

# Breaking the Myth of the “Non-Traditional” Physicist

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The Real Employment Picture for Physics Graduates

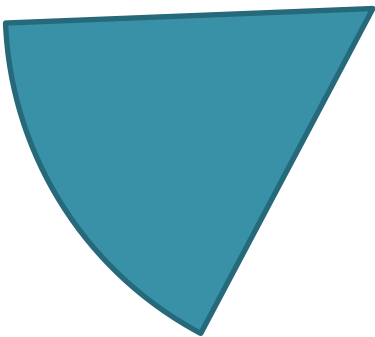
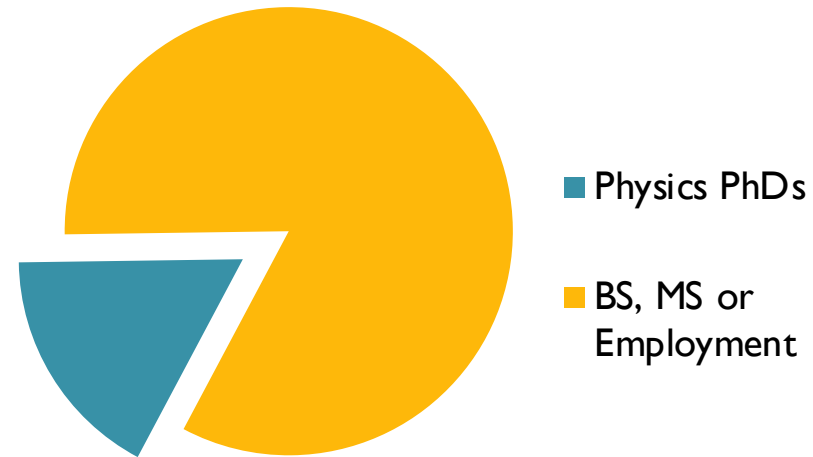


Crystal Bailey, PhD  
American Physical Society

# Where do Physicists Work?

What is a “traditional physicist”? A physics professor? A PhD researcher? The “most common” career path?

The AIP Statistical Research Center estimates that **1 in 5** physics bachelors will choose to finish a Physics PhD.



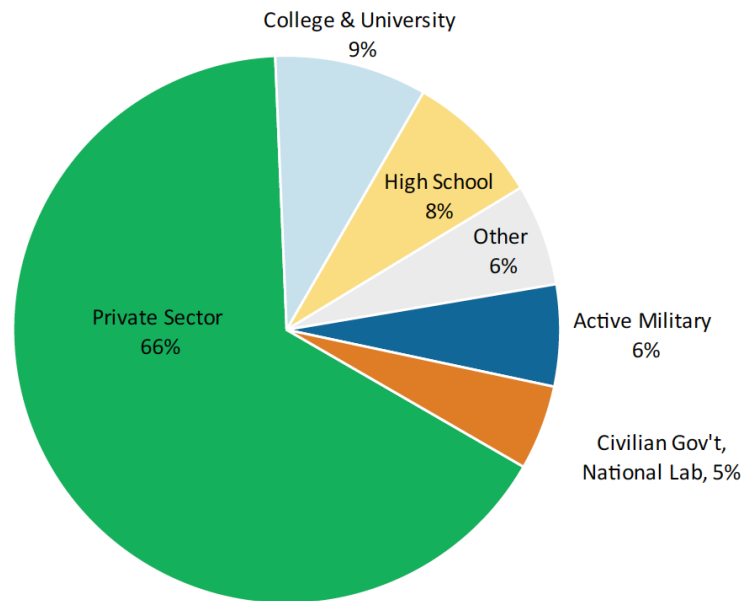
So ~20% of all Physics Degree holders will actually become Physics PhDs—and by extension “traditional physicists.”

# Where Physics Graduates Go

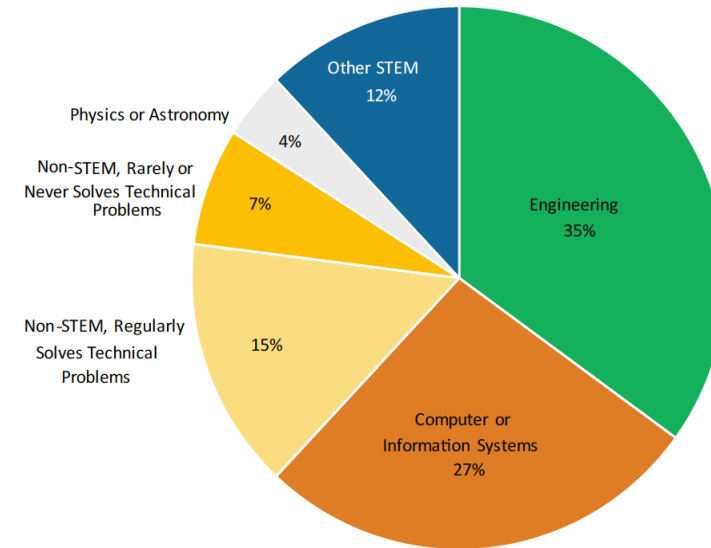
## Physics Bachelors

Around 40% of graduating physics bachelors will enter the workforce after graduation. About 66% of them will work in the private sector, mostly in STEM fields.

