



Physics Careers & Navigating Your Path

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Senior Careers Program Manager

American Physical Society

A little bit about you...

How many are...

- Undergraduates
- Grad Students
- Postdocs

Current Career Goals...

- Private sector
- National Lab
- Academia
- Other?

A little bit about me...

My story...

- UCLA – undergraduate degree
- University of Michigan – PhD in Physics
 - Student org involvement
 - Student government involvement
 - APS Volunteer
- Got my current job at APS through networking!

Goals of This Talk

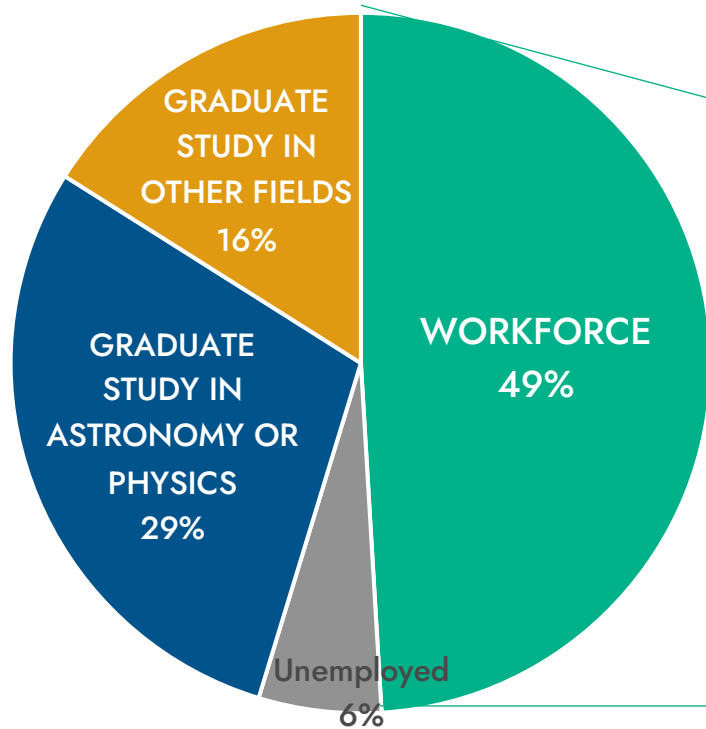
- Provide a **broad overview of career paths** available with physics/STEM degrees
- Give resources on **pursuing these career paths**
- Help you feel great about the future 😊



Working in Physics with a Bachelor's Degree

What can you do with a Bachelor's Degree in Physics?

Physics Bachelors 1 Year Later



About half go straight into the workforce

Employment Sector	%
Private Sector	59%
College & University	18%
High School	6%
Civilian, Gov't, National Lab	7%
Active Military	3%
Other	7%

Based on 5,764 individuals
Classes of 2019 and 2020 combined

[AIP.org/statistics](https://www.aip.org/statistics)



Common Job Titles with a Bachelor's Degree in Physics

Education

High School Physics Teacher
High School Science Teacher
Middle School Science Teacher
Instructor
Tutor

Business/Finance

Business Analyst
Consultant
Project Manager
Investment Associate/Trader

Engineering

Systems Engineer
Electrical Engineer
Design Engineer
Mechanical Engineer
Project Engineer
Optical Engineer
Manufacturing Technician
Associate Engineer
Application Engineer
Process Engineer/Technician
Development Engineer
Product Engineer
Product Manager
Research Engineer
Quality/Test Engineer
Technical Services
Integration Engineer
Accelerator Operator

Research and Technical

Research Assistant
Research Associate
Research Technician
Lab Technician/Assistant
Scientist

