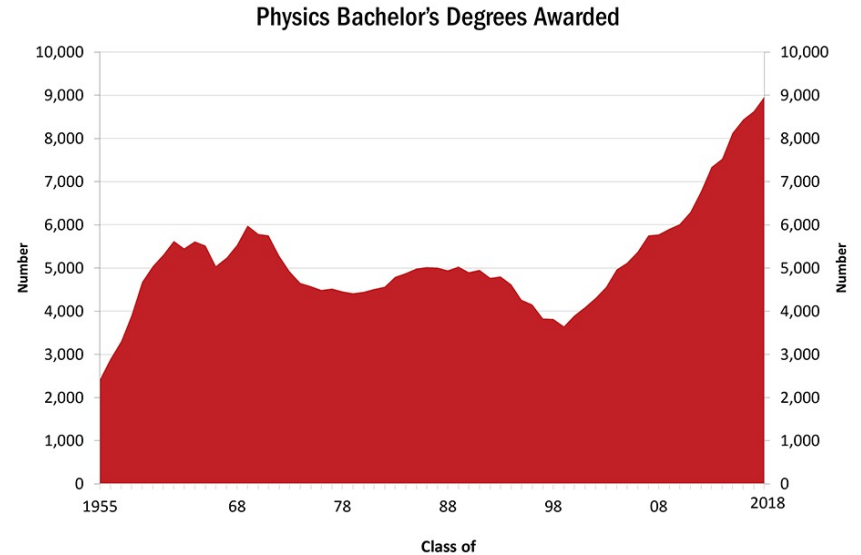
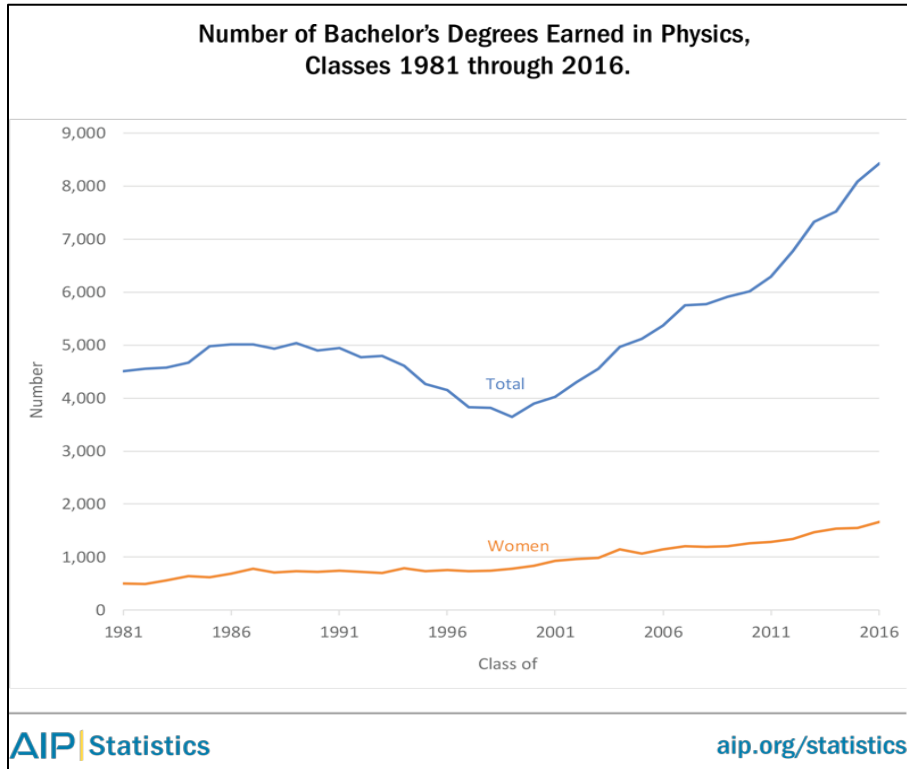


# The Physics and Astronomy Education and Career Landscape

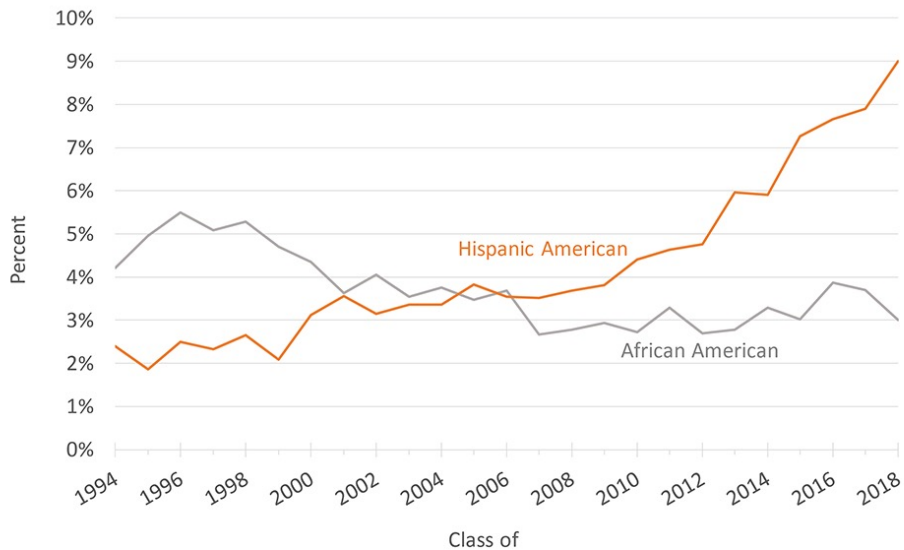
Data from [www.aip.org](http://www.aip.org)

