the total number of degree-granting physics departments.

In any given year, a few programs will lose their physics degree-granting status and a few degree programs will begin. During the last decade, 31 colleges or universities suspended or discontinued their degree program in physics. During the same time period the SRC has become aware of 32 colleges and universities that added or reinstated a degree program in physics.

In addition to starting or discontinuing a degree program, occasionally departments will change the level of highest degree offered. Although the total number of departments has remained fairly stable in recent years, the number of departments with a master's as their highest degree has been slowly declining. Rather than these departments being eliminated altogether, departments which previously offered a master's as their highest physics degree typically expand their offerings to include a PhD or limit their degree offering to just the bachelor's.

The number of students taking an introductory physics class at degree-granting physics departments has increased by about 25% during the last decade. Although increases have been realized in each type of course offering, the algebra based and conceptual courses have experienced the greatest gains with both increasing by 28%, while the calculus based classes increased by 19% and continued to have the highest overall enrollments.

Table 2

Introductory physics course enrollments at physics departments, academic year 2006-07.

Highest physics degree offered by department	Calculus Based	Algebra Based	Conceptual
Bachelor's	49,000	48,000	29,000
Master's	17,000	17,000	13,000
PhD	108,000	81,000	33,000
Total	174,000	146,000	75,000

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In total, nearly 400,000 students took an introductory-level physics course during the 2006-07 academic year. This is an increase of about 25% from a decade earlier.

Table 3

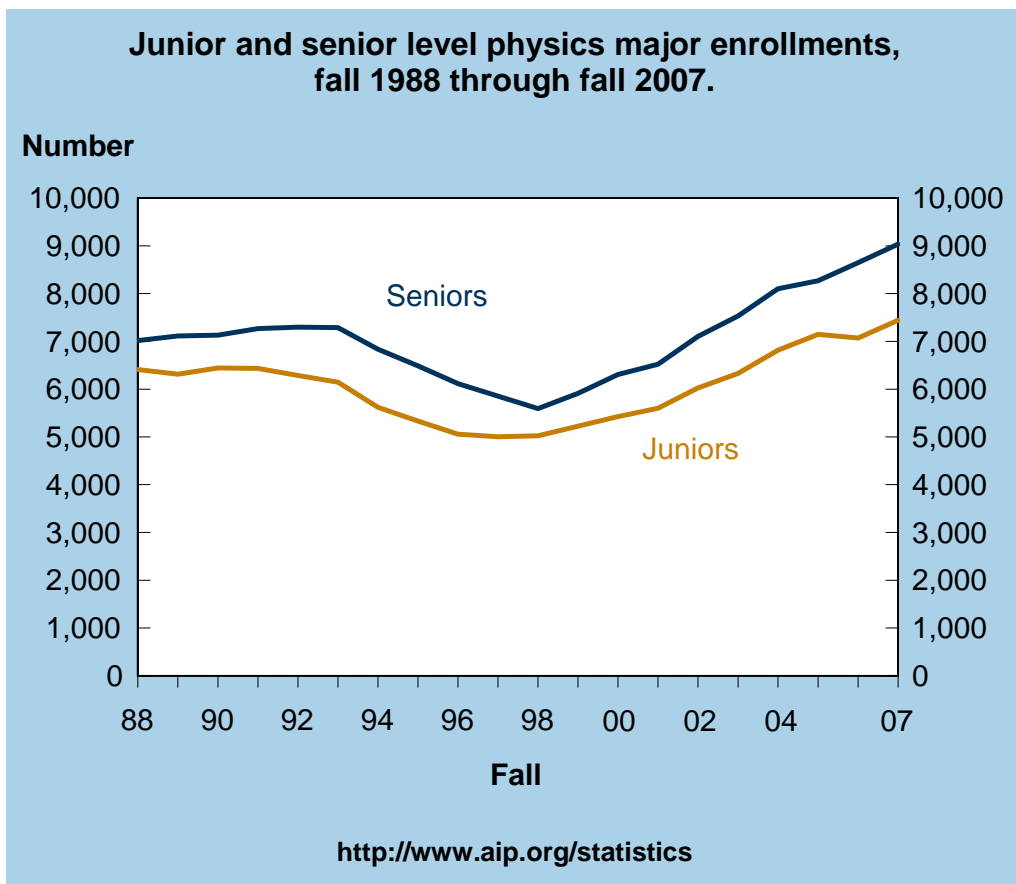
Introductory physical science and astronomy course enrollments at physics departments, academic year 2006-07.

