AIP American Institute of Physics

focus on

A publication of the AIP Statistical Research Center
www.aip.org/statistics

One Physics Ellipse • College Park, MD 20740 • 301.209.3070 • stats@aip.org

April 2014

Graduate Physics Degrees

Largest Departments and Degree Distribution

Patrick J. Mulvey and Starr Nicholson

REPORTS ON ENROLLMENTS AND DEGREES

Trends in Physics PhDs (February 2014)

Trends in Exiting Physics Master's (March 2014)

Graduate Physics Degrees: Largest Departments and Degree Distribution (April 2014)

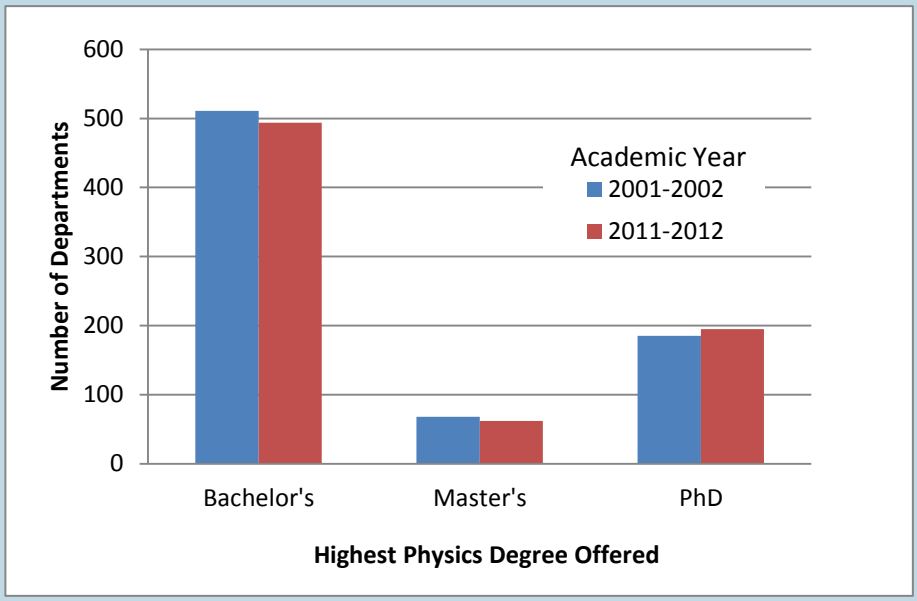
During the past decade there has been a net increase of 10 physics departments that offer a PhD and a decline of 6 departments where the master's was the highest physics degree offered.

THE SURVEY OF ENROLLMENTS AND DEGREES

Degree-granting physics departments are contacted each fall and asked to provide the number of degrees they conferred the previous year.

Figure 1

Number of Degree-granting Physics Departments.



http://www.aip.org/statistics

This *focus on* presents findings from the annual Enrollments and Degrees survey. It examines the size of PhD and master's granting departments in the U.S. as measured by the number of graduate degrees awarded. It also identifies the departments that recently awarded the most degrees. There are two other reports in this series on enrollments and degrees which present degree production trends for exiting master's and PhDs. These reports include data on citizenship, women and minorities. Detailed department specific enrollment and degree data can be found in the Physics Roster.[1]

In the 2011-12 academic year there were 751 degree-granting physics departments in the U.S. Of these, 195 offered a PhD and 62 departments offered a master's as the highest physics degree. The remaining 494 departments offered a bachelor's as their highest physics degree. There were six universities that had two doctoral-granting physics departments, a traditional physics department and one with an applied physics program.

