

Physics Bachelor's Demographic Profiles

Data from the degree recipient follow-up survey for the classes of 2006 and 2007

Patrick Mulvey and Brandon Shindel

**REPORTS ON
PHYSICS
BACHELOR'S**

[Physics Bachelor's, One Year
Later \(May 2010\)](#)

[Physics Bachelor's, Initial
Employment \(June 2010\)](#)

**Physics Bachelor's,
Demographic Profiles (August
2010)**

*5,755 physics
bachelor's were
awarded in 2007.*

**THE 2006 AND 2007
FOLLOW-UP SURVEYS OF
PHYSICS BACHELOR'S**

The data in this *focus on* come from three different Statistical Resource Center surveys: Follow-up Survey of Physics Bachelor's, Survey of Physics Seniors, and Survey of Enrollments and Degrees.

In 2007, physics bachelor's degree production was the highest since 1971. The number of physics bachelor's degrees has risen steadily for 8 consecutive years, increasing a total of 58%.

Figure 1

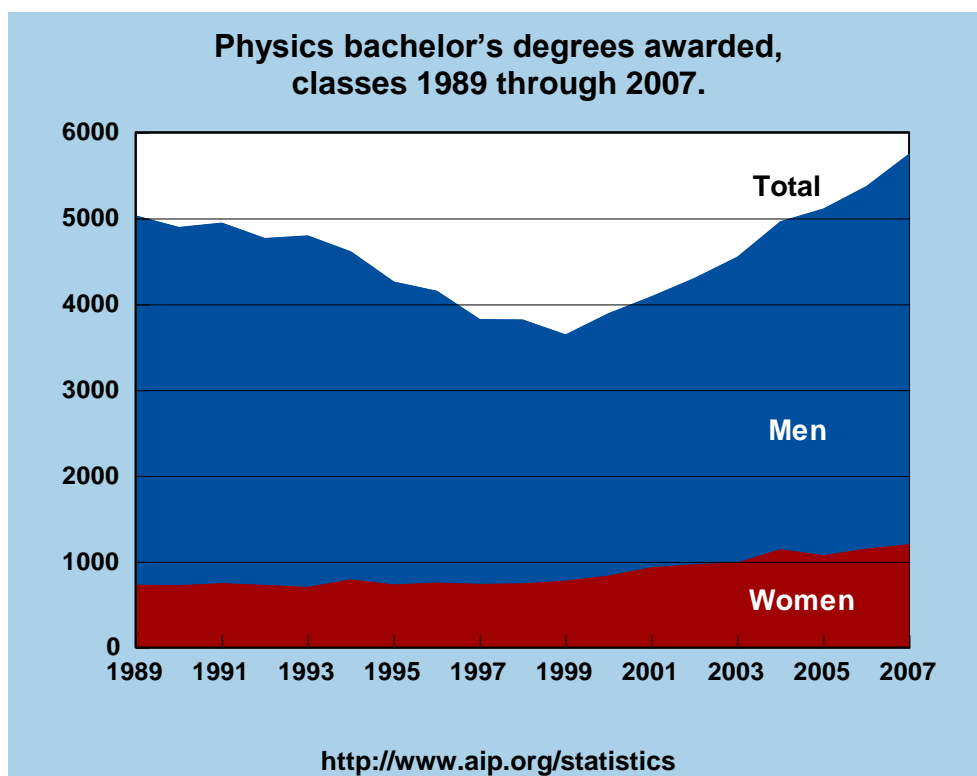


Table 1**Characteristics of physics bachelor's, classes of 2006 & 2007.**

	Percent
Gender	
Male	79
Female	21
Age	
Median	22
Citizenship	
US	93
Non-US	7
Type of high school physics taken:	
Advance placement	43
Other	50
None	7

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

The vast majority of students who received a physics bachelor's degree took a physics course while in high school.

The demographic profile of physics bachelor's degree recipients changes slowly. The representation of women among physics bachelor's is down slightly from a high of 23% in the class of 2004. Two-thirds of physics bachelor's were 22 at the time of their degree. When comparing age by gender, men tended to be slightly older. When they earned their degrees, 37% of the men were 23 or older compared to 26% of the women. Non-US citizens make up a relatively small proportion (7%) of physics bachelor's, and their representation is similar to what is seen for all bachelor's.

The vast majority (93%) of students who receive a physics bachelor's degree took a physics course while in high school. A large proportion of the high school physics courses taken were Advanced Placement courses. These proportions differ greatly from what is experienced by all high school seniors. The proportion of all high school seniors who took a physics class was 33%, with only 3% having taken an Advanced Placement course.

Attracting and retaining more minorities in the sciences is an ongoing issue. Similar to other sciences, the areas of the country from which physics draws its under-represented minority bachelor's are not uniformly distributed.

The majority of Hispanic-American physics bachelor's receive their degrees from states with large Hispanic populations, as well as from Puerto Rico. The physics departments in California account for about a quarter of all Hispanic-Americans receiving physics bachelor's degrees in the classes of 2006 and 2007. Other states with a large proportion of Hispanics among their physics bachelor's are New Mexico, Florida, Texas, and Arizona.

Although the regions of the country where African-Americans live has an influence on physics bachelor's degree production, physics departments at historically black colleges or universities (HBCUs) play an even greater roll. The 33 HBCUs with degree-granting physics departments conferred about half of all the physics bachelor's that were earned by African-Americans in the classes of 2006 and 2007.

Table 2

Minority and ethnic breakdown of physics bachelor's, classes of 2006 & 2007.