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



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



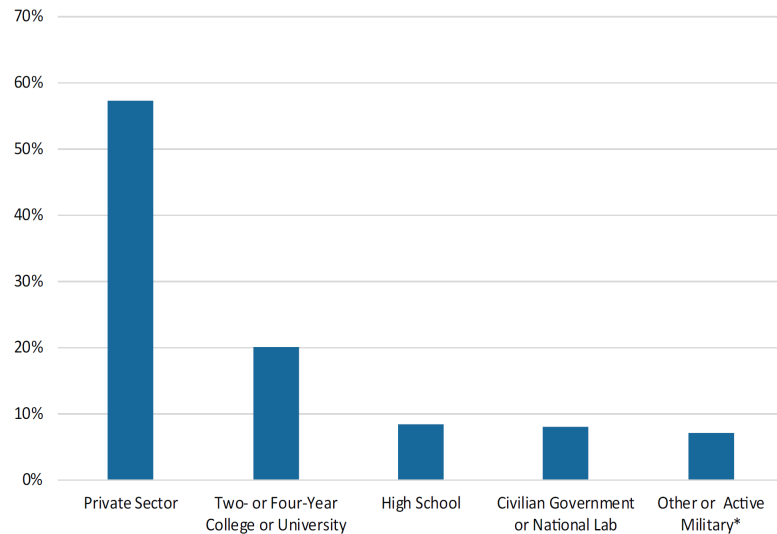
STEM refers to natural science, technology, engineering and mathematics. Regularly solving technical problems refers to respondents who selected "Daily", "Weekly", or "Monthly" on a four-point scale that also included "Rarely or Never".

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

# Physics Masters

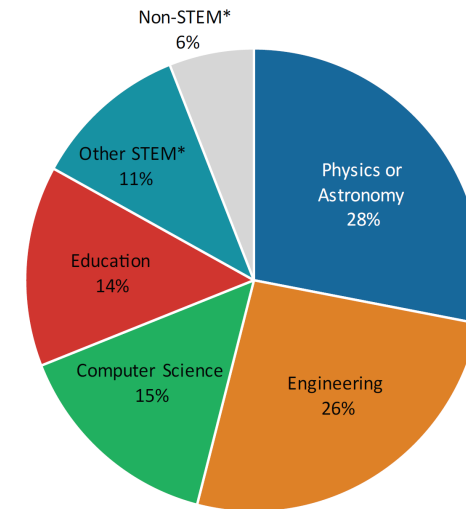
Between 2016 - 2018, about 45% of physics masters recipients entered or remained in the workforce. Most (~60%) worked in the private sector, in STEM fields<sup>2</sup>.

Employment Distribution of Exiting Physics Masters One Year After Degree, Classes of 2016, 2017, & 2018 Combined



Exiting masters are individuals who, upon receiving their master's degrees, leave their current physics departments. Figure includes US employed physics masters, including those who were employed part-time and not enrolled in a degree program and masters continuing in positions they held while pursuing their degrees. Other includes elementary and middle schools, health care facilities, and non-profit organizations. Figure based on responses from 349 individuals.  
\*Active military excludes masters receiving their degrees from military academies.