Highest physics degree offered by department	Physical Science	Astronomy
Bachelor's	32,000	57,000
Master's	8,000	24,000
PhD	14,000	57,000
Total	54,000	138,000

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Many physics departments also offer introductory-level astronomy and physical science courses.

Figure 3



Undergraduate physics majors have been increasing steadily for about the last 10 years, with junior enrollments up 49%.

The number of senior-level physics majors is significantly and consistently larger than each of the previous academic year's junior enrollments. This reflects the fact that many students take longer than 4 years to complete their degree requirements and subsequently have senior status for more than one academic year.

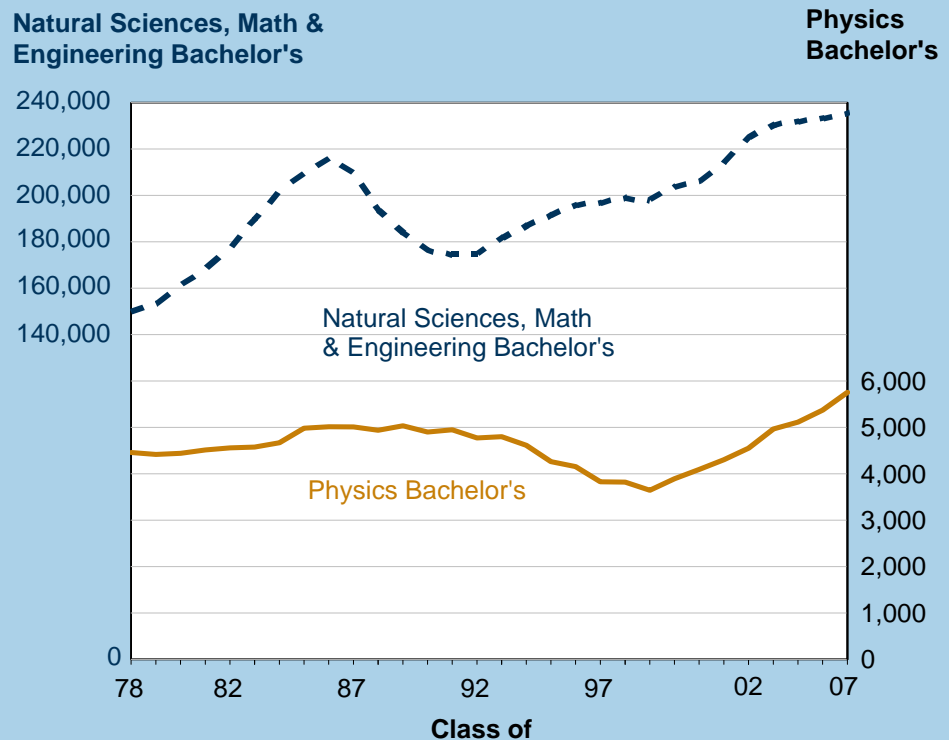
Many factors can contribute to why physics bachelor's might require more than four years to obtain their undergraduate degree, including: taking additional course work for a double major, changing major, taking a leave of absence, holding employment while enrolled part-time, and transferring from another institution.

The 5,755 physics bachelor's in the class of 2007 represents a 7% increase from the previous year. As has been historically true, foreign citizens make up only a small portion of the undergraduate physics degrees conferred in the US, with 6% of the class of 2007 being non-US citizens.

The number of natural science, math and engineering bachelor's has also been increasing in recent years, with physics representing 2% of these degrees. When all degree fields are combined, there were about 1.5 million bachelor's degrees conferred in the US during the 2006-07 academic year. Physics represented about one-third of one percent of all bachelor's, or 1 out of every 262 bachelor's is awarded in physics.