Physics and astronomy are closely related fields and as a result, in the academic year 2011-12, departments at 12 universities granted graduate-level degrees in both physics and astronomy. These departments were asked to report their astronomy enrollment and degree data separately from their physics data. The data concerning the astronomy students at these combined departments will be published in a separate astronomy *focus on* where they are combined with the data from an additional 32 separate departments that offer graduate degrees in astronomy. Detailed department-level astronomy enrollment and degree data can be found in the Astronomy Roster.[(2)]

Each year there are a number of changes in the physics degrees offered by individual universities and colleges. The data in Figure 1 represent a net decline of 15 departments that offer a physics degree from a decade earlier. This net loss is a result of many changes in the highest degree offered by a department: departments eliminating their degree granting status altogether, and departments starting a new physics degree program. The shifts in highest degree offered by departments happened in the following ways:

- 15 undergraduate-only departments added a physics master's or PhD program.
- 15 departments with the physics master's as their highest degree decreased their offerings to a bachelor's or increased their offerings to a PhD.
- 1 department with the PhD as its highest degree decreased its offering to a physics bachelor's degree.
- 3 graduate-level programs stopped offering physics degrees at all levels.
- 36 undergraduate-only departments stopped offering a physics degree.
- 2 new master's programs and 2 new PhD programs were added at universities where a physics degree program did not previously exist.
- 19 new physics bachelor's programs were added where one did not previously exist.

The net effect of a decade's worth of changes resulted in the number of departments offering a physics PhD to increase by 10, the number offering a physics master's as its highest degree fell by 6, and the number of bachelor's-only departments fell by 19.

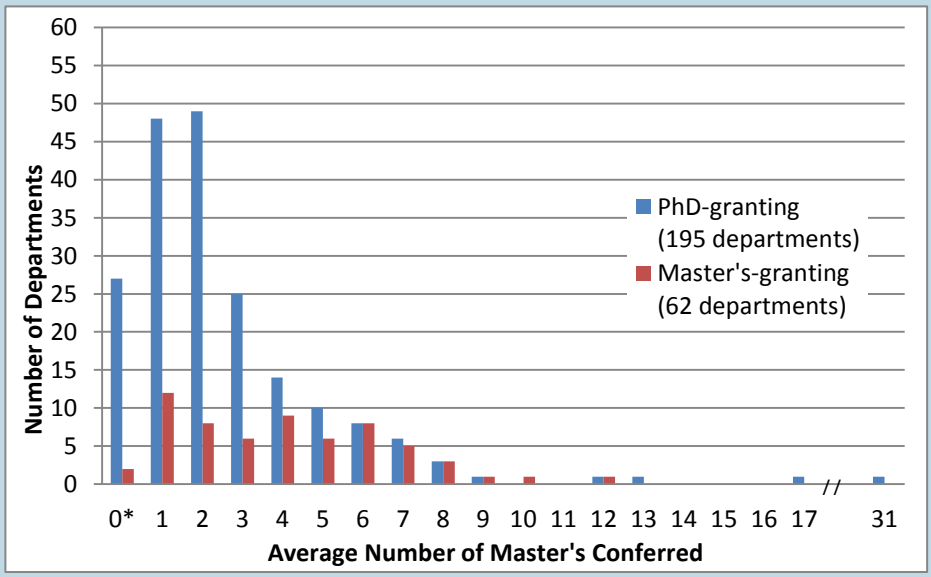
We categorize physics master's degrees into two types. Master's en route degrees are conferred at doctoral-granting departments to students continuing on at the same department in pursuit of a PhD. Exiting master's degrees are awarded to individuals who leave their current physics department upon receiving their master's degree. Physics graduate students who enrolled in departments where the master's was the highest

degree available were clearly seeking to receive exiting master's degrees. Students who enrolled in departments where a PhD was offered may have been seeking and specifically enrolling in a master's program or they may have initially enrolled in a PhD program but left the department with a master's. Many PhD-granting physics departments do not have a separate and distinct master's program for incoming graduate students to enroll in.

The number of exiting master's degrees conferred varies greatly by the highest physics degree offered by a department. Departments where the master's was the highest degree offered averaged 4.1 exiting master's degrees a year for the combined degree classes of 2010, 2011 and 2012. Departments that offered a physics PhD averaged 2.5 exiting master's. This average does not include the Naval Postgraduate School, which has a unique program that averaged 31 exiting master's during this time period, almost twice the production of the next largest physics program.

Figure 2

Physics Departments in the U.S. by the Average Number of Exiting Master's Conferred.