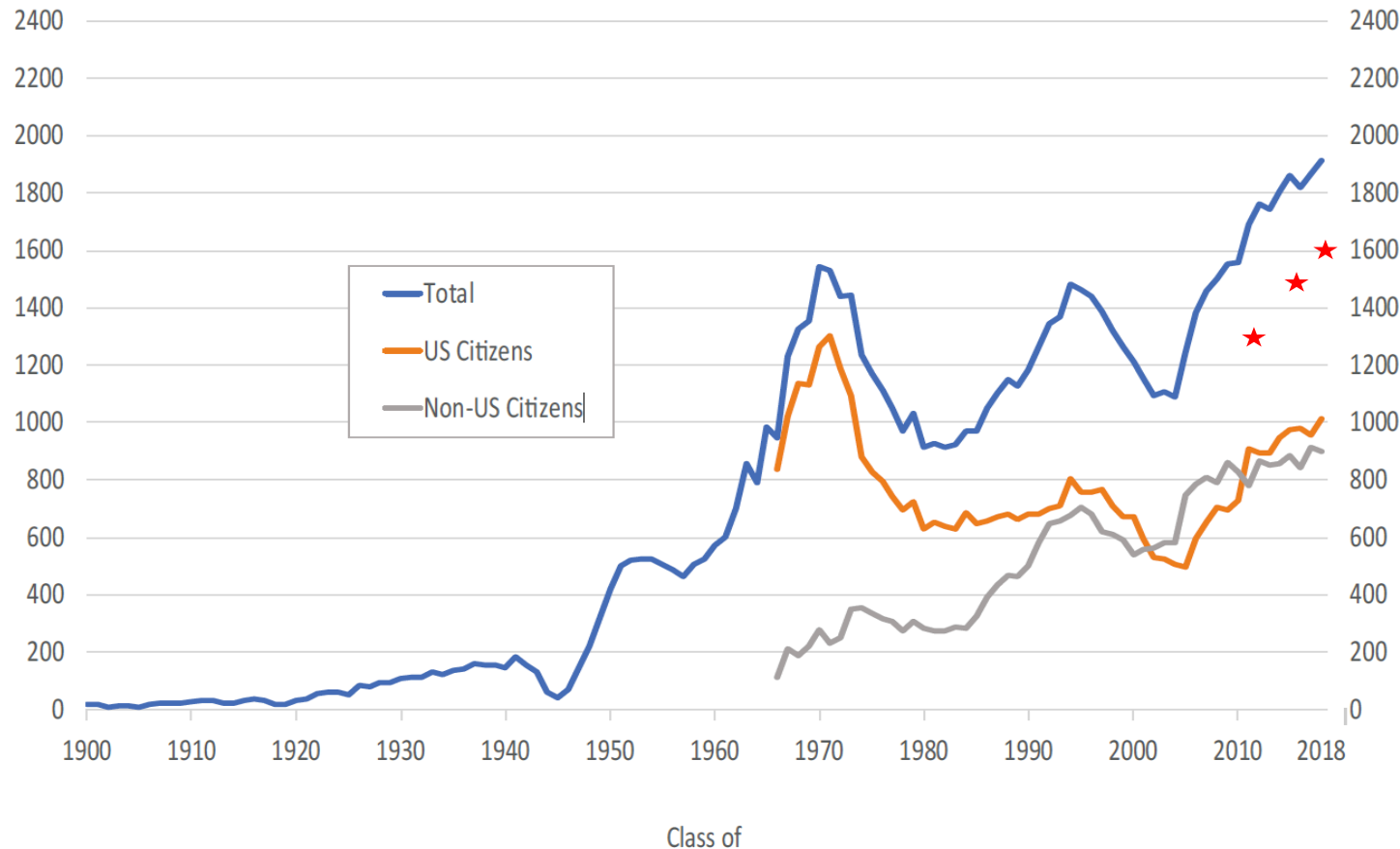
Fields of Employment of Exiting Physics Masters One Year After Degree, Classes of 2016, 2017, & 2018 Combined



Exiting masters are individuals who, upon receiving their master's degrees, leave their current physics departments. Figure includes US-employed physics masters, including those who were employed part time and masters continuing in positions they held while pursuing their degrees. Figure is based on responses of 331 individuals.  
\*STEM refers to science, technology, engineering, and math.

# Physics PhDs

## PhDs Conferred in the United States, 1900 - 2018



Sources: ACE (1900-1919), NAS (1920-1961), AIP (1962-2018)

About 10% of US and 25% of non-US PhD graduates leave the US – mostly for Post Doc positions

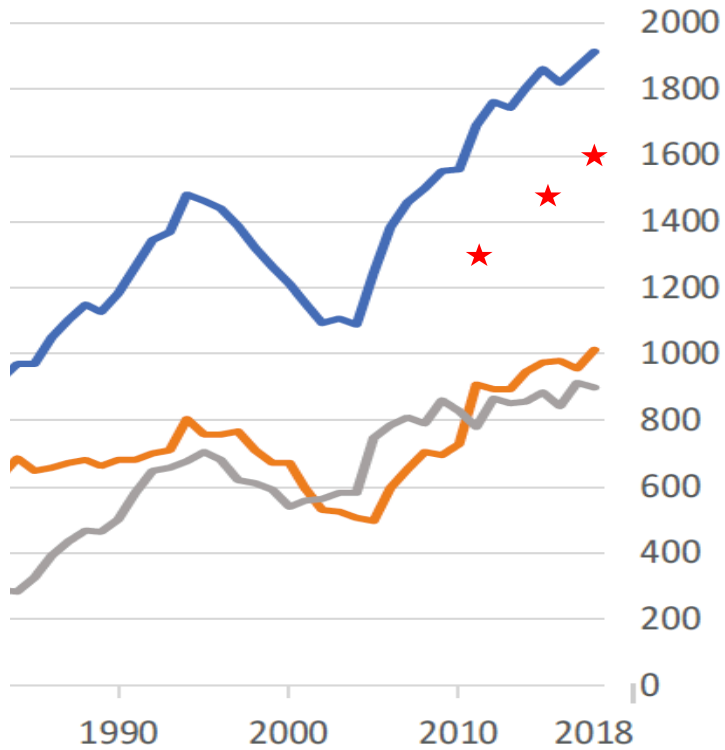
In 2018, this translates to **1,600 PhDs** remaining in the US Workforce

