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 2015

Astronomy Degree Recipients Initial Employment

Results from the follow-up survey of degree recipients, classes of 2010, 2011 and 2012 combined

Jack Pold and Patrick Mulvey

REPORTS ON INITIAL EMPLOYMENT

Physics & Astronomy Master's: One Year Later (September 2014)

Physics Doctorate's: Initial Employment (December 2014)

Astronomy Degree Recipients: Initial Employment (April 2015)

Physics Bachelor's: Initial Employment (forthcoming)

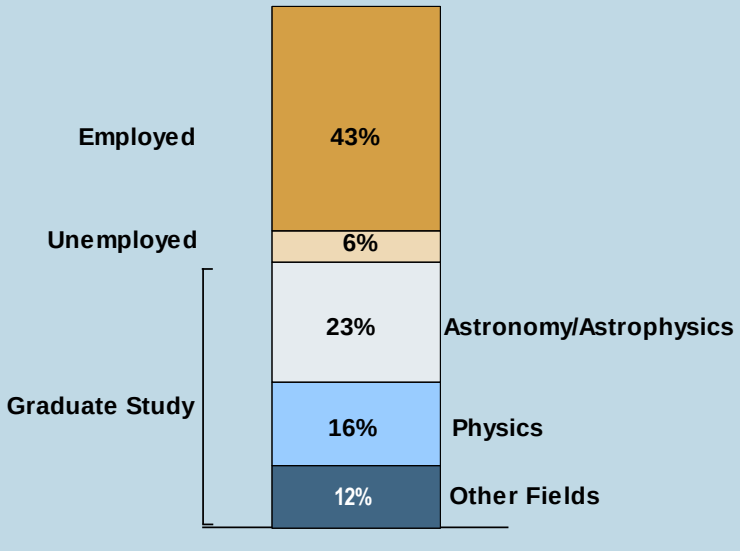
Astronomy Bachelor's

Half of new astronomy bachelor's degree recipients from the classes of 2010, 2011 and 2012 entered the workforce following receipt of their degrees. The other half continued into graduate studies, with the majority studying physics or astronomy. Nearly three quarters of the degree recipients who entered the workforce had plans to enroll in a graduate program in the future.

About half of new astronomy bachelor's recipients entered the workforce after earning their degrees.

Figure 1

Status of Astronomy Bachelor's One Year After Degree, Classes of 2010, 2011 & 2012 Combined.



http://www.aip.org/statistics

THE FOLLOW-UP SURVEYS OF BACHELOR'S, MASTER'S AND PHD RECIPIENTS

Degree recipients are contacted in the winter following the academic year in which they received their degrees.

Table 1

Demographic Profile of Astronomy Bachelor's, Classes of 2010, 2011 & 2012 Combined.

Sex*	Male	62%
	Female	38%
Citizenship*	US	94%
	Non-US	6%
Age	20-23	86%
	24+	14%
Highest Astronomy Degree of Department*	PhD	72%
	Master's	3%
	Bachelor's	25%
Double Major	No	58%
	Yes	42%

*Source: Survey of Enrollments and Degrees

http://www.aip.org/statistics

38% of recent astronomy bachelor's recipients were female.

42% percent of astronomy bachelor's recipients graduated with a double major.

There were 79 degree-granting astronomy departments in the US during the academic year of 2011-12. About half of these were combined departments offering degrees in both physics and astronomy. The other half were separate astronomy departments, administered independently from a physics program.