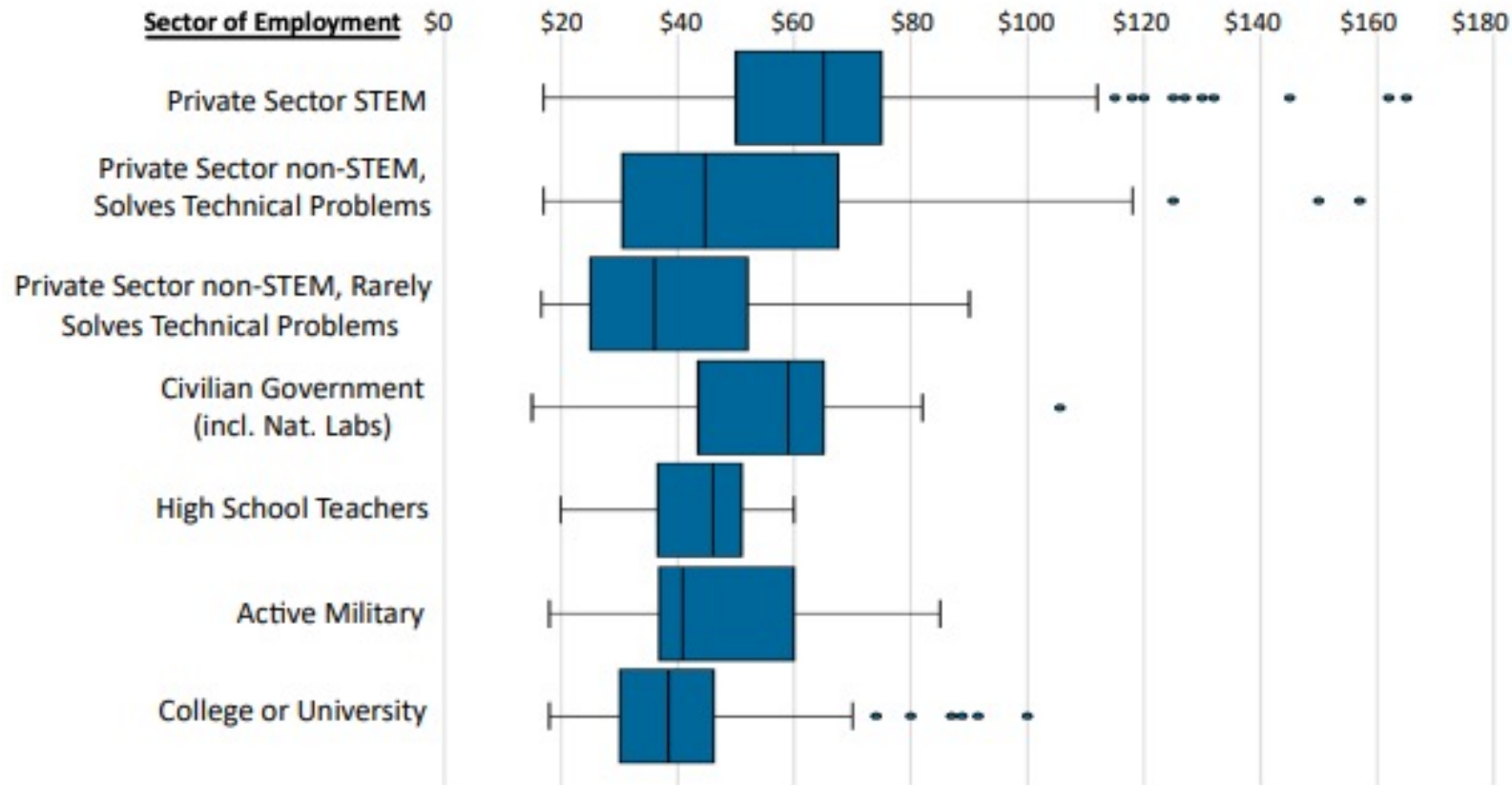
Computer Hardware/Software

Software Engineer/Developer
Programmer
IT Consultant
Systems Analyst
Technical Support Staff
Data Analyst/Scientist

How much can you earn with a Bachelor's Degree in Physics?

Starting Salaries for New Physics Bachelors, Classes of 2019 & 2020 Combined

Salaries (in thousands)



Lines outside box = Full range
 Blue box = 25th – 75th percentile
 Vertical line = median
 Dots = outliers

Only includes full-time, newly accepted positions.