In 2015 – 2016, this number was closer to **1,500 PhDs who remained in the US**

In 2010, it was about **1,300 PhDs who remained**

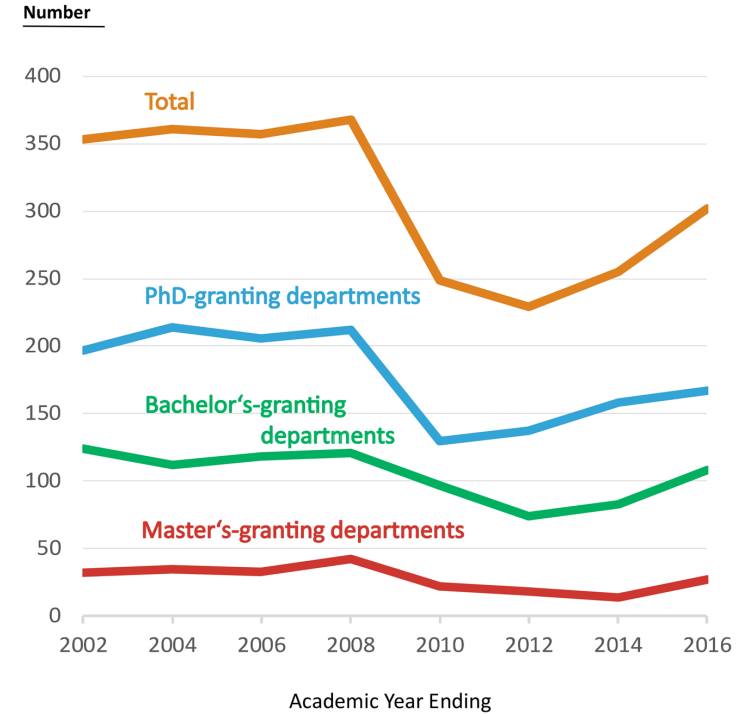
Meanwhile, the number of permanent hires in academia has decreased since 2002.

PhDs Conferred in the United States, who remain ★



Number of Faculty Hired by Physics Departments

Tenured and Tenure-Track Positions Only



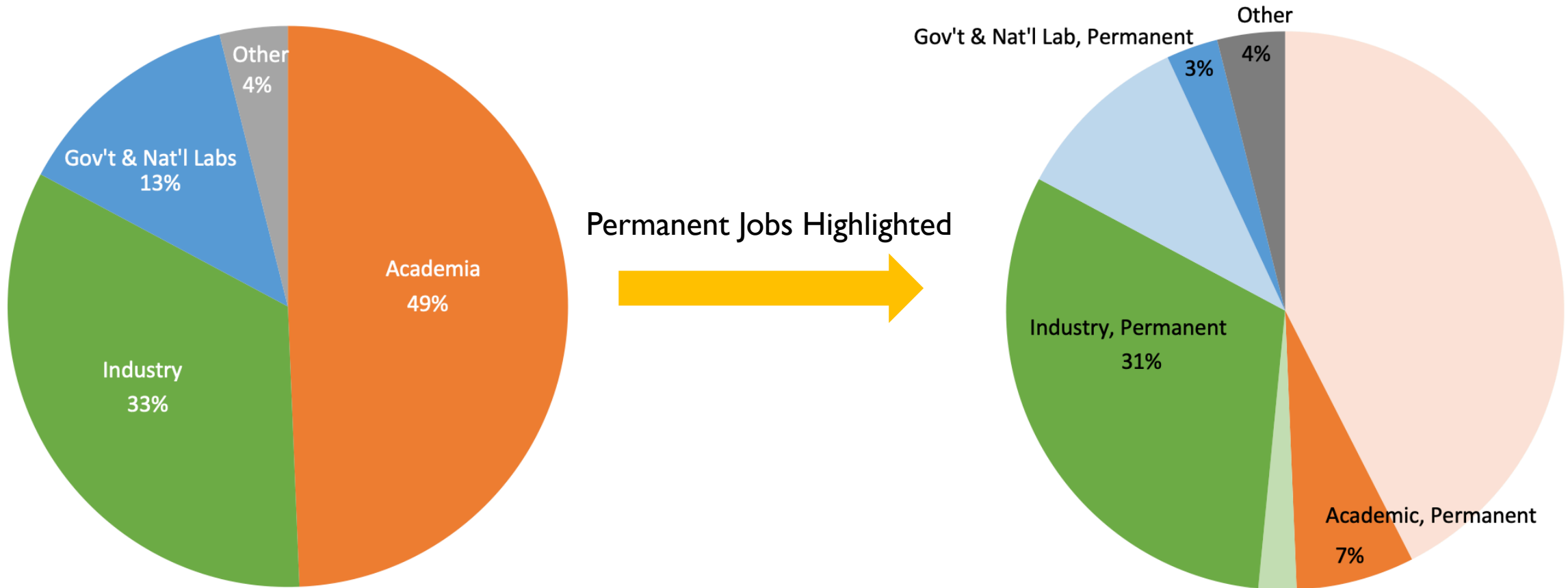
• The noticeable drop from 2008 to 2010 is likely due to the 2008 recession.

In 2010, ratio of new faculty/PhDs conferred: 19%. After 6 years (2016), that ratio is 23%.

# Physics PhDs

In 2015 and 2016, about **1,500 physics** PhDs remained in the US workforce per year.