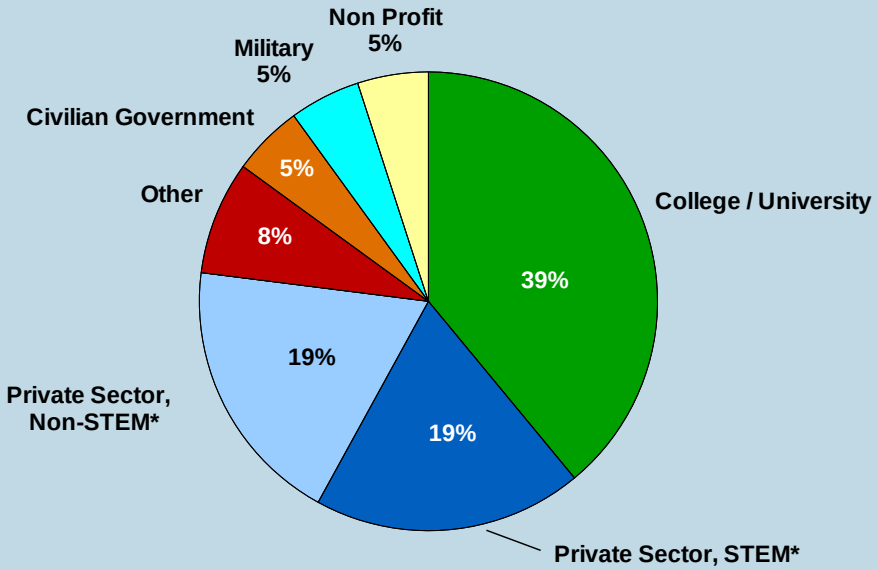
The classes of 2010 through 2012 averaged 328 astronomy bachelor's per year. Astronomy degrees made up a very small part of the ~ 270,000 bachelor's degrees in natural science and engineering degrees conferred in recent years.

It is fairly common (42%) for astronomy bachelor's degree recipients to graduate with a double major. More astronomy bachelor's graduated with a double major than their physics counterparts (34%) and far more than the proportion nationally for all majors (5%)[1]. Physics was the most commonly reported second major for astronomy bachelor's, followed by math and engineering.

[1] Calculated with data from the U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics

Figure 2

Initial Employment Sectors of Astronomy Bachelor's, Classes of 2010, 2011 & 2012 Combined.



*STEM refers to positions in natural science, technology, engineering and math. The data are based on the responses of 169 respondents.

http://www.aip.org/statistics

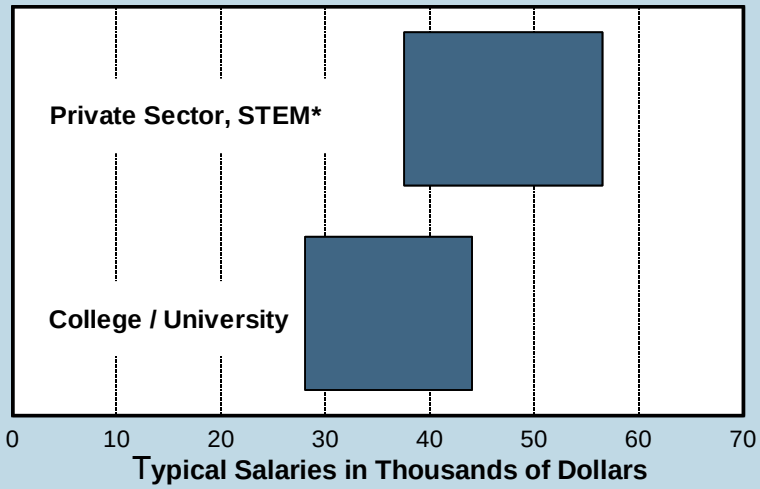
Half of all new astronomy bachelor's recipients employed in the private sector were working in a STEM field.

New astronomy bachelor's degree recipients were concentrated into two primary employment sectors: college/universities and the private sector. Of the 38% of bachelor's employed in the private sector, half were employed in STEM (science, technology, engineering, and math) fields. The *Other* category in Figure 2 mostly includes degree recipients working in middle and high schools, and in medical fields. Virtually all employed astronomy bachelor's recipients who were working outside of the private sector were working in a STEM field.

A significant proportion (69%) of all newly employed astronomy bachelor's recipients indicated that they were satisfied with their current position. Satisfaction levels varied depending on the field of employment. Three-quarters of those employed in STEM fields, regardless of sector, reported being satisfied with their position compared to 53% of those employed in non-STEM fields.

Figure 3

Starting Salaries of Astronomy Bachelor's, Classes of 2010, 2011 & 2012 Combined.



Note: Typical salaries are the middle 50%, i.e., between the 25th and the 75th percentiles. The private sector STEM* and college/university salary ranges are based on 27 and 35 respondents respectively who are full time employed.