Figure 4

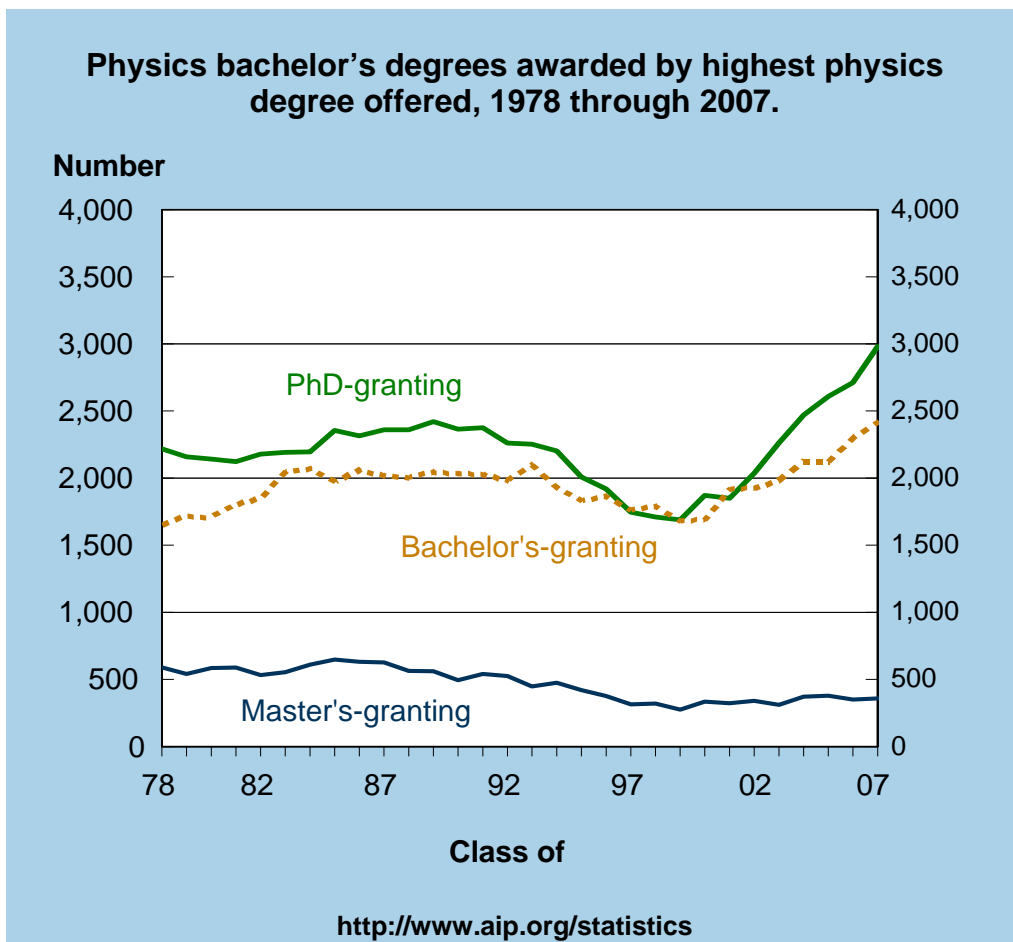
Physics bachelor's and Natural Sciences, Math & Engineering bachelor's produced in the US, 1978 through 2007.



Physics bachelor's production has been increasing rapidly for the last 8 years, up 58% since the recent low in 1999.

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

Figure 5



The greatest gains in physics bachelor's awarded have been at the 188 PhD-granting departments, where degree production is up 78% from 8 years earlier.

Although the number of bachelor's degrees conferred has been increasing at all department types since 1999, these recent gains have not been uniform. Degree production at departments where the master's is the highest degree offered has risen 30% and bachelor's-only departments have realized a gain of 44%. The largest increase has been at PhD-granting departments, with an increase of 78%. The number of bachelor's awarded at bachelor's and PhD-granting departments is the highest it's been in over 30 years.

Although generally smaller in size than the PhD-granting departments, the undergraduate programs at bachelor's and master's-granting departments produced almost half of all the physics bachelor's conferred in the class of 2007.

Table 4

Number of physics bachelor's produced by highest degree offered, class of 2007.

Highest physics degree offered by department	Number of depts.	Degrees per department	
		Average	Median
Bachelor's	511	4.7	4
Master's	63	5.7	5
PhD	180	16.6	12

Note: There are an additional 8 PhD-granting and 1 master's-granting departments that do not offer a bachelor's degree.