Initial Employment of Physics PhDs,\* 2015 – 2016



Also, about a quarter of US new faculty hires are individuals who got their PhD *outside* the US<sup>4</sup>. All told, about **30% of Physics PhDs<sup>5</sup>** in the US workforce are in permanent academic positions (as of 2017)<sup>5</sup>.

Academic Background of New Tenured and Tenure-Track Faculty Members, 2017–18 Academic Year

	Highest Physics Degree Offered	
	PhD	Bachelor's
Earned PhD in the US within the last 5 years	41%	61%
Earned PhD outside the US	20%	7%
Earned PhD in the US more than 5 years ago; previously employed in academia in the US	33%	25%
Earned PhD in the US more than 5 years ago; previously employed outside academia	6%	7%

Note: These data are not provided for Master's departments due to the small number of new hires in those departments.

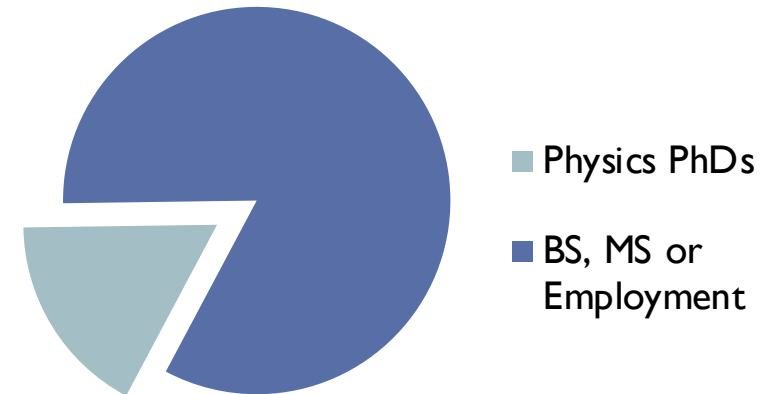
AIP | Statistics

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

Only about 18% of physics BS graduates will choose to finish a PhD in physics.

About **5 out of 100** US physics BS graduates will become “traditional” physicist, i.e. permanent physics faculty...

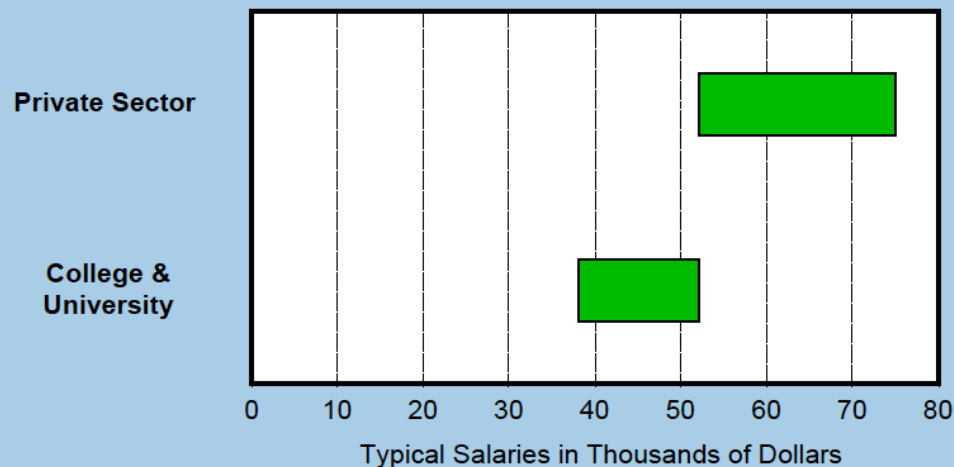
...over half of them will work in a private sector job with a physics BS, MS or PhD.