Presented by  
Dr. Mike Strauss  
For REU Program

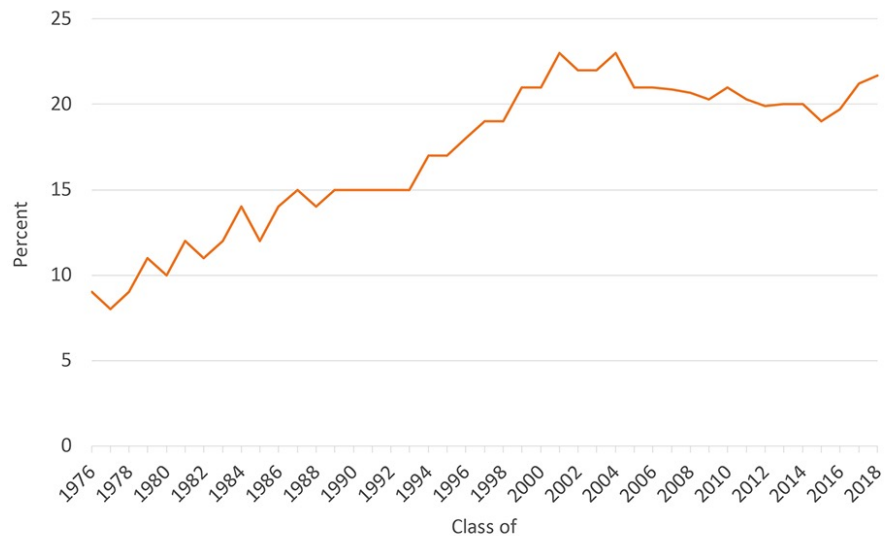
# Physics Bachelor Degree Numbers



### The Proportion of Physics Bachelor's Degrees Awarded to African Americans and Hispanic Americans

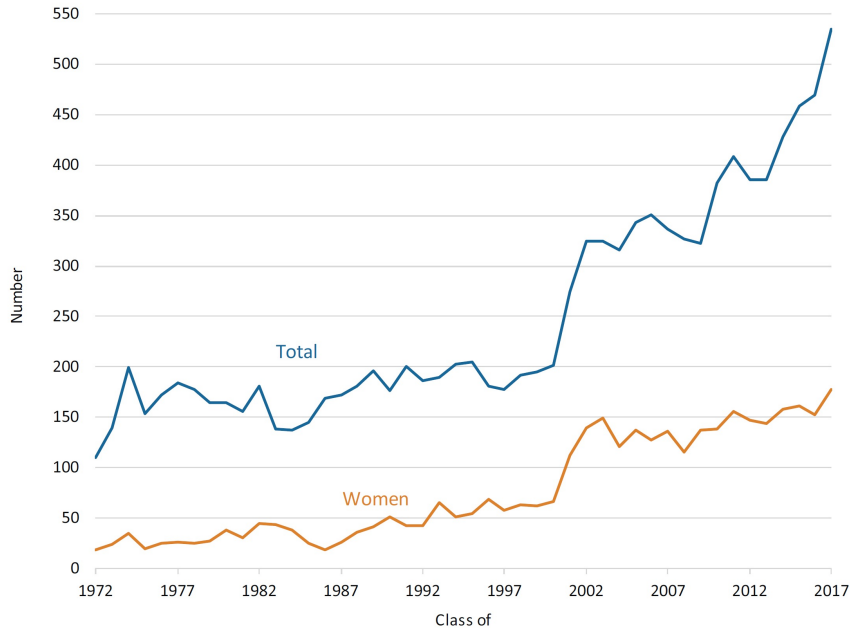


### Percent of Physics Bachelor's Conferred to Women



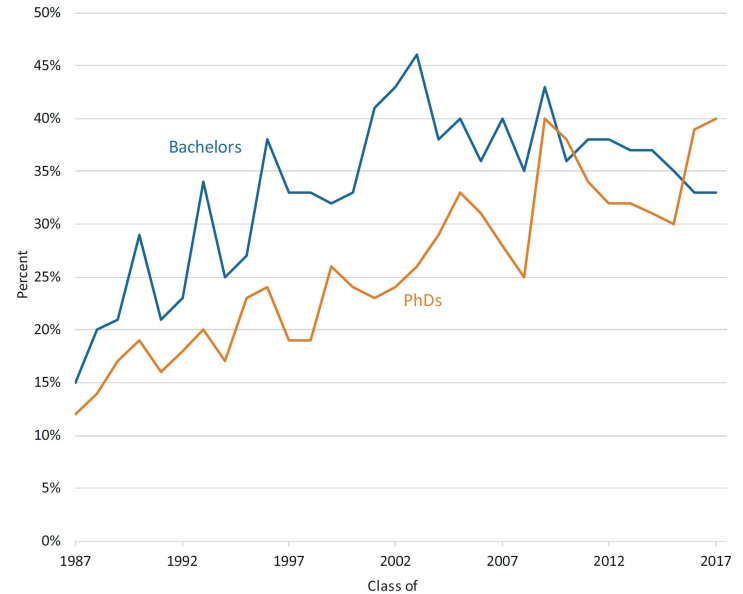
# Astronomy Bachelor Degree Numbers

## Number of Bachelor's Degrees Earned in Astronomy, Classes of 1972 through 2017



Source: AIP Statistical Research Center, Enrollments and Degrees Survey.

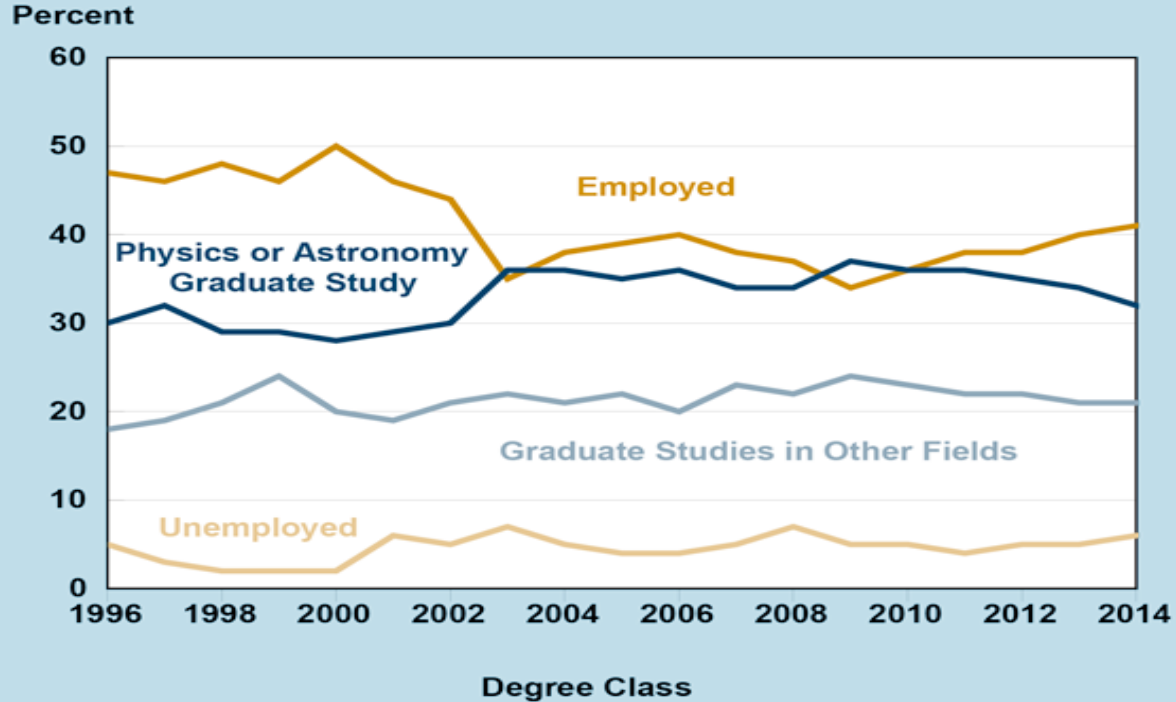
## Percent of Astronomy Bachelors and PhDs Earned by Women, Classes of 1987 through 2017



Source: AIP Statistical Research Center, Enrollments and Degrees Survey.

# What are new graduates doing?

Status of Physics Bachelors One Year After Degree,  
Classes 1995 through 2014



# PHYSICS:

## YOUR GATEWAY TO MULTIPLE CAREER OPTIONS

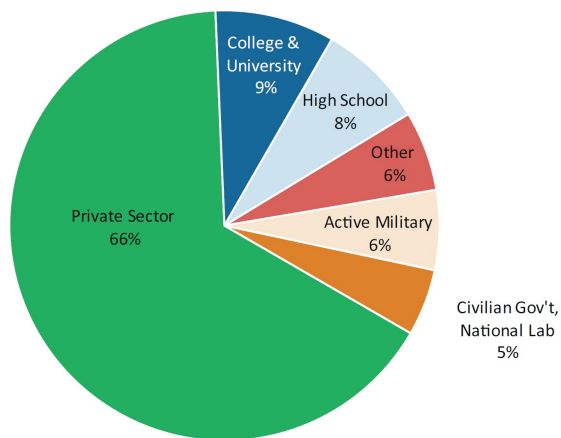


A degree in physics leaves one poised to enter many professions that include but are not limited to traditional physics. The discipline of physics teaches skills that are transferable to those professions. These transferable skills include: mathematical modeling, problem solving, designing experiments, interpretation of experimental data, reflecting on answers before trusting them, research experience, laboratory technique, communication skills. Study physics and maximize your options!



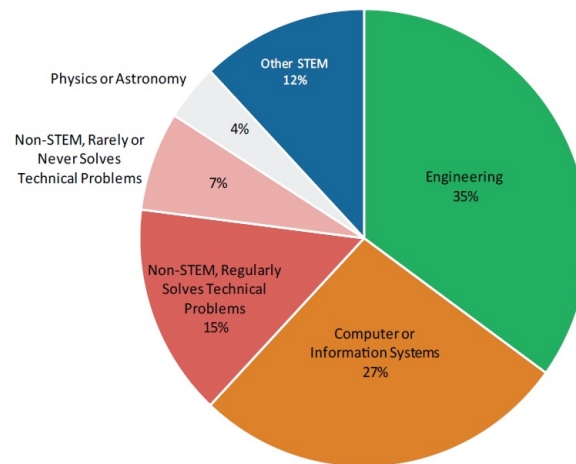
# Employment Where and What?

Initial Employment\* Sectors of New Physics Bachelors,  
Classes of 2015 & 2016 Combined



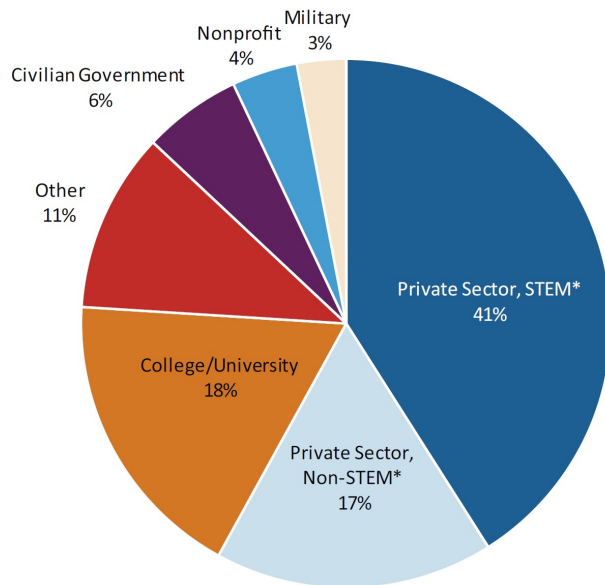
\* 47% of new physics bachelors were employed in the winter following the year in which they received their degree.

Field of Employment for New Physics Bachelors in the Private Sector,  
Classes of 2015 & 2016 Combined



4 refers to natural science, technology, engineering and mathematics. Regularly solving technical problems refers to respondents who rated "Daily", "Weekly", or "Monthly" on a four-point scale that also included "Rarely or Never".