***Includes 13 PhD and 1 Master's department that conferred one master's During the 3-year period, classes of 2010, 2011 and 2012 combined.**

Note: Exiting master's are individuals who upon receiving their master's degree leave their current physics department. Exiting master's are conferred at both master's-granting and doctoral-granting departments.

http://www.aip.org/statistics

The number of exiting master's a department awards differs greatly by the highest physics degree offered.

Table 1

Largest Physics Master's-Granting* Departments in the U.S.

	Annual Average
CA State U, Long Beach	12
CA State U, Northridge	10
Fisk U (TN)	9
Louisiana Tech U	8
Miami U (OH)	8
U of Puerto Rico, Mayaguez	8
Appalachian State U (NC)	7
Cleveland State U (OH)	7
San Francisco State U (CA	7
U of Houston, Clear Lake (TX)	7
Wright State U (OH)	7
Central Michigan U	6
San Diego State U (CA)	6
U of Massachusetts, Boston	6
U of Massachusetts, Dartmouth	6
U of Memphis (TN)	6
U of Texas, Brownsville	6
Western Illinois U	6
Ball State U (IN)	5
Bowling Green State U (OH)	5
Christopher Newport U (VA)	5
Missouri State U	5
Northern Arizona U	5
Virginia Commonwealth U	5

Among the 62 departments where the master's is the highest physics degree offered, the 24 departments listed in Table 1 produced the majority of the master's degrees awarded. They were responsible for 64% of all exiting master's degrees awarded at departments where the master's is the highest degree offered.

Note: List includes departments that averaged 5 or more physics master's degrees, classes of 2010, 2011 & 2012 combined. List includes only those departments who contributed degree data for all three years.

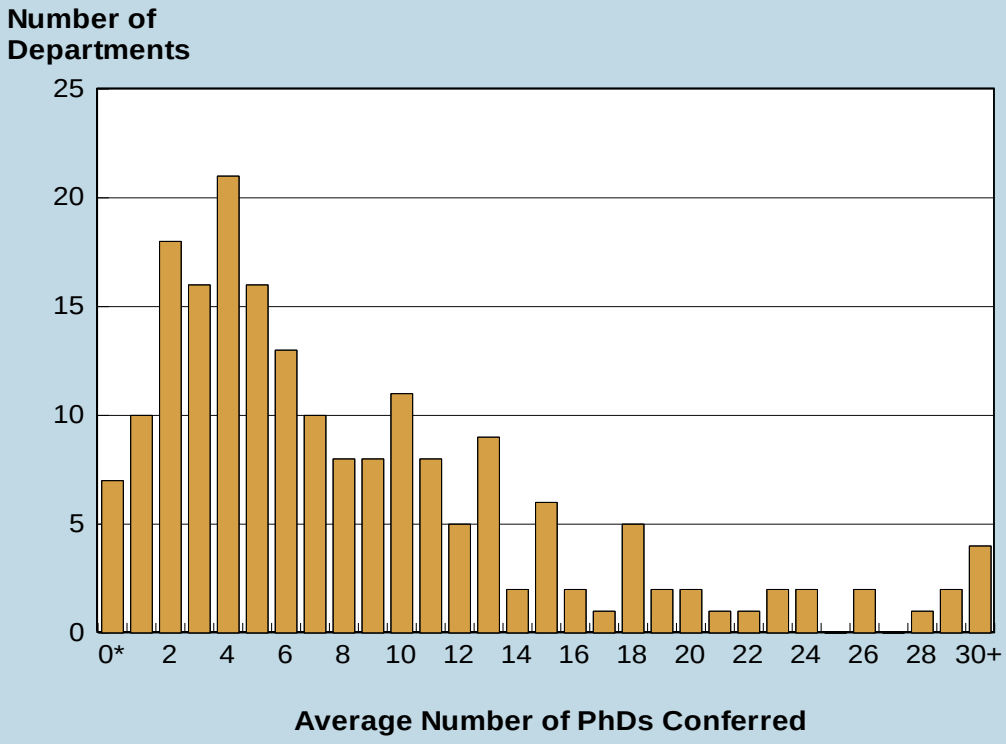
*** Departments offering a master's as their highest physics degree.**

http://www.aip.org/statistics

There is a wide range in the size of U.S. physics doctoral programs measured by PhDs awarded. The 15 departments that averaged 21 or more PhDs a year represented 8% of the departments, but were responsible for awarding 25% of the physics PhDs in the classes of 2010 through 2012.