	Physics bachelor's		
	2-year average	All %	US citizens %
White	4,504	80.9	86.6
Asian-American	234	4.2	4.5
Hispanic-American	184	3.3	3.5
African-American	164	2.9	3.2
Other US Citizen	115	2.1	2.2
Non-US Citizen	364	6.5	--
Total	5,565	100%	100%

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

Among the physical sciences, physics has one of the lowest representations of Hispanic-Americans and African-Americans.

Table 3**Characteristics of physics bachelor's undergraduate education, classes of 2006 & 2007.**

	Percent
Started undergraduate education at a community college	9
Highest physics degree of undergraduate department:	
Bachelor's-granting	43
Master's-granting	6
Doctoral-granting	51
Control of institution	
Public	57
Private	43
Completed degree in 4 years	75

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

About half 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.

Comparatively few (9%) of the physics bachelor's started their undergraduate education at a community college. Certain subgroups among physics bachelor's were more likely to have attended a community college. Students who received their undergraduate degree from an institution in California were more likely (23%) to have attended a community college. California has integrated its community college system with institutions that offer 4-year degrees. Physics bachelor's who did not take a high school physics class (7%) were more likely to have first attended a community college (36%).

Three-fourths of physics bachelor's complete their degree within 4 years of enrolling as a freshman. Reasons for requiring more than 4 years to complete their degree varied widely, with many seniors reporting more than one reason. Some of the reasons seniors have stated include taking additional coursework for a double major, changing major, taking a leave of absence, working and attending school on a part-time basis, and transferring from another institution.

The vast majority of physics bachelor's graduate from a traditional BS or BA program. However, 21% indicated they graduated with a physics bachelor's degree that had a specific curricular focus. Anecdotally, we hear that there is an increasing number of physics departments that are allowing greater flexibility in their standard curriculum and offering physics majors with a specific curricular focus.

Table 4

Types of physics degrees, physics bachelor's classes of 2006 & 2007.

Focus of physics major	Percent
Traditional BS or BA	79
Engineering or Applied Physics	11
Astrophysics	5
Physics Teaching	2
Other	3

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

About one-fifth of physics bachelor's recipients graduated with a degree that had a specific curricular focus.

Table 5

Physics majors have broad interests, physics bachelor's class of 2007.

Percent with a double major	31%
The most common second majors for those with a double major	
	<u>Percent</u>
Mathematics	46
Astronomy	12
Engineering	12
Other common second majors for those with a double major	
Biology	Geosciences
Chemistry	History & Political Science
Computer & Information Sci.	Music & Fine Arts
Economics	Philosophy & Theology
Education & Teaching Cert.	

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

About 1/3 of all physics majors earned a double major. This compares to about 1/15 of all bachelor's recipients.

With the physics curriculum frequently being very math-intensive, 14% of all physics majors made the extra effort to also meet the requirements for a mathematics major. Women and men were equally likely to have graduated with a double major. Men double majored in math more frequently than women did, and the women were more likely to have double majored in astronomy or astrophysics than the men. Bachelor's who received a degree with a curricular focus or concentration (see Table 4) were less likely to have a double major than those who did not.

The majority of physics majors participated in some type of undergraduate research project. In fact, 74% of those who did, participated in more than one. There was very little difference in participation rate by sex or by the type of department where the degree recipients received their degree.

Students were less likely to have had an undergraduate research experience if their degree was a BA, if they started their college education at a community college, or if they were not encouraged by a faculty member to take one.

Table 6

Types of undergraduate research experiences taken by physics bachelor's, class of 2007.

	Percent
As part of a thesis project or capstone experience on campus	40
Other on-campus research (e.g., participant in a faculty research project)	54
REU (NSF <u>R</u> esearch <u>E</u> xperience for <u>U</u> ndergraduates)	23
At a national lab	10
An industrial research co-op or internship	7
None	26

Three-quarters of the physics bachelor's in the class of 2007 participated in some type of undergraduate research project.

Note: Percentages add to more than 100% because respondents were allowed to choose more than one type of research.

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

Table 7**Career guidance from physics faculty, physics bachelor's classes of 2006 & 2007.**

Initial career path	Percent receiving career guidance
Graduate study in physics or astronomy	73
Graduate study in other fields	66
Employment or seeking	55
Overall	63

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

Physics bachelor's going to graduate school in physics are far more likely than those going into the workforce to receive career guidance from faculty.

Whether a student did or did not receive career guidance from a physics faculty member was related to what students did immediately after receiving their degree.

Table 8**Long-range career goals, physics bachelor's classes of 2006 & 2007.**

Preferred future employment sector	Percent
Private sector	35
College or university	32
Civilian government or national lab	12
Hospital or medical setting	6
High school	6
Other	9

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

Over 1/3 of all physics majors aspire to a career working in the private sector.

There are differences in career goals between men and women. Men were more likely than women to indicate a career goal of working in the private sector, 37% and 26%, respectively. Women were more likely to indicate a career goal of high school teaching than men, 9% and 4%, respectively.

Survey Methodology

The data presented in this *focus on* comes from three different AIP surveys: The Enrollments and Degrees Survey, Bachelor's Follow-up Survey, and the Survey of Physics Seniors.

Each fall, the Statistical Research Center conducts its Survey of Enrollments and Degrees, which asks physics and astronomy departments to provide information concerning the number of students enrolled in their department and how many students received degrees the previous academic year. The degree recipient information includes a breakdown by sex, citizenship, and race or ethnicity. In connection with this survey, we ask for the names and contact information for the enrolled students and recent degree recipients. This contact information is used to conduct our follow-up survey in the winter following the academic year in which they received their degree and our Senior Survey in the spring.

We thank the many physics and astronomy departments, seniors, degree recipients, and faculty advisors who made this publication possible.