[AIP.org/statistics](https://www.aip.org/statistics)



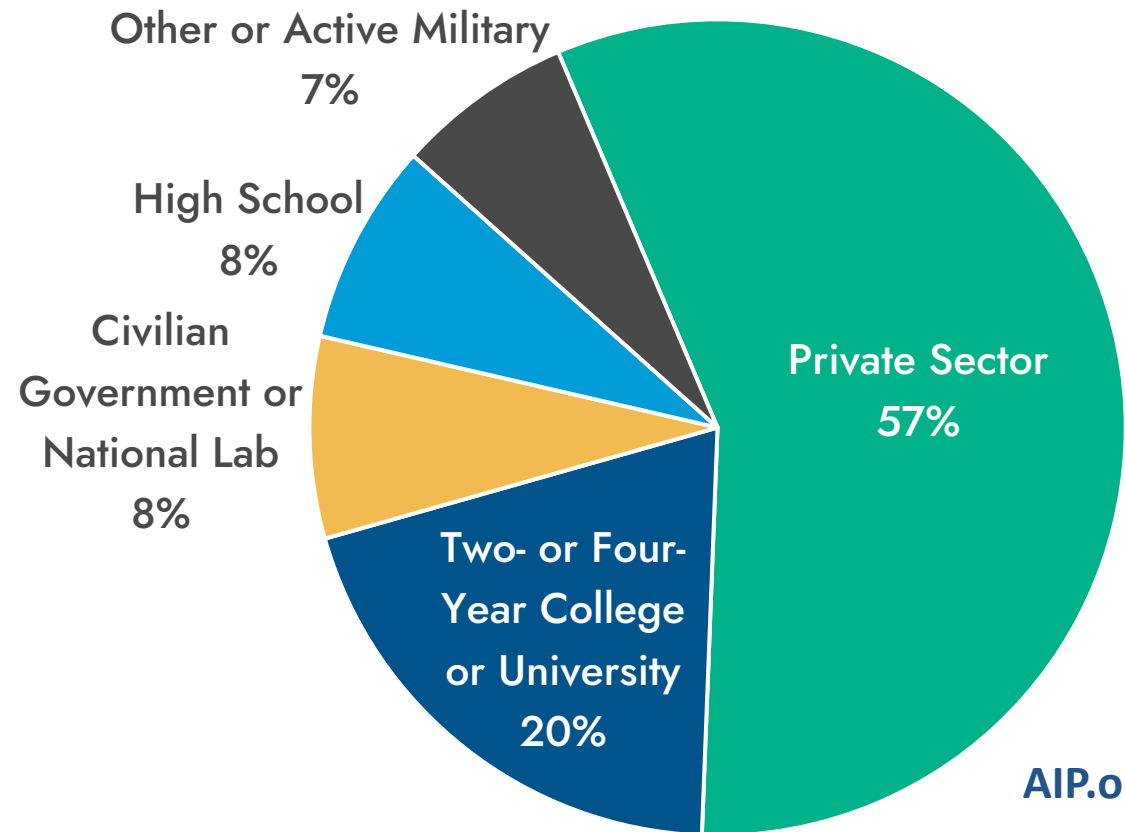


**Working in Physics
with a
Master's Degree**

What can you do with a Master's Degree in Physics?

Employment Distribution of Exiting Physics Masters One Year After Degree

Class of 2016, 2017 and 2018 Combined



AIP.org/statistics

Majority of Master's holders also go into the private sector

~20% find jobs at colleges or universities

Physicist Profile



Paul Markoff-Johnson, MS

Director of Product Development

Paul gained an appreciation for physics when he saw its connection with math.

He switched majors from engineering to physics due to the broader scope, variety of career options, and the invaluable skill of using basic principles to solve problems.

Currently, Paul is the Director of Product Development at a company specializing in thin film technology.

Learn more: aps.org/careers/physicists/profiles/markoff.cfm

Physicist Profile



Julia Scherschligt, MS

Thermodynamic Metrology Scientist

Julia found a job at the National Institute of Standards and Technology (NIST) through her network.

After working in different areas at NIST, she now leads a group responsible for the fundamental measurements of temperature and pressure.

Advice for students: Talk to the grad students before applying to a school and take skills-based classes.

Learn more: aps.org/careers/physicists/profiles/scherschligt.cfm

How much can you earn with a Master's Degree in Physics?