## Initial Employment Sectors of Astronomy Bachelors One Year After Degree, Classes of 2014, 2015, & 2016 Combined



The "Other" category is mostly comprised of middle and high schools, medical facilities, and nonprofit organizations.

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



# Employment by Gender

## Initial Employment Sectors of Physics Bachelors by Gender, Classes of 2013 & 2014

	Female %	Male %
Private Sector	54	61
Civilian Government*	5	4
High School Teacher	13	8
College or University**	15	16
Active Military	2	7
Other	11	4
Total %	100%	100%

\* Includes Federally Funded Research and Development Centers and National labs.

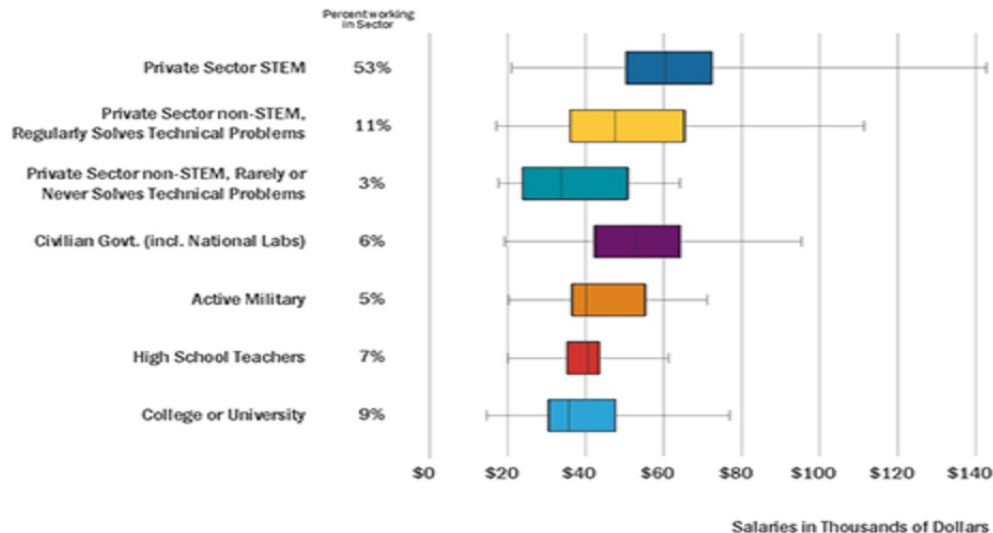
\*\* Includes two- and four-year colleges, universities, and university affiliated research institutes.

Figure based on the responses of 1,657 physics bachelors

# Employment Salaries

## Starting Salaries for Physics Bachelors

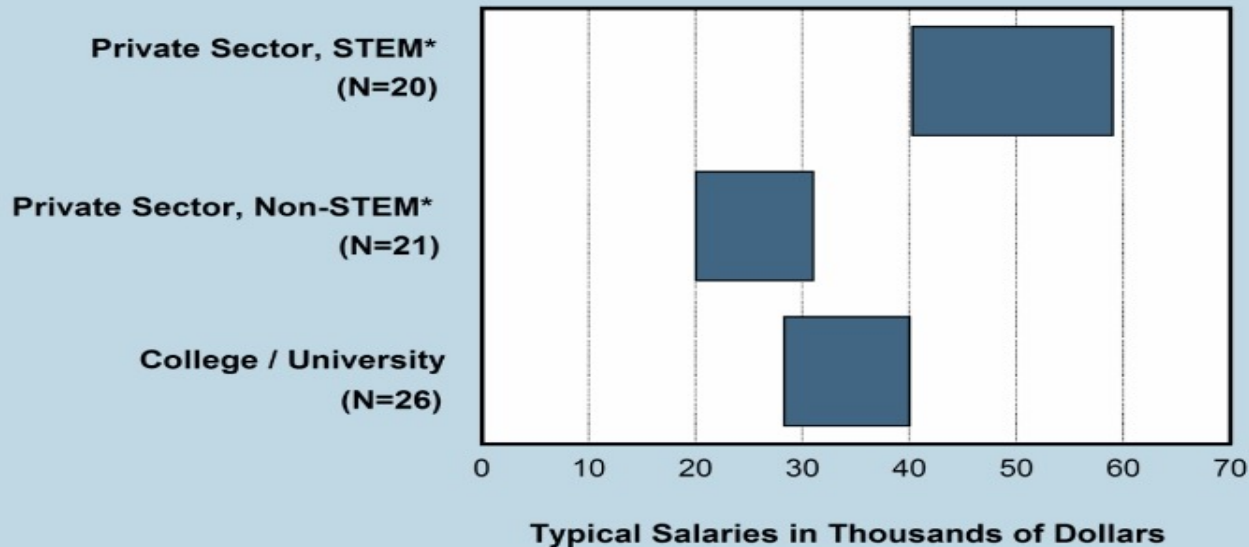
Classes of 2017 & 2018



The salary range for the 5% employed in other sectors is not shown. The full starting salary range is represented by the lines extending to each side of the box. The box represents the middle 50% (25th to 75th percentile) of the salaries. The vertical line within the box represents the median starting salary. STEM refers to positions in science, technology, engineering, and math. Regularly solving technical problems refers to respondents who selected "Daily", "Weekly", or "Monthly" on a four-point scale that also included "Rarely or Never" when asked how frequently they solved technical problems in their positions.

# Salaries for Astronomy Bachelor's Degree

**Starting Salaries for Astronomy Bachelor's,  
Classes of 2007, 2008 & 2009 Combined.**



Updated 2010-2012  
plot is basically  
identical

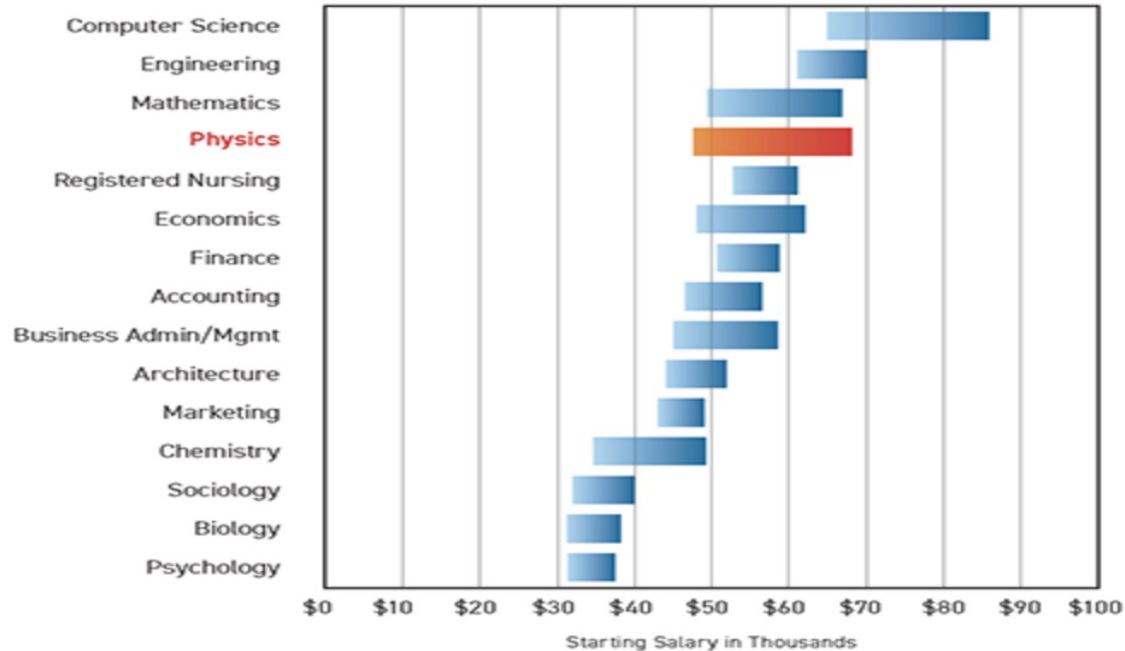
**Note: Typical salaries are the middle 50%, i.e., between the 25<sup>th</sup> and the 75<sup>th</sup> percentiles.**