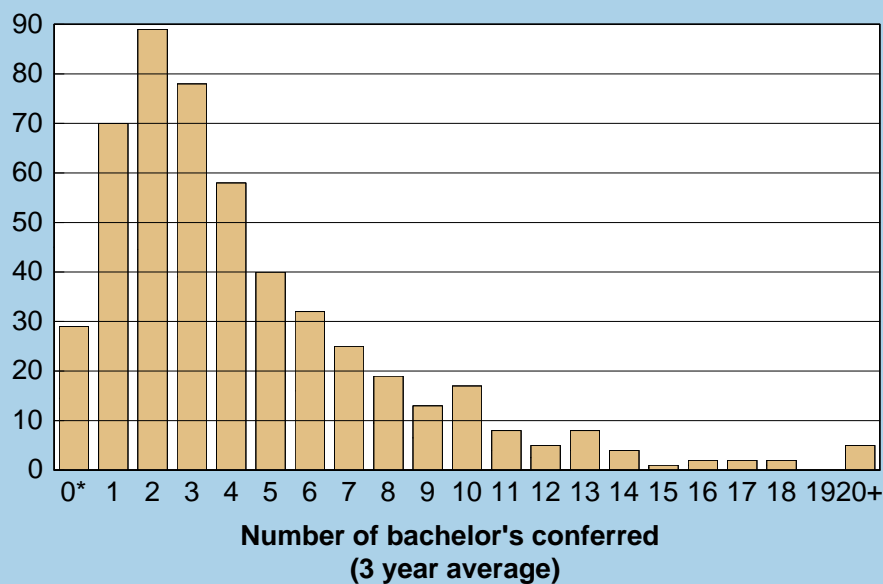
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In the class of 2007, 52% of all physics bachelor's were conferred at doctoral-granting departments. These departments make up only 24% of the degree-granting physics departments in the US.

Figure 6

Number of bachelor's-only departments by the average number of bachelor's conferred, classes of 2005 through 2007.

Number of departments



Over 70% of the physics departments that offer the bachelor's as their highest physics degree average 5 or fewer degrees a year.

Note: Figure includes 505 departments where the bachelor's was the highest physics degree offered for all 3 years.

* Includes 19 departments who conferred one bachelor's degree during the 3 year period.

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

Table 5

Bachelor's-only departments averaging 10 or more physics bachelor's degrees per year, classes 2005 through 2007.

	<u>Annual Average</u>		<u>Annual Average</u>
CA Poly St U, San Luis Obispo	24	Swarthmore Coll (PA)	12
Harvey Mudd College (CA)	22	Whitman Coll (WA)	12
US Naval Academy (MD)	22	U of Wisconsin, River Falls	12
US Air Force Academy (CO)	21	Bates College (ME)	11
SUNY College, Geneseo (NY)	20	Bowdoin College (ME)	11
Carleton College (MN)	18	CA State Poly U, Pomona	11
Illinois State U	18	Longwood U (VA)	11
Loyola U of Chicago (IL)	17	Middlebury Coll (VT)	11
Williams College (MA)	17	Occidental College (CA)	11
Bethel College (MN)	16	The College of New Jersey	11
U of Wisconsin, La Crosse	16	U of Puerto Rico, Humacao	11
James Madison U (VA)	15	Coll of the Holy Cross (MA)	10
Colby College (ME)	14	Dickinson College (PA)	10
Gustavus Adolphus Coll (MN)	14	Fordham U (NY)	10
Reed College (OR)	14	Furman U (SC)	10
Xavier U (LA)	14	Gettysburg Coll (PA)	10
Bucknell U (PA)	13	Ithaca Coll (NY)	10
College of Charleson (SC)	13	Lawrence U (WI)	10
Grinnell College (IA)	13	Luther College (IA)	10
Oberlin College (OH)	13	Murray State U (KY)	10
Saint Olaf College (MN)	13	Shippensburg U (PA)	10
Taylor U (IN)	13	US Military Academy (NY)	10
U of Northern Colorado	13	U of Puget Sound (WA)	10
U of Wisconsin, Eau Claire	13	Weber State U (UT)	10
Franklin & Marshall Coll (PA)	12	Westmont Coll (CA)	10
Macalester College (MN)	12	Whitworth Coll (WA)	10

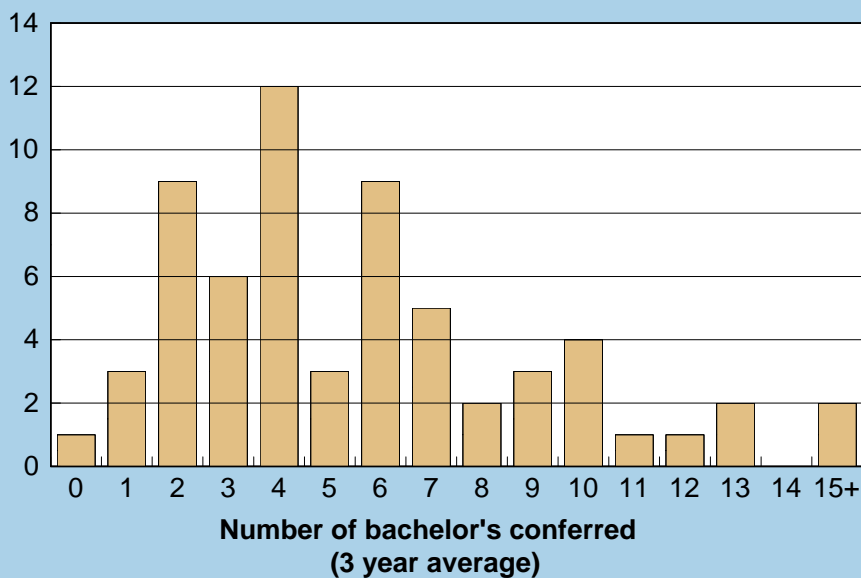
Note: List includes only those departments who contributed degree data for all 3 years.