*STEM refers to positions in natural science, technology, engineering and math.

http://www.aip.org/statistics

Astronomy bachelor's recipients employed in private sector STEM positions had a median starting salary of $50,000.

Two-thirds of the astronomy bachelor's recipients from the combined classes of 2010, 2011 and 2012 reported receiving career guidance from faculty members. Bachelor's recipients continuing to graduate study were more likely (73%) to report having received career guidance from a faculty member than were recipients who directly entered the workforce (60%).

Profiles of the Prevailing Employment Sectors for Astronomy Bachelor's Degree Recipients Classes of 2010, 2011 and 2012 Combined

College and University – The majority of new astronomy bachelor's degree recipients working at colleges and universities were employed at the same institutions from which they received their bachelor's degrees. Many of these individuals were only intending to stay in their position for a short time with about three-quarters planning to continue their education at the graduate level within the next 2 years.

Over eighty percent of astronomy bachelor's recipients employed at colleges and universities reported working in a STEM field, with three-quarters of these employed in the fields of physics or astronomy. Most of the college and university positions had job titles such as *research assistant* or *specialist*. Some astronomy bachelor's were employed at a university's observatory.

Private Sector – Over a third (38%) of employed astronomy bachelor's recipients were employed in the private sector.

> ***STEM*** – About half of astronomy bachelor's recipients employed in the private sector were employed in STEM fields. Many of these degree recipients were employed in the fields of engineering and computer science working for government contractors, high-tech companies, software developers, or utilities. Job titles frequently included the word *engineer, analyst,* and *developer*.
>
> ***Non-STEM*** – Half of astronomy bachelor's recipients employed in the private sector indicated that their positions were not in STEM fields. Some were employed as *associates* in retail or food service positions while others were working in the fields of finance and business with titles like *assistant* and *administrator*.

Astronomy Master's

Exiting astronomy master's degree recipients are defined as individuals who received master's degrees in astronomy or astrophysics from a degree-granting US astronomy department and left that department with the master's as their highest degree. There were a total of 43 departments that offered graduate level degrees in astronomy and astrophysics during the 2011-12 academic year. Three of these departments granted the master's as their highest astronomy degree with the remainder also offering a PhD.

40% of exiting astronomy master's degrees were earned by women.

Table 2

Demographic Profile of Exiting Astronomy Master's,* Classes of 2010, 2011 & 2012 Combined.

Sex**	Male	60%
	Female	40%
Citizenship**	US	86%
	Non-US	14%
Age	Median	25
Highest Degree of Graduate Department**	PhD	79%
	Master's	21%

*****Exiting master's are defined as individuals who left their departments after earning their master's degree.

**Source: AIP Survey of Enrollments and Degrees

http://www.aip.org/statistics

The combined classes of 2010, 2011 & 2012 averaged 35 exiting master's recipients per year. We received responses from 38 individuals from these 3 classes combined. More than a fifth of the exiting astronomy master's recipients were produced by the three departments where the master's degree was the highest degree offered.

There were a number of different career paths taken by exiting astronomy master's from the classes of 2010, 2011 and 2012. Although we received responses from 40% of the known number of astronomy master's in the three degree classes covered by this survey, the low overall number of respondents limits discussion of their post degree status.

About a quarter of exiting astronomy master's recipients chose to immediately continue their education at another department or university. The majority of these were pursuing degrees in astronomy, astrophysics, or physics. Several respondents left the US after receiving their master's and are not included in this analysis.

Almost three quarters of exiting master's recipients entered the workforce after receipt of their degrees with academic institutions employing the largest proportion. The private sector also employed a significant proportion of exiting astronomy master's. Nearly all of the exiting masters who entered the workforce were working in STEM fields. A quarter of the employed master's indicated they intended to continue their studies in the future.

Astronomy PhDs

The classes of 2010, 2011 and 2012 averaged 156 PhDs a year from the 40 departments that offer doctorates in astronomy and astrophysics in the US. This total does not include physics PhD recipients with dissertation subfields of astronomy or astrophysics who received their PhDs from a PhD-granting physics department.