# MS and PhD Starting Salaries

**Typical Starting Salaries of Exiting Physics Masters  
One Year after Degree,  
Classes 2012, 2013, & 2014 Combined.**

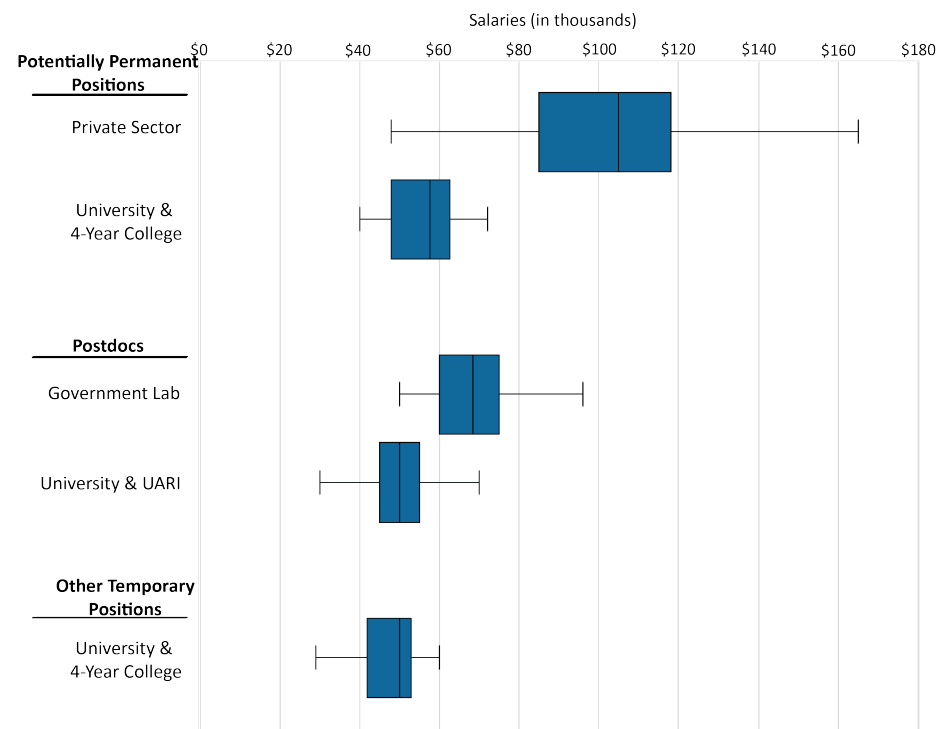


Exiting masters are individuals who, upon receiving their master's degrees, leave their current physics departments.

The graphic represents the middle 50% of reported salaries, i.e., between the 25th and 75th percentiles. Figure does not include salaries for masters holding part-time positions or salaries for respondents who reported starting their employment more than a year prior to earning their master's degree. The College & University category includes two-year colleges, four-year colleges, universities, and university affiliated research institutes. Data are based on 71 private sector salaries and 19 college and university salaries.

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

**Starting Salaries for New Physics PhDs, Classes of 2015 & 2016 Combined**



Data represents only US-educated PhDs who remained in the US after earning their degrees. 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 for the sector. 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 and have not been adjusted. Data are based on respondents holding potentially permanent positions in the private sector (214) and in universities and 4-year colleges (30), postdocs in government labs (78) and universities and UARIs (257), and "other temporary positions" in universities and 4-year colleges (24).

AIP | Statistics

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

# Beware the Rose-Colored Binoculars...



Responsible career preparation – and mentorship – means considering all possibilities

**There are many exciting, rewarding opportunities to do science, in a lot of different places!**

# Preparing For Your Future

## Career Planning – Broaden Your Focus

### Perform a detailed self-assessment

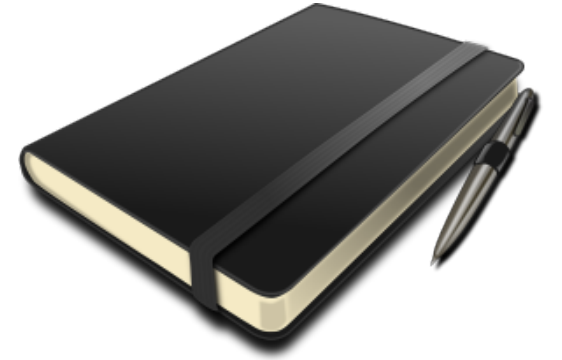
- Understand what you love doing as well as what you're good at doing

### Keep a Career Journal and Document Skills

- Document valuable transferrable skills
- Revisit and expand this list over time
- These will be the building blocks of every resume you will ever write

### Use Career Resources Creatively

- Many university career services departments can offer valuable resources. Guide the interaction to fit your needs