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

# Physics and Other STEM Degrees

spring20-bs-salaries.png

## What Do New Bachelors Earn? Starting Salaries for the Class of 2018

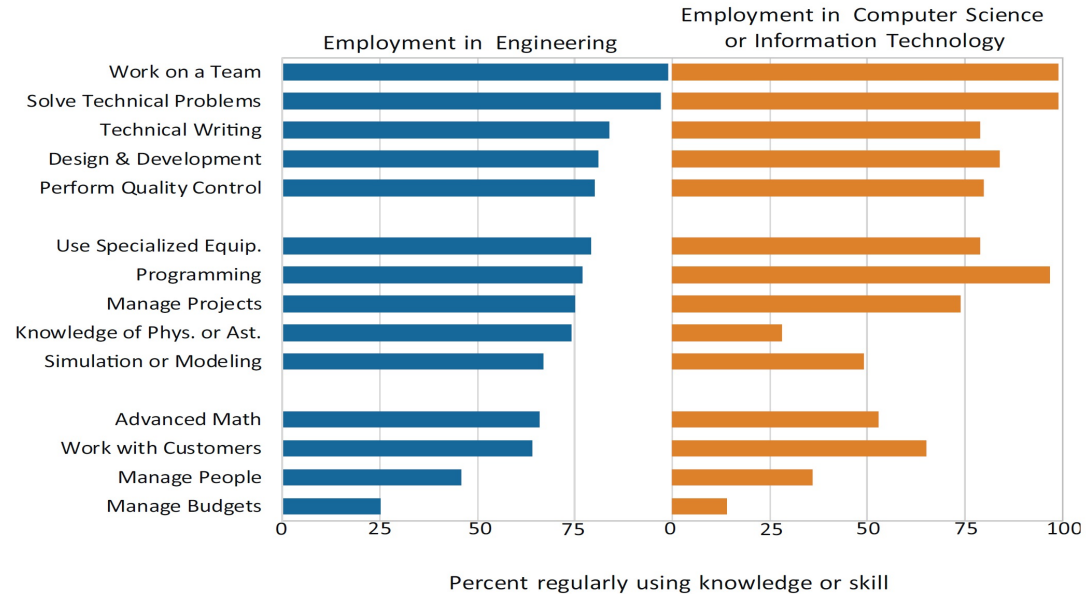


Bars represent the middle 50% of salaries, i.e. between the 25th and the 75th percentiles.

Reprinted from the Summer 2019 Salary Survey, with permission of the National Association of Colleges and Employers, copyright holder.

# Skills Used

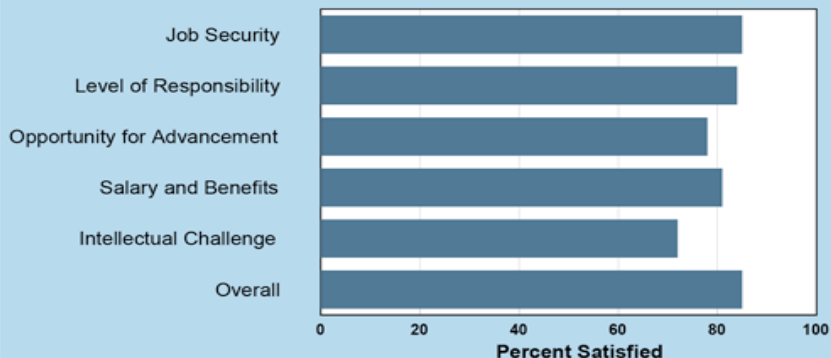
## Knowledge and Skills Regularly Used by New Physics Bachelors Employed in the Private Sector, Classes of 2015 & 2016 Combined



Percentages represent the physics bachelors who indicated they use a knowledge or skill "daily," "weekly," or "monthly" on a four-point scale that also included "never or rarely."

# Job Satisfaction of Physics Bachelor's Degree

## Job Satisfaction of Physics Bachelors in Private Sector STEM Positions, Classes of 2013 & 2014 Combined

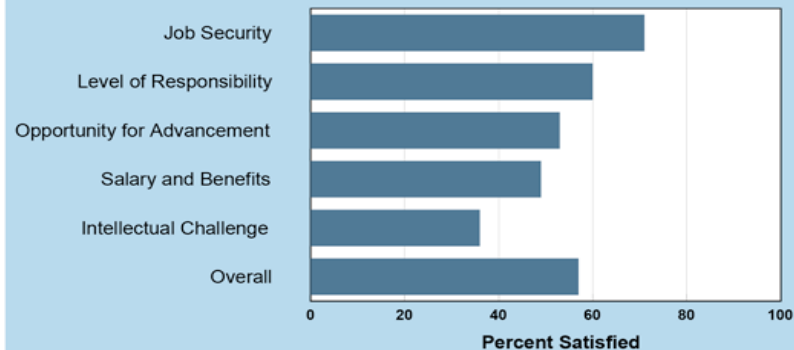


Percentages represent the physics bachelors who chose "very satisfied" or "somewhat satisfied" on a four-point scale that also included "somewhat dissatisfied" and "very dissatisfied." STEM refers to natural science, technology, engineering and math.

Figure based on the responses of 670 physics bachelors employed in private sector STEM positions.

[www.aip.org/statistics](http://www.aip.org/statistics)

## Job Satisfaction of Physics Bachelors in Private Sector Non-STEM Positions, Classes of 2013 & 2014 Combined



Percentages represent the physics bachelors who chose "very satisfied" or "somewhat satisfied" on a four-point scale that also included "somewhat dissatisfied" and "very dissatisfied." STEM refers to natural science, technology, engineering and math.

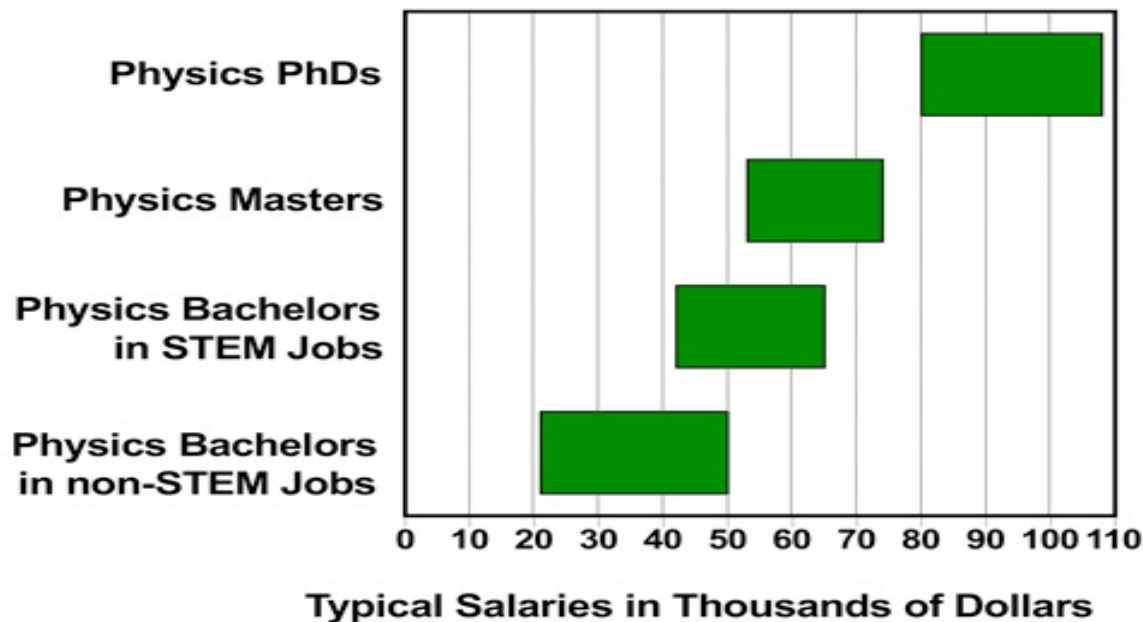
Figure based on the responses of 266 physics bachelors employed in private sector non-STEM positions.

[www.aip.org/statistics](http://www.aip.org/statistics)

# More than a Bachelor's Degree?

## Starting Salaries in the Private Sector

Physics Degree Recipients, Classes of 2013 & 2014



Note: Typical salaries are the middle 50%, i.e. between the 25th and 75th percentiles.  
STEM refers to positions in Science, Technology, Engineering, and Math.