Table 3

Demographic Profile of Astronomy PhDs, Classes of 2010, 2011 & 2012 Combined.

Sex*	Male	65%
	Female	35%
Citizenship*	US	68%
	Non-US	32%
Age	Median	29

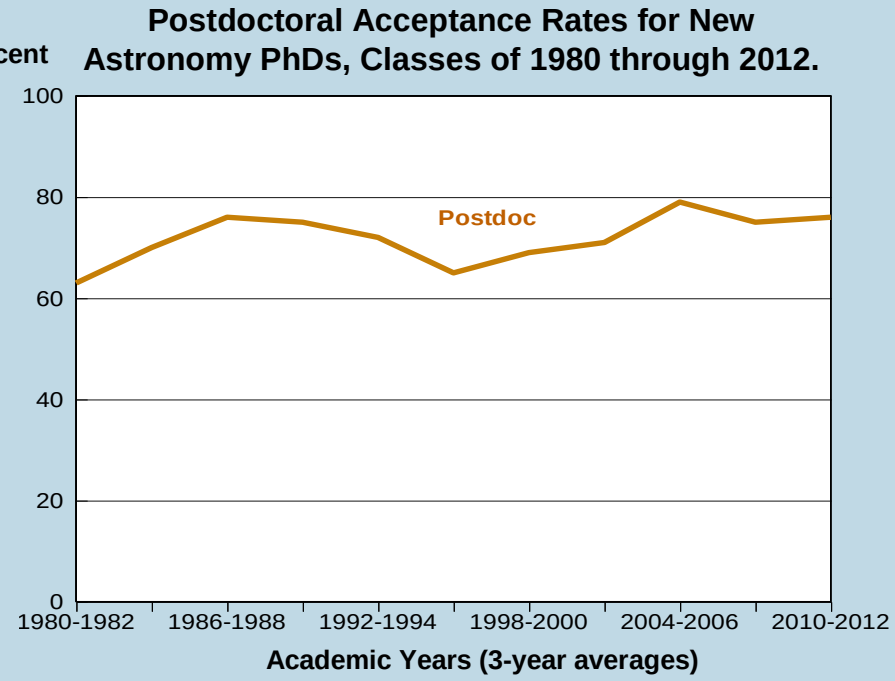
***Source: AIP Survey of Enrollments and Degrees**

http://www.aip.org/statistics

US citizens made up 68% of new astronomy PhD recipients.

Astronomy PhD recipients reported specializing in a wide range of subfields. The most commonly reported subfields were related to extragalactic astronomy, galactic astronomy, and solar and stellar astronomy. Female PhD recipients were more likely to specialize in galactic astronomy, while male recipients were more commonly focused in high energy astronomy and astronomical instruments.

Figure 4



Data are limited to PhDs who earned their degrees from a US university and remained in the US.

http://www.aip.org/statistics

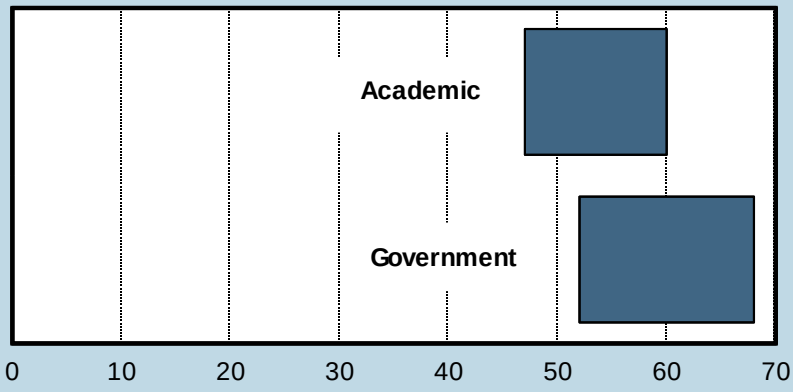
About three-quarters of new astronomy PhD recipients in the classes of 2010, 2011 and 2012 accepted postdoc positions.