# Build Your Professional Network

## 1st degree contacts

- People you know
- Peers, colleagues, mentors

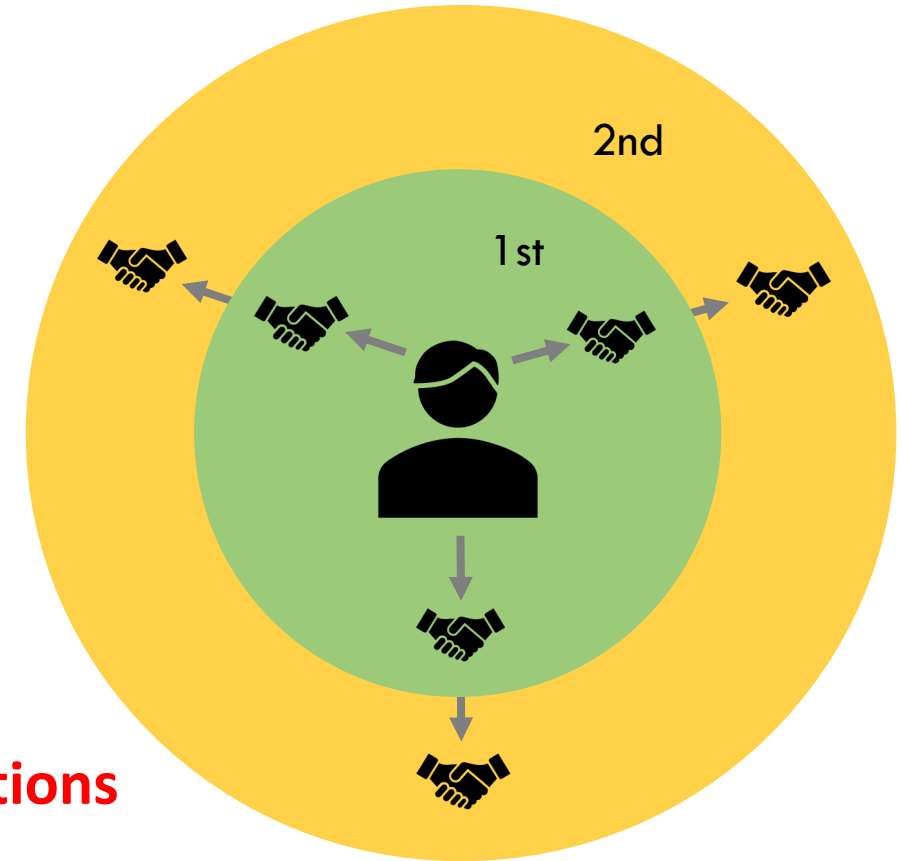
## 2nd degree contacts

- People that your 1<sup>st</sup> degree contacts know
- More diverse and larger than your pool of 1<sup>st</sup> degree contacts
- Always growing – whether you do anything or not

**80% of people get jobs through their 2nd degree connections**

Networking simply means speaking to as many people as you can about:

- who you are, and
- what you want



Do It EVERYWHERE!

- LinkedIn
- In person conference, virtual conferences
- Airplanes, buses, doctor's offices

# Explore Career Paths – Informational Interviews

## Informational interviews are your secret weapon for gaining insight into specific careers

- 30-minutes long
- talk to a person from an industry or company of interest
- get through LinkedIn, professional networks (alumni, prof. societies)
- *you* ask the questions!

## Update CVs and Resumes

### CVs

- Static document, edited periodically
- Every professionally relevant experience, e.g. degrees, positions held, presentations, publications, courses taught, etc
- **Appropriate for National Lab and Academic positions ONLY**

### Resume

- Ideally one page long (no more than 2)
- Write a different one (in principle) for every job application
- Literally a function of the job description – cannot exist without a specific job in question
- **Appropriate for industry/non-academic positions**



# What's Next?

## Shape Up Email Series

- Subscribe to weekly professional development “challenges,” with resources and tips.
- Current topics include Career Exploration, Job Search, Interview Process, Professional Image



## APS Online Professional Guidebook

- Topics include self-assessment, networking, interviewing and negotiation strategies, and more.
- Each chapter features 5-minute “webinette” clips from the top APS careers webinars



# APS Careers 2021 Guide

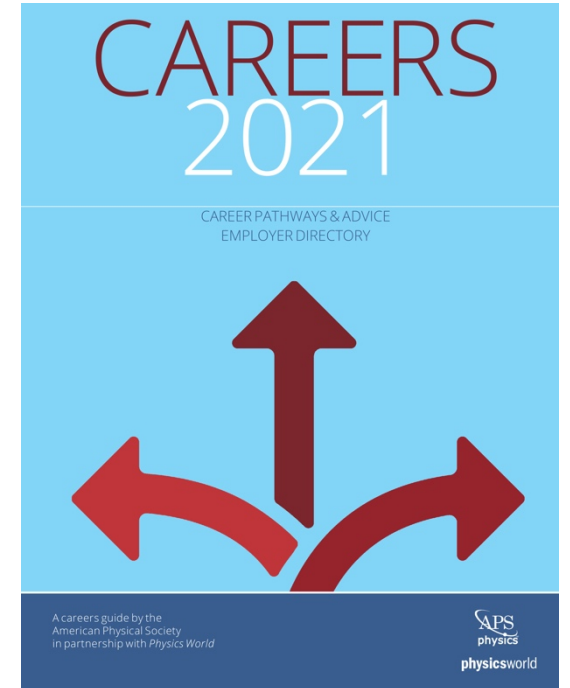
Career guide produced in partnership with IOP targeted at students and early career physicists.

- Profiles of physicists working in a variety of career paths
- Careers and professional development analysis articles
- Feature on #BlackInPhysics week and NMC!
- Employer Directory - Companies/Organizations hiring physicists

Print and digital copies  
FREE to all Members



[go.aps.org/careersguide](https://go.aps.org/careersguide)



# APS Success in Industry Careers Series

A “deep dive” into skills to prepare students for successful careers in industry environments.

## Topics include:

- Teamwork in Industry
- Understanding IP: From Patents to Publications to Trade Secrets
- The Many Faces of Industry
- And many more!