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

Figure 7

Number of master's-granting* departments by the average number of bachelor's conferred, classes 2005 through 2007.

Number of departments



Departments where the master's was the highest physics degree offered were responsible for producing 6% of the physics bachelor's conferred in the class of 2007.

*Figure includes 63 master's-granting physics departments that offered a physics bachelor's degree in 2007.

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

Table 6

Master's-granting* departments averaging 7 or more physics bachelor's degrees per year, classes 2005 through 2007.

	Annual Average		Annual Average
Miami U (OH)	15	San Jose State U (CA)	9
Appalachian State U (NC)	13	Stephen F Austin State U (TX)	9
California State U, Northridge	13	Virginia Commonwealth U	9
U of Puerto Rico, Mayaguez	12	Missouri State U	8
Northern Arizona U	11	San Diego State U (CA)	8
Ball State U (IN)	10	Eastern Michigan U	7
SUNY-Binghamton U (NY)	10	Indiana U of Pennsylvania	7
U of Central Oklahoma	10	Western Illinois U	7

Note: List includes only those departments who contributed degree data for all 3 years.

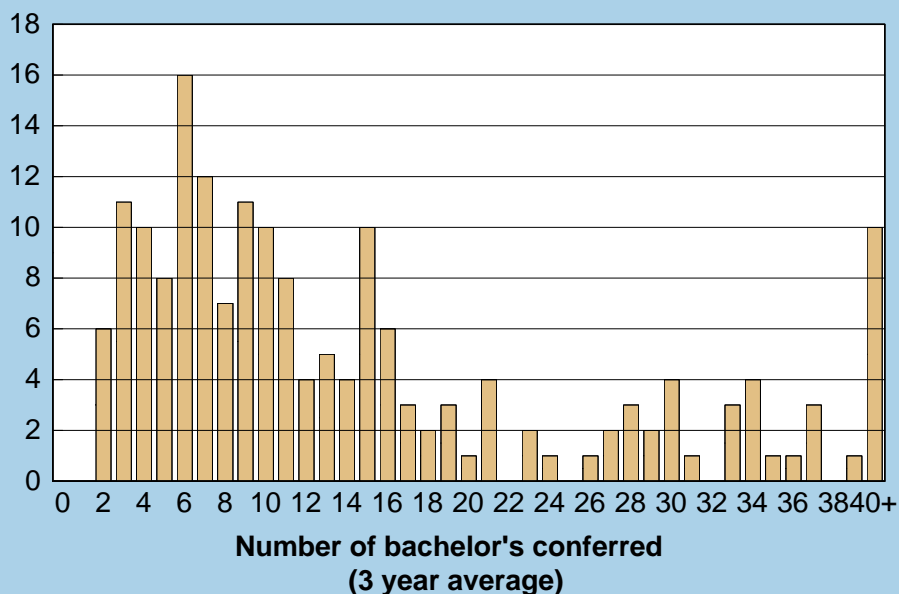
* Departments offering a master's as their highest physics degree.

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

Figure 8

Number of doctoral-granting* departments by the average number of bachelor's conferred, classes 2005 through 2007.

Number of departments



The 10 doctoral-granting departments that averaged 40 or more bachelor's were responsible for awarding about 10% of all physics bachelor's conferred.

*Figure includes 180 PhD-granting physics departments that offered a physics bachelor's degree in 2007.