Starting Salaries of Exiting Physics Masters One Year After Degree,
Classes of 2016, 2017, & 2018 Combined



Lines outside box = Full range
Blue box = 25th – 75th percentile
Vertical line = median

Does not include part-time positions or those who held roles >1 year prior to getting master's



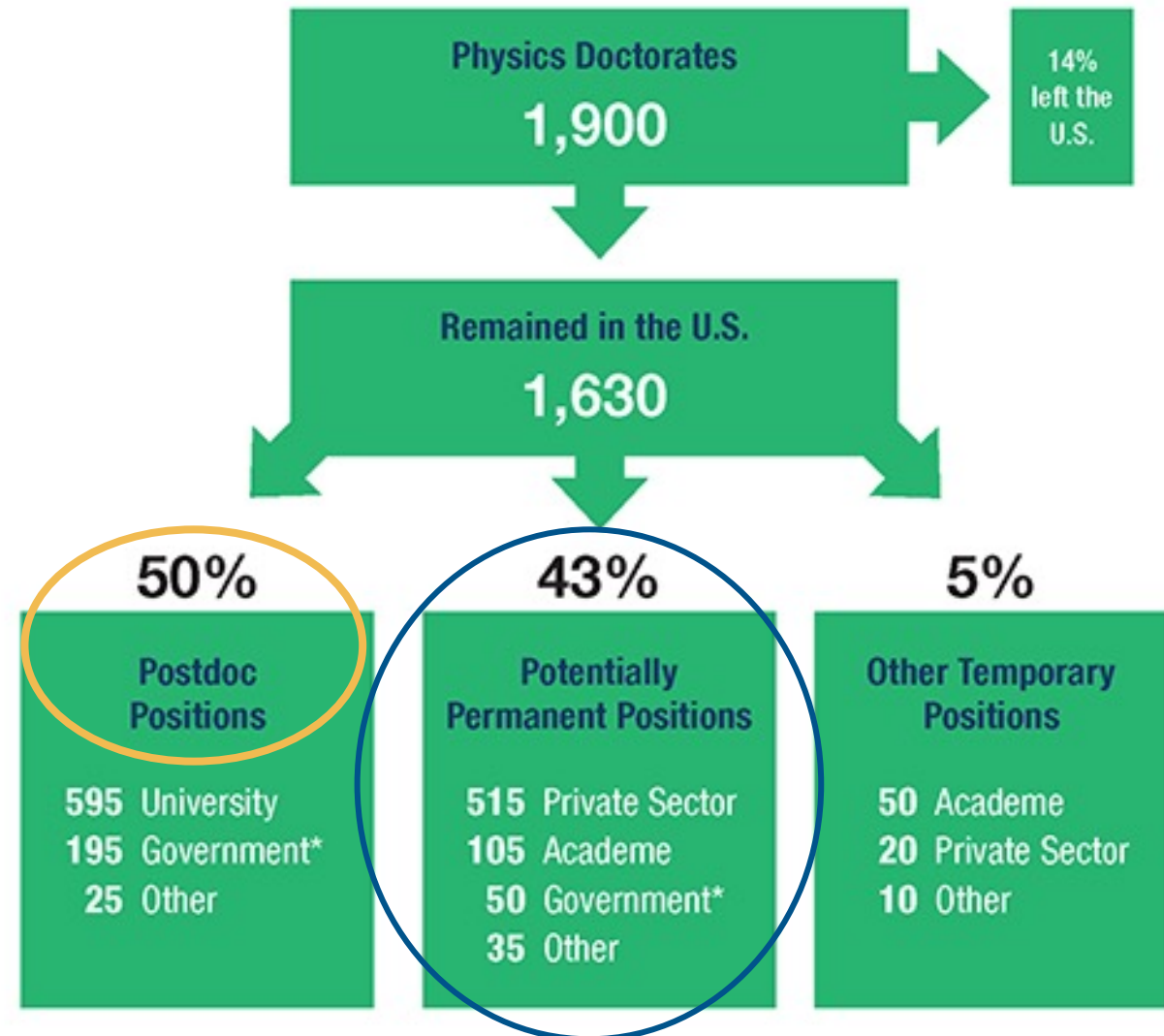
**Working in Physics
with a
Doctoral Degree (PhD)**

What can you do with a PhD in Physics?

About **50% work in postdoc positions**, which are contract based (1-3 years).