# Physics Bachelor's Pursuing Graduate School

Field of Graduate Study for Physics Bachelors One Year After Degree, Classes of 2013 & 2014 Combined

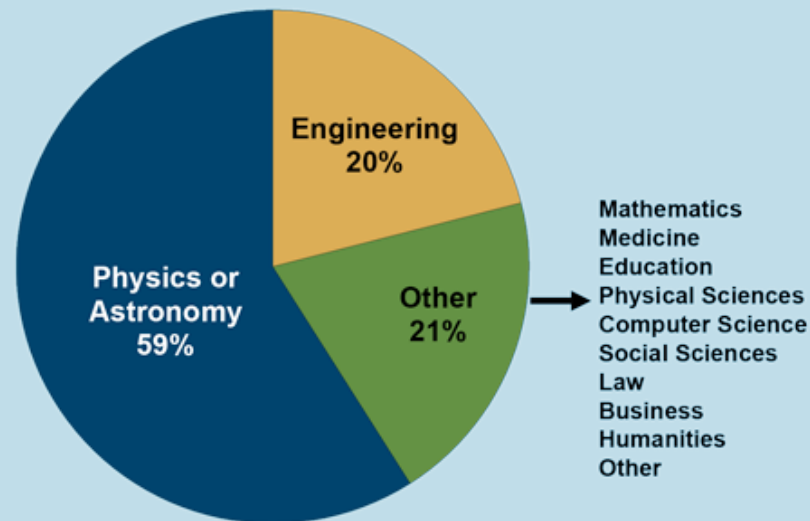
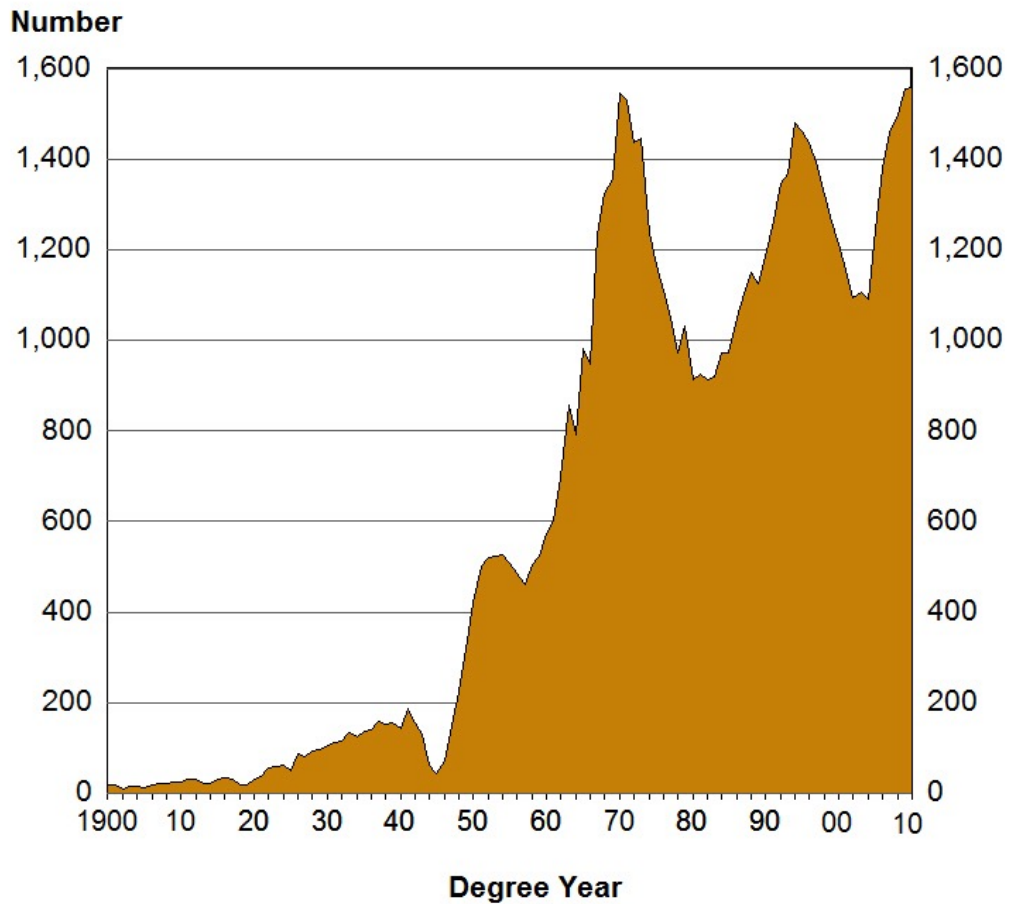


Figure based on 2,709 physics bachelors who enrolled in graduate school following graduation.

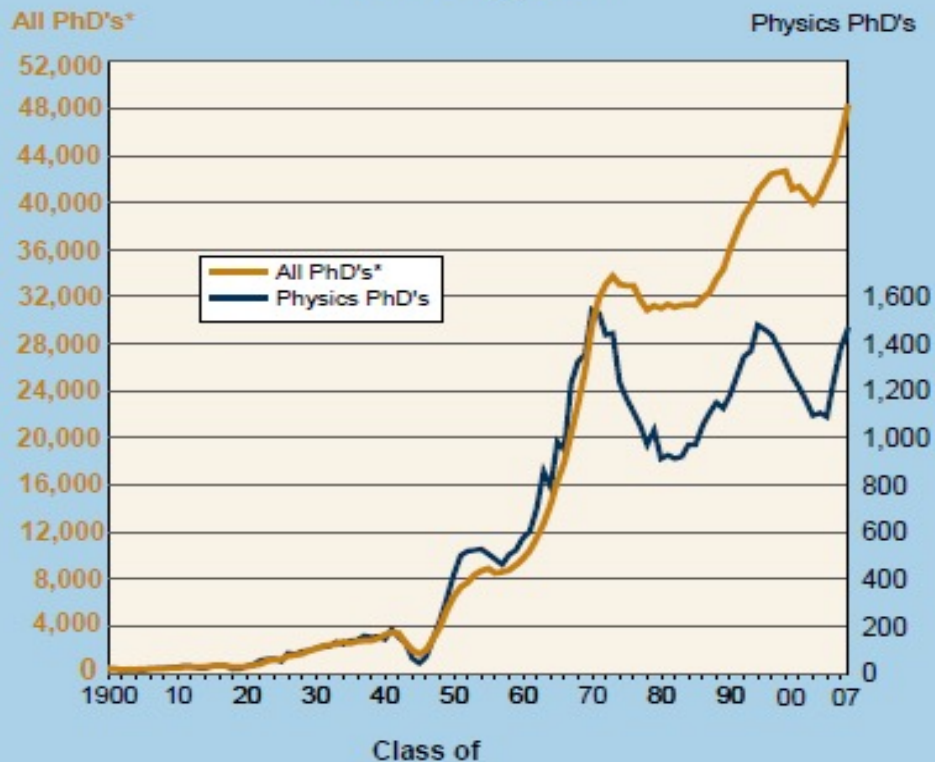


# Physics PhDs Conferred in the US, 1900 through 2010.



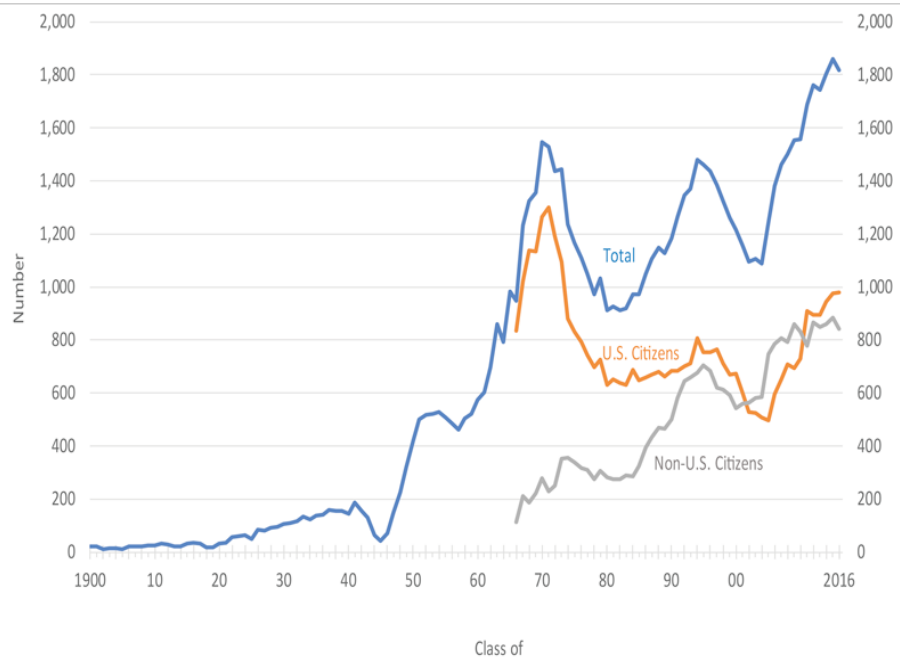
# Ph.D.s Conferred

Physics PhD's and all PhD's conferred in the US,  
1900 through 2007.