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

Table 7

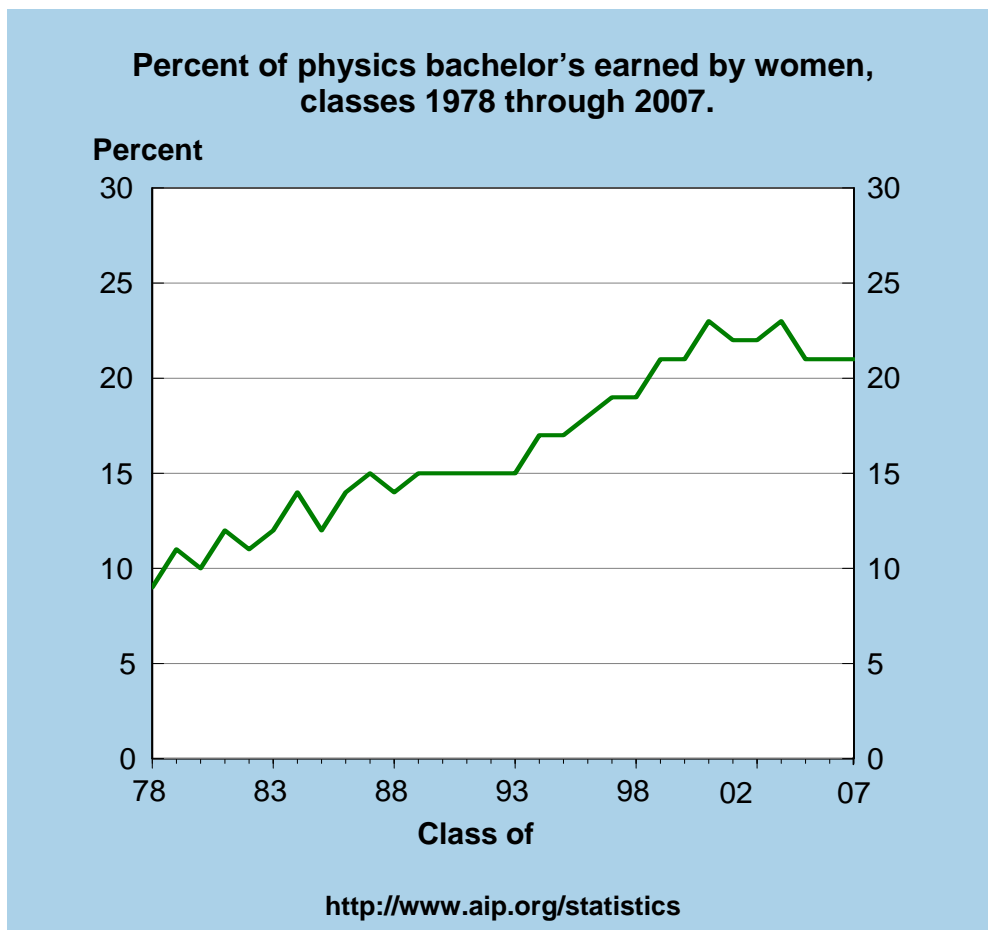
PhD-granting departments averaging 20 or more physics bachelor's degrees per year, classes 2005 through 2007.

	<u>Annual Average</u>		<u>Annual Average</u>
Mass. Inst. of Technology	82	Carnegie Mellon U (PA)	31
U of California, Berkeley	75	Cornell U-Applied (NY)	30
U of Washington	66	Purdue U, West Lafayette (PA)	30
Brigham Young U (UT)	55	Rensselaer Polytech Inst. (NY)	30
Colorado School of Mines	51	U of MN, Minneapolis	30
U of IL, Urbana/Champaign	49	U of California, Davis-Applied	29
U of California, Los Angeles	47	U of Florida	29
U of Maryland, College Park	42	U of California, Davis	28
U of California, San Diego	40	U of California, Santa Barbara	28
U of Colorado, Boulder	39	U of California, Santa Cruz	28
Ohio State U	37	Michigan State U	27
U of Michigan, Ann Arbor	37	Stanford U (CA)	27
U of Virginia	37	Yale U (CT)	26
U of Arizona	36	Princeton U (NJ)	24
Rutgers U, New Brunswick (NJ)	35	Columbia U (NY)	23
Cornell U (NY)	34	U of California, Irvine	23
Pennsylvania State U	34	Boston U (MA)	21
U of Texas, Austin	34	College of William & Mary (VA)	21
U of Wisconsin, Madison	34	Florida State U	21
California Inst. of Technology	33	U of MA, Amherst	21
U of Chicago (IL)	33	U of Rochester (NY)	20
U of Utah	33		

Note: List includes only those departments who contributed degree data for all 3 years.

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

Figure 9



The proportion of women receiving physics bachelor's degrees has declined in recent years.

After making relatively steady gains and peaking at around 24%, the representation of women among physics bachelor's has remained at 21% for 3 consecutive years. The representation of women among physics undergraduates has consistently been among the lowest in natural sciences, math and engineering fields.

There were 17 women's colleges in the US with undergraduate physics programs averaging about 3 bachelor's each in the in the class of 2007. The women receiving physics bachelor's from these departments only represent about 4.5% of all the women receiving physics bachelor's in the class of 2007.