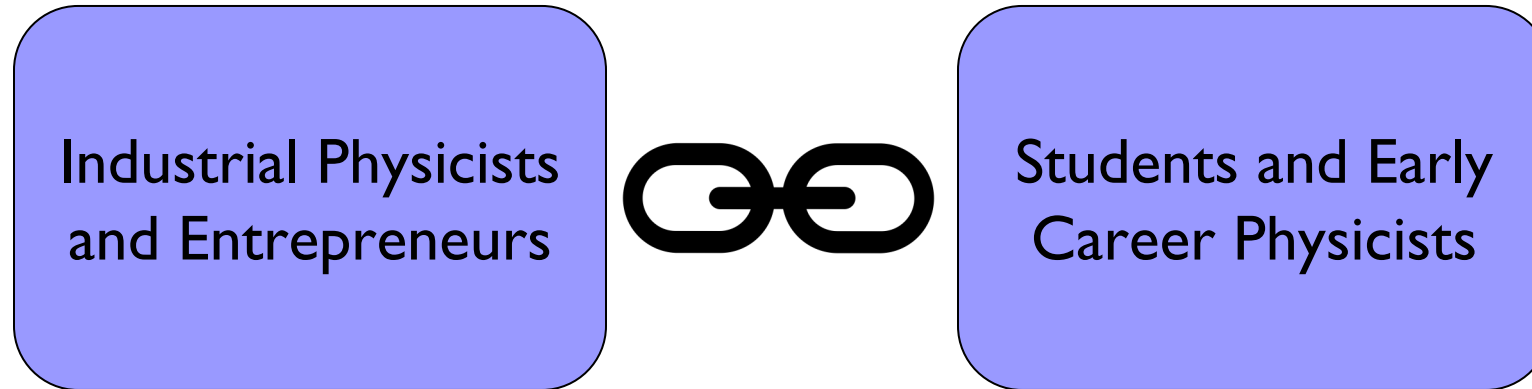
## Working in the US: Career Development for International Physicists

Visit [go.aps.org/apswebinars](https://go.aps.org/apswebinars) and sign up on our mailing list

A registration form with the following fields: First Name, Last Name, Email, Affiliation, and a dropdown menu for "Where are you in your physics career?". Below these is a section titled "Select webinar topics you would like to receive more information about." with five checkboxes: "Success in Industry Careers", "Physics Career Exploration", "Success in Physics Graduate School", "Professional Development Advice for Job Seekers", and "Career Development for International Physicists". A red circle highlights the checkbox section.



# APS IMPact Program



- Signup is easy – must be an APS member
- Search database based on a variety of characteristics (e.g. topics willing to discuss, physics background, professional experience)
- Mentees can search the mentor database, request a relationship (usually ~3 mo.)

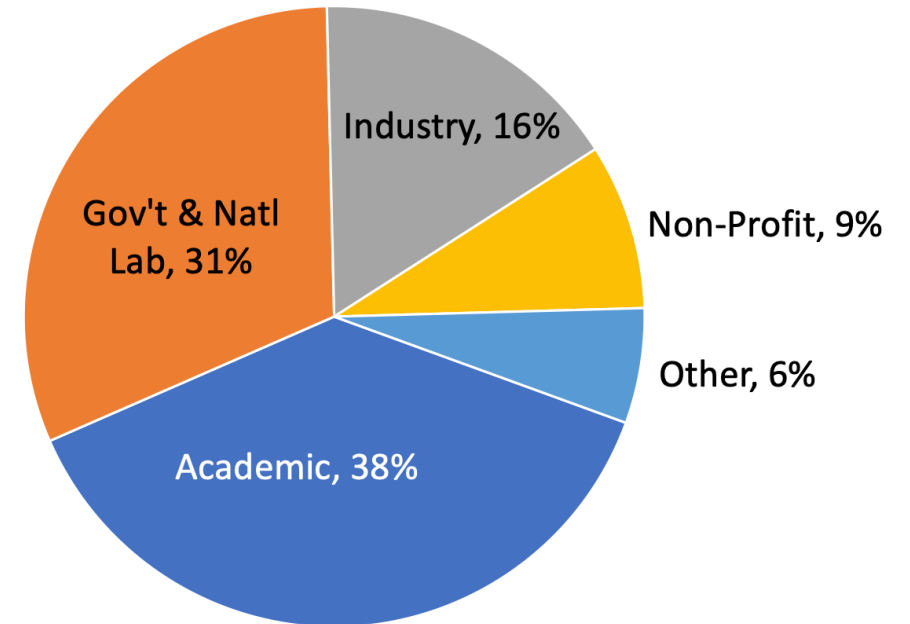
# APS Job Board and Job Fairs

- Job Board is a shared jobs database (Physics Today, AVS, IEEE Computing, AAPT, SPS, and others)
- FREE for Job Seekers, APS Membership is not required
- Job Fairs at APS March and DPP meetings – plans for annual virtual job fair underway!
- Employers can post unlimited jobs, schedule interviews on-site
- FREE for Job Seekers, APS Membership not required

[careers.aps.org](https://careers.aps.org)



APS Job Board Jobs, 2020 by Sector



**Total # jobs posted – 417**

\*includes temporary positions, such as postdoctoral research, lecturer, asst. prof.

# Remember:

- Plan Effectively by Broadening Your Focus
  - *Use your resources to explore your career values and learn about career paths that fit your interests, abilities, and values*
- Don't be afraid to leave your comfort zone
  - *There are many rewarding, well paying careers outside of academia – seek them out.*

Visit the [APS Online Professional Guidebook](#)  
and the [Careers Website](#)

# THANK YOU!

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