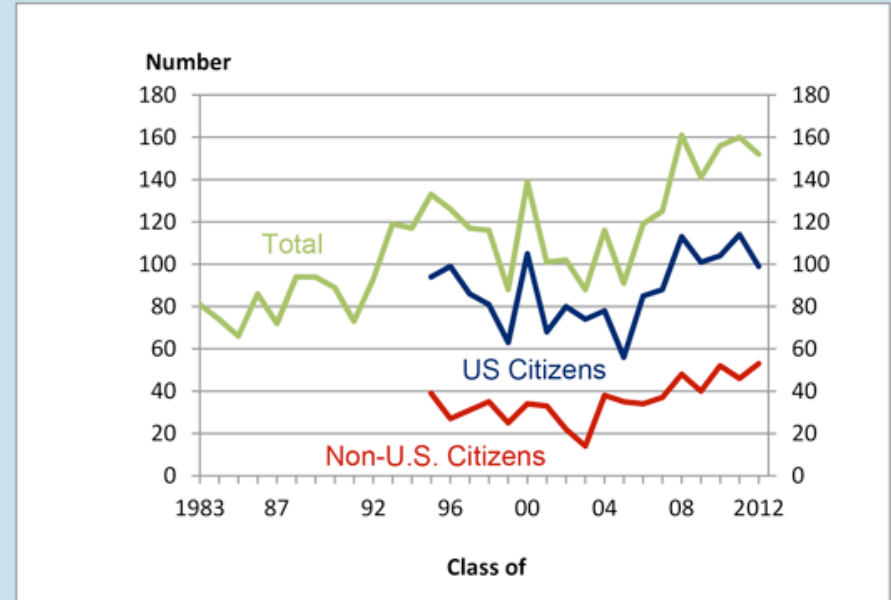
# Citizenship of Physics and Astronomy Ph.Ds

## Physics PhDs Conferred in the U.S., 1900 through 2016.



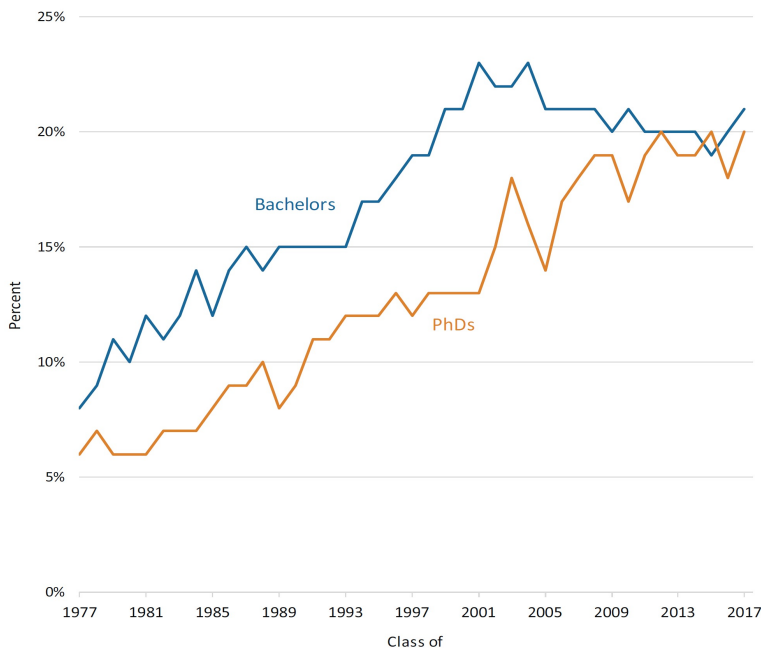
Sources: ACE (1900-1919), NAS (1920-1961), AIP (1962-2016)

## Astronomy PhDs Awarded by Citizenship, Classes 1983 through 2012.



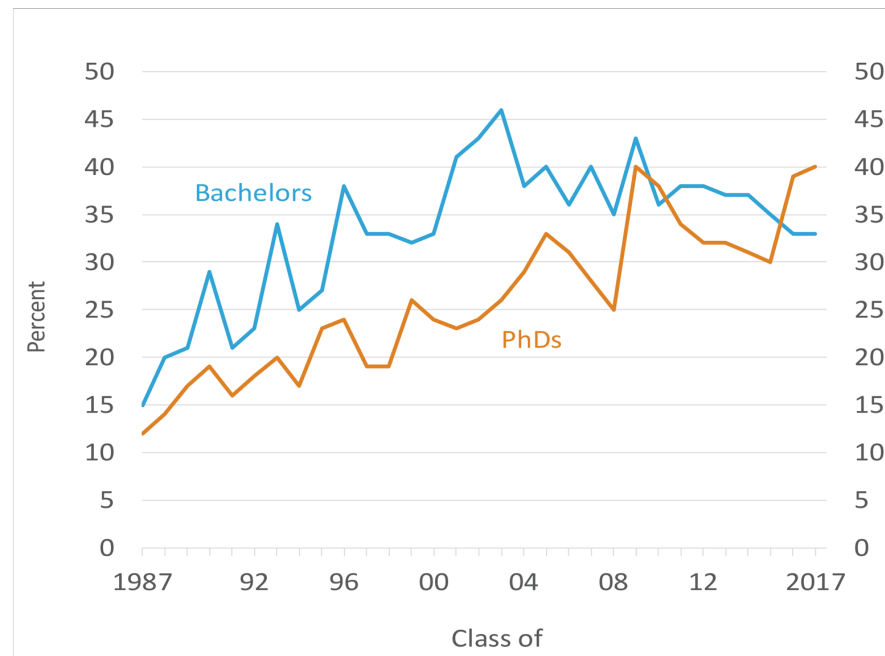
# Women in Physics and Astronomy

### Percent of Physics Bachelors and PhDs Earned by Women, Classes of 1977 through 2017



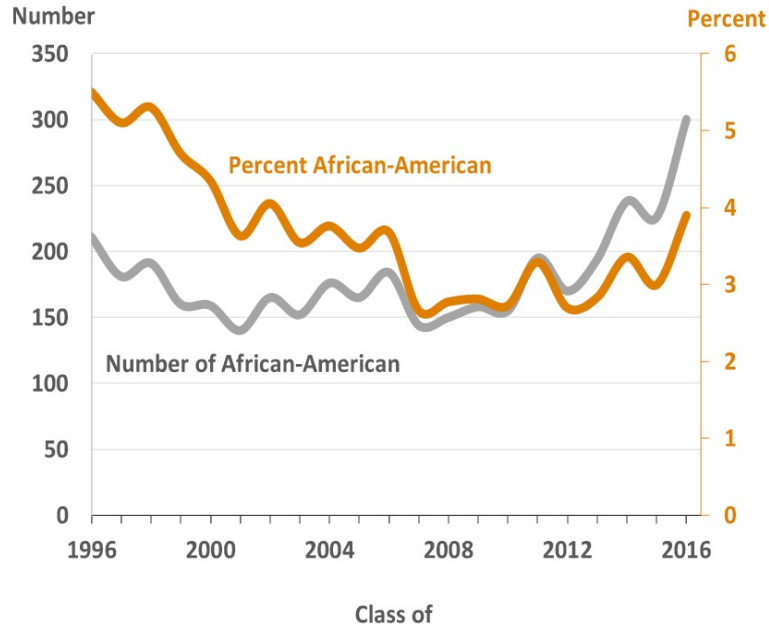
Source: AIP Statistical Research Center, Enrollments and Degrees Survey.