Hispanic Americans and African Americans are underrepresented among college graduates relative to their proportion among the college-age population. Among the sciences, physics has one of the lowest representations of Hispanic Americans and African Americans.

Table 8

Minority and ethnic break-down of physics bachelor's, class of 2007.

	Number	Percent of all Bachelor's	Percent of US Bachelor's *
White	4712	82	87
Asian American	245	4	4
African American	144	3	3
Hispanic American	190	3	4
Other US citizens	111	2	2
Non-US citizens	353	6	-
Total	5755	100%	100%

*Based on 5,402 US citizens.

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

Hispanic Americans and African Americans continue to be underrepresented among physics bachelor's recipients.

Table 9

Departments averaging 3 or more African American physics bachelor's per year, classes 2005 through 2007.

	Annual Average
Xavier U (LA)	14
Benedict College (SC)	6
Morgan State U (MD)	4
Florida State U	3
North Carolina A&T State U	3
Spelman College (GA)	3

Note: List includes only those departments who contributed degree data for all 3 years.

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

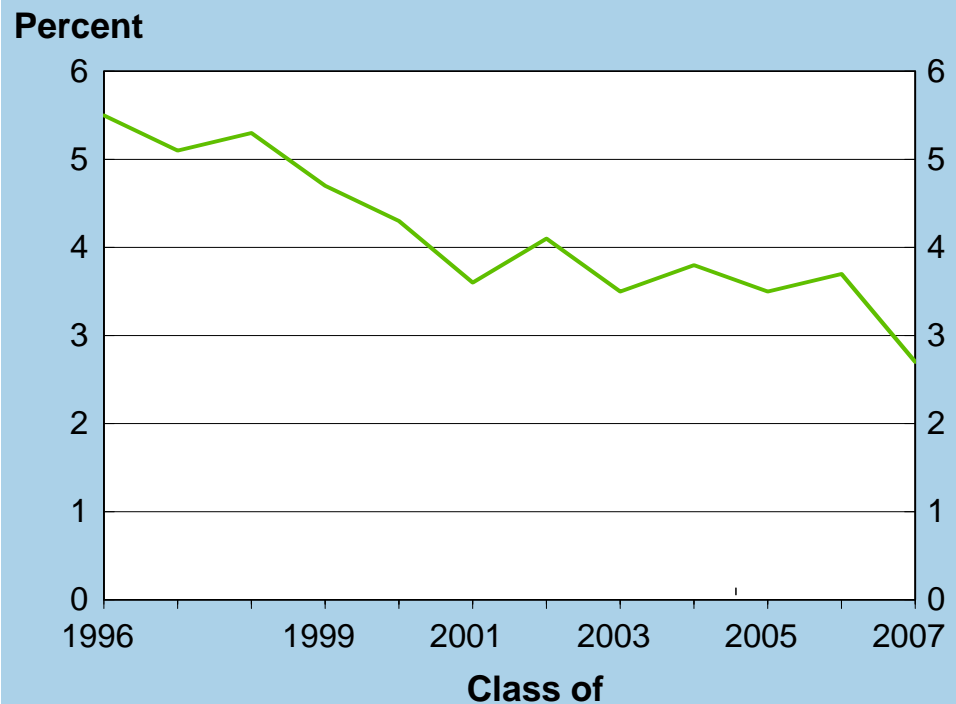
The physics departments averaging the largest number of African American bachelor's are all at Historically Black Colleges or Universities.

Among the 754 departments that offer an undergraduate physics degree in the US, 33 or 4.4% are located at Historically Black Colleges or Universities (HBCUs). The proportion of African Americans who receive their physics degree from an HBCU has been declining in recent years. In 1999, 68% of the physics bachelor's who were African American received their degree from an HBCU. For the class of 2007 that proportion dropped to 42%.

The combination of fewer African Americans receiving physics bachelor's degrees and the recent sharp increase in the number of overall physics bachelor's degrees awarded has resulted in the representation of African Americans in the class of 2007 to drop to 2.7%.

Figure 10

Percent of physics bachelor's* who were African American, classes 1996 through 2007.