Figure 3

Number of Doctoral-Granting Physics Departments in the U.S. by the Average Number of PhDs Conferred.



*Includes three departments that conferred one PhD during the 3-year period, classes of 2010, 2011 & 2012 combined.

http://www.aip.org/statistics

The 195 doctoral-granting physics departments in the U.S. had a median of 6 and an average 8.7 PhDs awarded for the classes of 2010 through 2012.

Table 2

Largest Physics PhD-Granting* Departments in the U.S.

	Annual Average		Annual Average
Massachusetts Inst of Tech	38	U of California, Los Angeles	19
U of California, Berkeley	35	U of California, Davis	18
Harvard U (MA)	29	U of California, San Diego	18
U of Maryland, College Park	29	U of Michigan, Ann Arbor	18
U of Colorado, Boulder	28	U of Minnesota, Minneapolis	18
SUNY, Stony Brook U (NY)	26	U of Washington	18
Stanford U (CA)	26	Brown U (RI)	17
Ohio State U	24	Georgia Inst of Technology	16
U of Wisconsin, Madison	24	Yale U (CT)	16
Cornell U (NY)	23	Arizona State U	15
Stanford U-Applied (CA)	23	Florida State U	15
U of California, Santa Barbara	22	Pennsylvania State U	15
U of Florida	21	Purdue U, West Lafayette (IN)	15
California Inst. of Technology	20	U of Chicago (IL)	15
U of California, Irvine	20	Washington U (MO)	15
Princeton U	19		

Note: List includes departments that averaged 15 or more physics PhDs, classes of 2010, 2011 & 2012 combined. List includes only those departments who contributed degree data for all three years.

http://www.aip.org/statistics

There are twice as many departments averaging 15 or more physics PhDs a year than there were eight years earlier.

As seen in the *focus on*: *Trends in Physics PhDs*[3], the number of physics PhDs awarded in recent years has increased sharply, 62% from a recent low 8 years earlier. During that same time period the number of departments offering a physics PhD has had a net increase of eight. Only about one percent of the overall increase in degrees conferred is a result of the additional departments.

The increase in the number of PhDs awarded has happened at departments of all sizes. Eighty-six percent of the departments that offered a physics PhD in both 2004 and 2012 now average more PhDs than they did 8 years earlier. The median number of PhDs awarded by departments in 2004 was 4, but grew to 6 in 2012.

References

1. Nicholson, Starr and Mulvey, Patrick. 2013. *focus on Roster of Physics Departments with Enrollments and Degree Data*, *2012*. AIP, College Park, MD.

2. Nicholson, Starr and Mulvey, Patrick. 2013. *focus on Roster of Astronomy Departments with Enrollments and Degree Data, 2012*. AIP, College Park, MD.

3. Mulvey, Patrick and Nicholson, Starr. 2014. *focus on Trends in Physics PhDs*, 2014. AIP, College Park, MD.

About the Survey

Each fall the Statistical Research Center conducts its Survey of Enrollments and Degrees. The survey is sent to all degree-granting physics and astronomy departments in the U.S. and Puerto Rico to provide information concerning the number of students they currently have enrolled and the number of degrees they conferred in the previous academic year. We define the academic year as being from September to August.

In the academic year 2011-12 there were 257 departments with physics graduate programs. We received responses from 95% of these departments. Estimates were derived and included in the totals for non-responding departments.

Data from this survey are also used to produce the "Roster of Physics Departments," which provides a departmental-level enrollment and degree snapshot for each academic year. The most recent roster can be found at: http://www.aip.org/statistics/trends/reports/physrost.pdf

We thank the many physics departments for contributing their departmental–level information. Without their cooperation these reports would not be possible.

e-Updates

You can sign up to receive e-mail alerts which notify you when we post a new report. Visit http://www.aip.org/statistics/e_updates.html to sign up. You can indicate your area(s) of interest; we will send you an e-Update only when we post a new report that includes data of interest to you. If you sign up for every possible notification, you should receive no more than twenty messages in a year.