### Percent of Bachelor's Degrees and Doctorates in Astronomy Earned by Women, Classes 1987 through 2017.

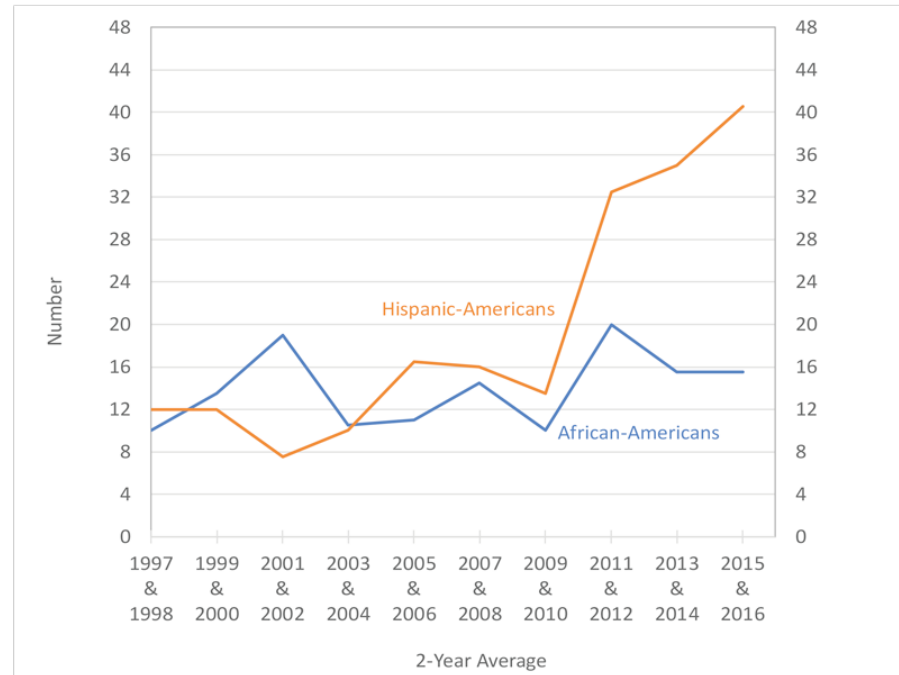


# Under-represented groups in Physics

## Number and Percent of Physics Bachelor's Degrees Earned by African-Americans

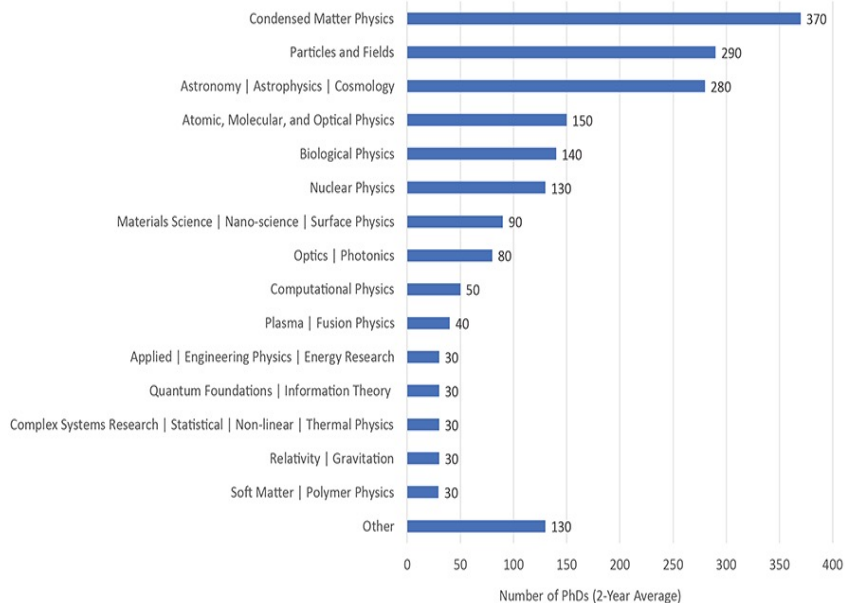


## Number of Physics Doctorates Earned by African-Americans and Hispanic-Americans, Classes 1997 through 2016.



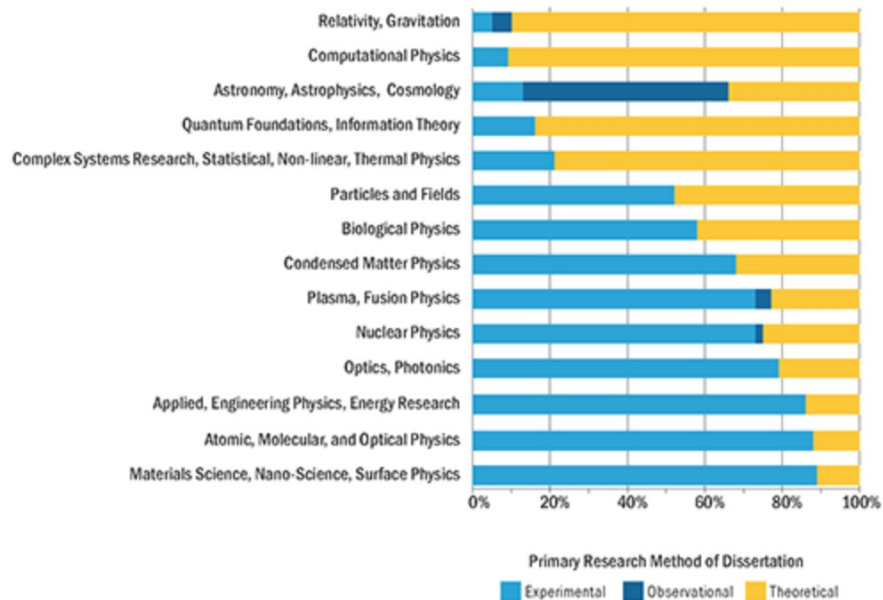
# Subfields of Physics

Average Number of PhDs Granted by Subfield from Physics Departments  
Annually, Classes of 2017 and 2018 Combined

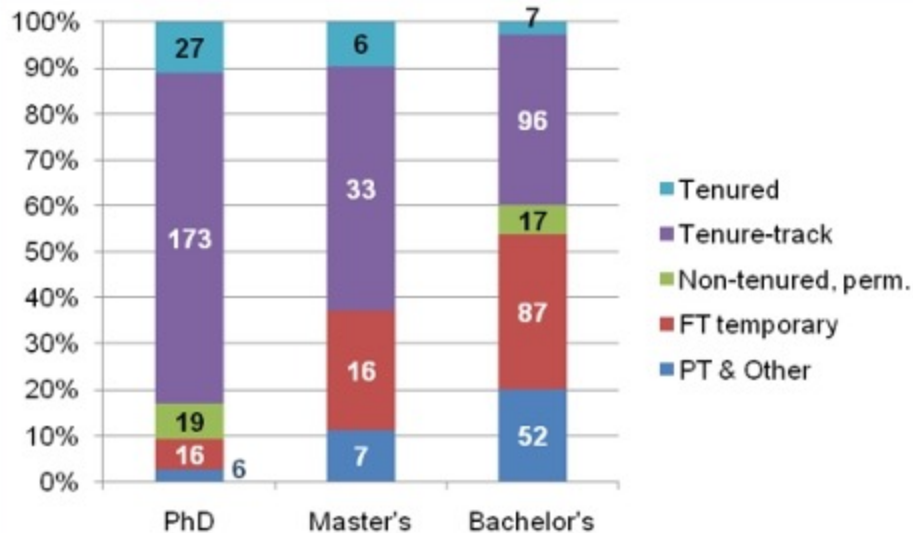


Note: These data are estimated from responses to the AIP Follow-up Survey of Physics PhDs and total 1,900 individuals. Additionally, there was an average of 180 astronomy PhDs conferred at departments that offer an astronomy degree.

## Dissertation Research Method by Subfield of Dissertation



## Current Positions of New Faculty Members, 2007-08



The numbers on the graph indicate the number of new faculty members.

Total number of new faculty:  
 241 in PhD-granting departments  
 62 in Master's-granting departments  
 259 in Bachelor's-granting departments

FT – Full-time ◆ PT – Part-time

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

# After Physics Graduate School?

**Type of Employment of Physics PhDs by Employment Sector  
One Year After Degree, Classes of 2013 & 2014 Combined**

Sector of Employment	Initial Employment Type			Overall %
	Postdoc %	Potentially Permanent %	Other Temporary %	
Academic*	75	20	71	52
Private	1	70	18	31
Government	21	8	3	14
Other	3	2	8	3
	100%	100%	100%	100%

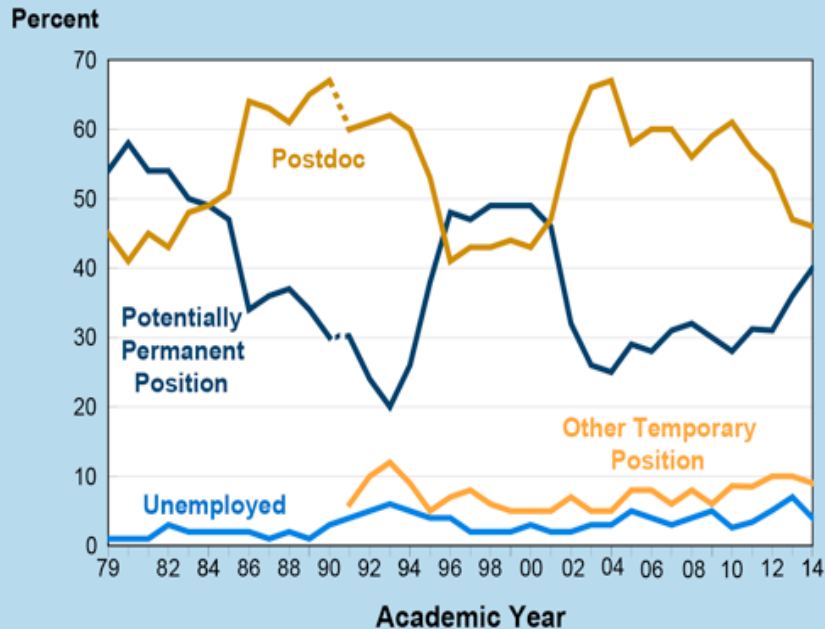
Note: Data only include US-educated physics PhDs who remained in the US after earning their degrees. Data are based on the responses of 655 postdocs, 523 individuals working in potentially permanent positions and 126 individuals working in "other temporary positions."

\*The academic sector includes two- and four-year colleges, universities, and university affiliated research institutes.