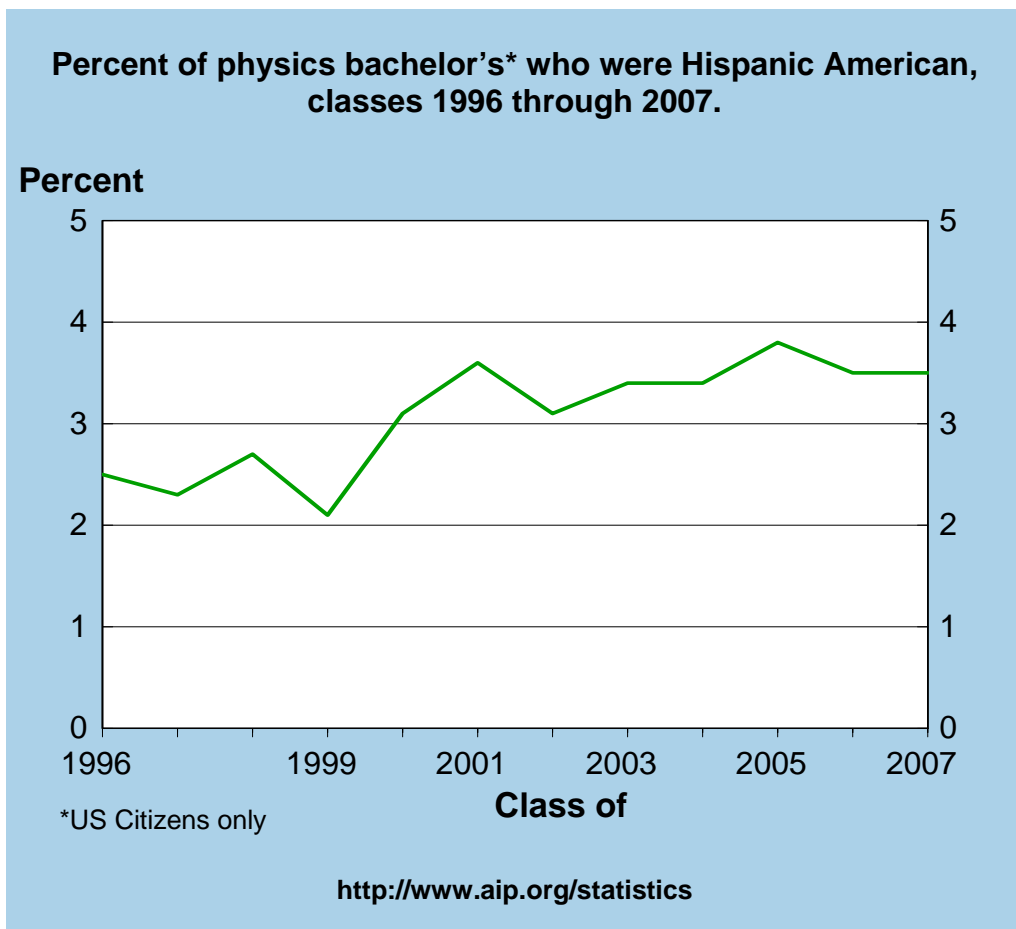


* US Citizens only

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

During the last 12 years, the representation of African Americans among physics bachelor's has plummeted from 5.5 to 2.5 percent.

Figure 11



During the last 12 years the representation of Hispanics among physics bachelor's recipients has increased from 2.5 to 3.5 percent.

In the general population Hispanic Americans are not evenly distributed across the country. Reflecting this uneven distribution, the majority of Hispanic American physics bachelor's receive their degrees from states with large Hispanic American populations, as well as from Puerto Rico.

California leads the country in conferring the largest number of physics bachelor's to Hispanic Americans with 9% being of Hispanic heritage. As a result, California awarded about a quarter of all the Hispanic Americans receiving physics bachelors' degrees in the class of 2007. California is a very populous state and was responsible for producing about 10% of all physics bachelor's in the class of 2007.

Other states with a large proportion of Hispanic Americans among their physics bachelor's are: New Mexico (23%), Florida (11%), and Texas (7%). All of the physics bachelor's from Puerto Rico were Hispanic, representing about 19% of all the Hispanic Americans in the class of 2007.

About the Survey

The Statistical Research Center of the American Institute of Physics conducts an annual census from October through February of all degree-granting physics departments in the United States and Puerto Rico. The survey, collecting data from the 763 degree-granting departments for the class of 2007, had a 91% response rate. Estimates were derived and included in the totals for non-responding departments.

In addition to this *focus on* series there is a companion report, “Rosters of Physics Departments”, which provides a departmental-level enrollment and degree snapshot of the class of 2007. It can be found on our web site: <http://www.aip.org/statistics/>

These reports are possible because of the efforts of department chairs, faculty, and staff in providing their departmental data to the AIP year after year.