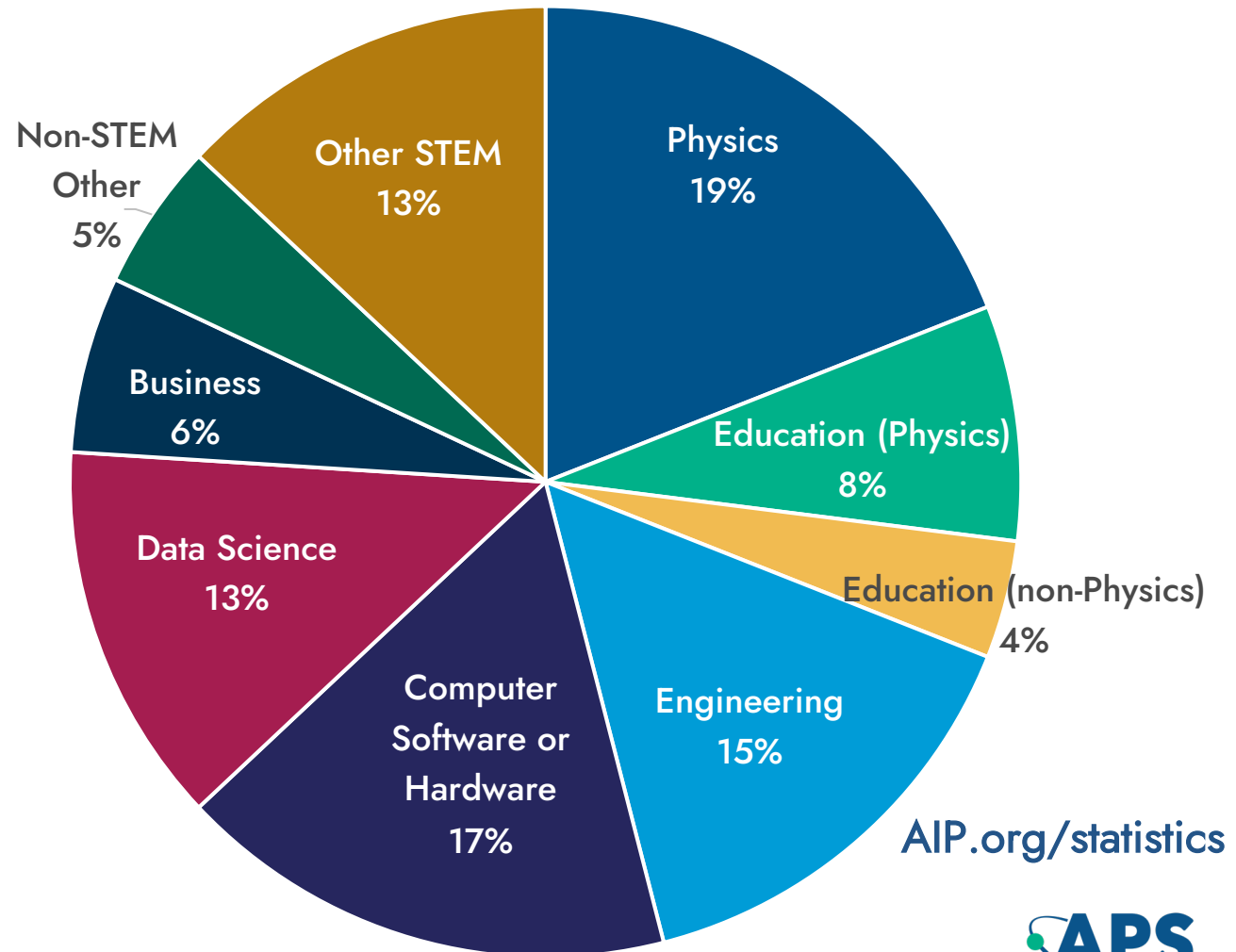
Meanwhile, **~43% find potentially permanent positions**, a majority of which are in the private sector.

Classes of 2021 & 2022,
initial employment



What can you do with a PhD in Physics?

Employment Fields for new physics PhDs in potentially permanent positions, classes of 2016-2020



Meanwhile, ~43% find potentially permanent positions, a majority of which are in the private sector.