# After Physics Graduate School?

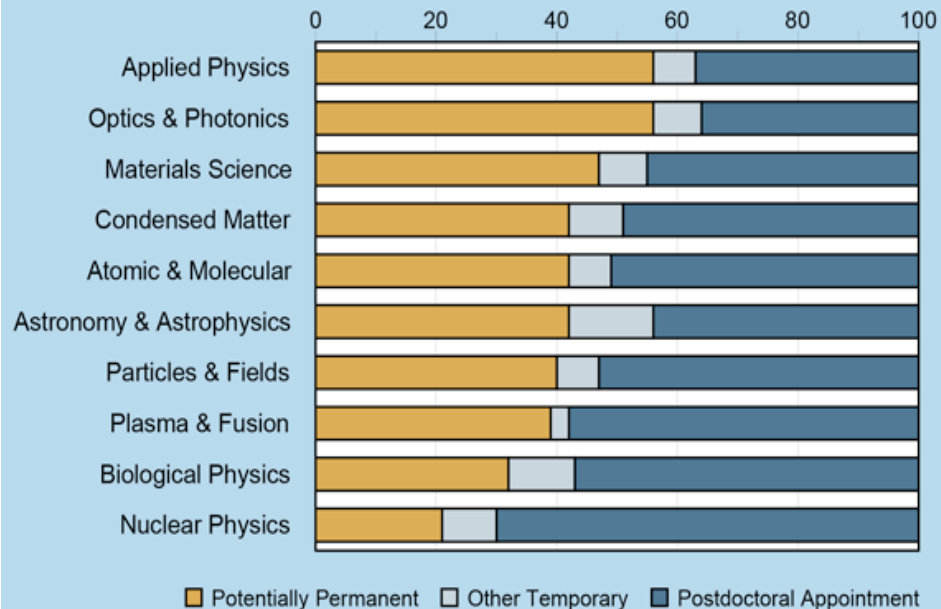
Initial Employment of Physics PhDs, 1979 through 2014.



In 1991, the survey questionnaire was changed to measure "other temporary" employment as a separate category. Data are limited to PhDs who earned their degrees from a US university and remained in the US.

[www.aip.org/statistics](http://www.aip.org/statistics)

Initial Employment of Physics PhDs by Subfield of Dissertation, Classes of 2013 & 2014 Combined.



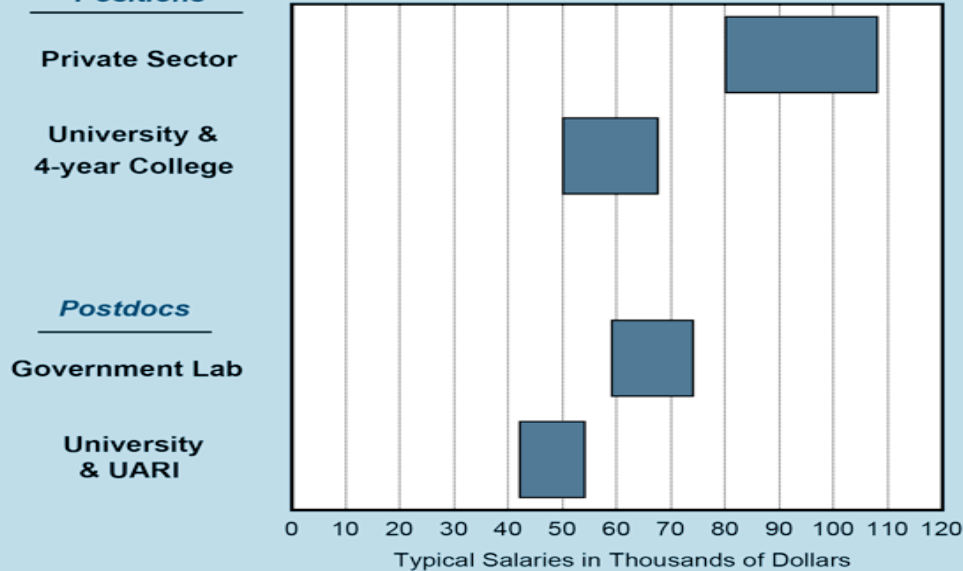
Data are limited to PhDs who earned their degrees from a US university and remained in the US.

[www.aip.org/statistics](http://www.aip.org/statistics)

# Ph.D. Starting Salaries

Starting Salaries for Physics PhDs,  
Classes of 2013 & 2014 Combined

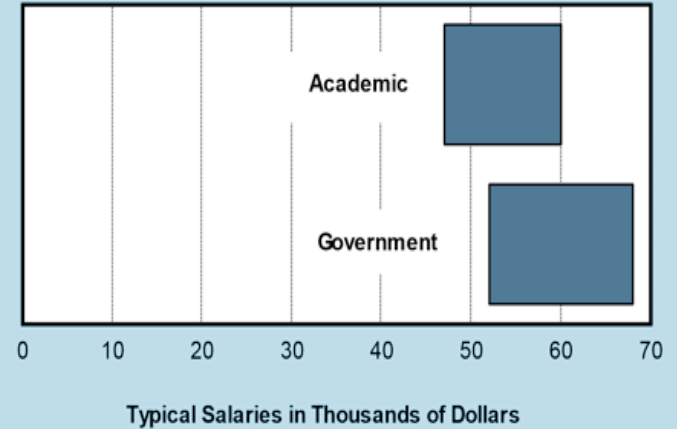
*Potentially Permanent  
Positions*



Data only include US-educated PhDs who remained in the US after earning their degrees. The ranges of salaries represent the middle 50%, i.e. between the 25<sup>th</sup> and 75<sup>th</sup> percentiles. Government Lab includes Federally Funded Research and Development Centers, e.g. Los Alamos National Laboratory. UARI is University Affiliated Research Institute. The data for PhDs holding potentially permanent positions in academia include salaries based on 9-10 and 11-12 month commitments. Data are based on respondents holding potentially permanent positions in the private sector (158) and in universities and 4-year colleges (36) and on postdocs in government labs (65) and in universities and UARIs (291).

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

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

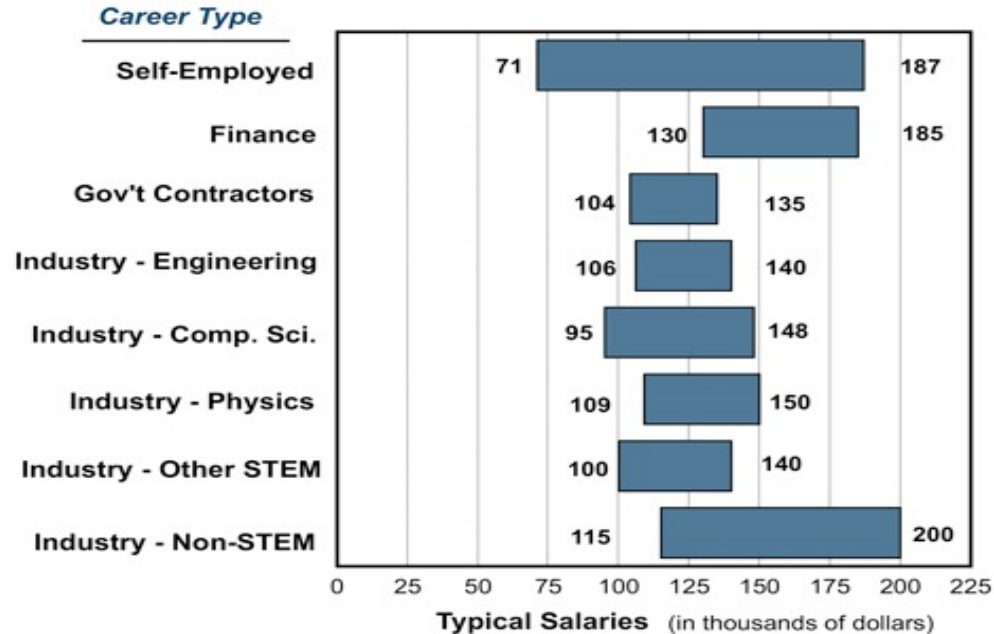


Note: Typical salaries are the middle 50%, i.e., between the 25<sup>th</sup> and the 75<sup>th</sup> percentiles. Data are limited to PhDs who earned their degrees from a US university and remained in the US. Academic includes: Universities, university-affiliated research institutes (UARI) and observatories. 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>

# What Physicists Do (and get paid) in the Private Sector

## Physicists in the Private Sector Salaries by Career Type, 2011



Data include U.S.-educated physicists who earned their PhD 10-15 years earlier and were working full-time in the U.S. in 2011. Respondents were asked to provide their current annual salary excluding bonuses, overtime and additional compensation. Typical salaries are the middle 50%, i.e. between the 25th and 75th percentiles.

# Ph.D. Preparation and Satisfaction

## Qualitative Aspects of Initial Employment for Physics PhDs, Classes of 2009 & 2010 Combined

Percent agreeing with statement	Type of Employment: All Sectors	
	Postdoc	Potentially Permanent
	%	%
A physics PhD is an appropriate background for this position.	97	80
This position is professionally challenging.	89	79
I am satisfied with this position.	84	83
I consider myself underemployed in this position.	20	30
Number of respondents	539	225

The percentages represent the two positive responses on a 4-point scale, i.e., Very appropriate, Appropriate, Not very appropriate and Not at all appropriate. Data only include U.S.-educated physics PhDs who remained in the U.S. after earning their degrees.

# Discussion/Questions