The proportion of astronomy PhDs accepting postdocs has risen over the last three decades. Three-quarters of new astronomy PhD recipients in the classes of 2010, 2011 and 2012 combined accepted a temporary postdoctoral appointment after receiving their degrees. A larger proportion of non-US citizens accepted a postdoc than US citizens, 89% and 71% respectively. Over a third of non-US citizens left the US after receiving their PhD, compared to 17% of US citizens. Respondents who left the US are not included in Figure 4 or 5.

When postdoc holders were asked what their most important reason for accepting a postdoctoral position was, the majority cited that it was a "necessary step toward a desired future position". Postdoc holders also cited gaining research experience in their fields and working with a particular scientist or research group as reasons for taking a postdoc. The majority (79%) of postdocs were working in academia with the rest in civilian government positions.

Figure 5

Starting Postdoc Salaries of Astronomy PhDs, Classes of 2010, 2011 & 2012 Combined.



Typical Salaries in Thousands of Dollars

Note: Typical salaries are the middle 50%, i.e., between the 25th and the 75th percentiles. Data are limited to PhDs who earned their degrees from a US university and remained in the US. Academic includes: Universities, university-affiliated research institutes (UARI) and observatories. Government includes: National laboratories and other federal agencies. The academic and government salary ranges are based on 89 and 19 respondents respectively.

http://www.aip.org/statistics

The median starting salary for astronomy PhDs holding postdocs in academia and government were $54,000 & $60,000 respectively.

Almost all astronomy PhD recipients in the classes of 2010, 2011 and 2012 indicated that they were satisfied with their current position. The majority felt that their PhD prepared them well and provided an appropriate background for their employment as postdocs. PhD recipients in potentially permanent positions showed slightly less satisfaction with their employment than their postdoctoral counterparts. Very few in any employment type reported feeling underemployed.

Survey Methodology

Each fall the Statistical Research Center conducts its Survey of Enrollments and Degrees, which asks all degree-granting physics and astronomy departments in the US to provide information concerning the numbers of students they have enrolled and counts of recent degree recipients. In connection with this survey, we ask for the names and contact information for their recent degree recipients. This degree recipient information is used to conduct our Follow-up Survey in the winter following the academic year in which they received their degrees. The post-degree outcome data in this *focus on* come from that survey.

Recent degree recipients can be difficult to reach because they tend to relocate after receiving their degrees. The departments often do not provide or don't have accurate contact information for their alumni. To assist us in determining outcome information and to help obtain updated contact information, we contact the advisors of non-responding degree recipients. The information obtained from the advisors is limited to citizenship, sex, employment status, sector of employment, location (in or out of the US) and subfield of dissertation for the PhDs.

Because astronomy degree classes at all levels are relatively small, we have combined Follow-up Survey response data for three degree classes in order to reliably report on degree recipient outcomes. The Follow-up Surveys for astronomy degree recipients in the classes of 2010, 2011 and 2012 were administered in a web-based format. Non-responding degree recipients were contacted up to four times with invitations to participate in the survey. Degree recipients who left the US after receiving their degree are not included in the employment analyses.

The astronomy bachelor's classes of 2010, 2011 and 2012 consisted of 382, 408 and 385 bachelors, respectively. We received post-degree information on 40% of these degree recipients. Twenty-two percent of the post-degree data came from advisors, with the remainder coming from the bachelor's themselves. About five percent of astronomy bachelor's recipients did not remain in the US after receiving their degrees.

The exiting astronomy master's classes of 2010, 2011 and 2012 consisted of 23, 47 and 35 master's, respectively. We received post-degree information on 36% of these degree recipients. Fifty-three percent of the post-degree data came from advisors, with the remainder coming from the master's themselves. Sixteen percent of astronomy master's recipients did not remain in the US after receiving their degree.

The astronomy PhD classes of 2010, 2011 and 2012 consisted of 156, 160 and 152 PhDs, respectively. We received post-degree information on 60% of these degree recipients. One-fourth of the post-degree data came from advisors and the remainder came from the PhD recipients themselves. Twenty-three percent of astronomy PhD recipients did not remain in the US after receiving their degree.

In this *focus on*, "N" refers to the number of respondents about whom we had data on a particular item.

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