AIP.org/statistics

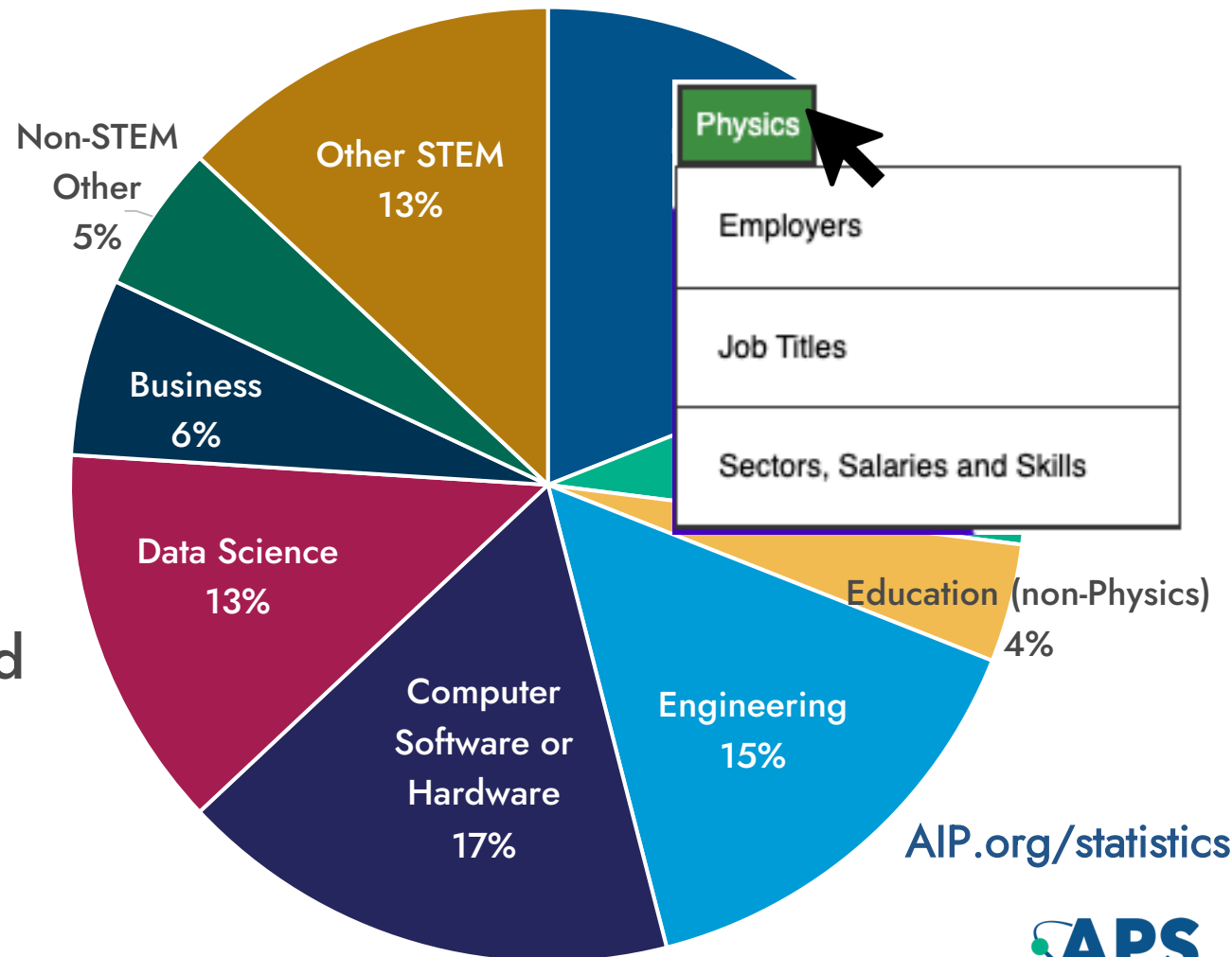


What can you do with a PhD in Physics?

Employment Fields for new physics PhDs in potentially permanent positions, classes of 2016-2020

aip.org/statistics/whos-hiring-physics-phds

Hover over each area to find employers, job titles, salaries and skills.



Common Job Titles of Physics PhDs

Engineering

Aeronautical Engineer
Aerospace Engineer
Application Engineer
Epitaxial Engineer
MBE Production Growth
Optical
Process
Software
Simulation Engineer
Test
Thin Film Coating

Education

Teaching Specialist
Education Developer &
Researcher
Teacher Fellow

Research & Development (R&D)

R&D Physicist or Scientist
Research Associate
Research Engineer
Research Scientist
Scientist I, II, or III

Applied/Scientist

Analyst
AMO Physicist
Application Scientist or Physicist
Applied Mathematician
Computational Physicist or
Scientist
Design Physicist
Device Scientist
Material Scientist
(Principal) Physicist
Project Scientist

Quantum

Quantum Computing
Applications Engineer
Quantum Engineer
Quantum Systems Engineer
Quantum Measurement
Scientist

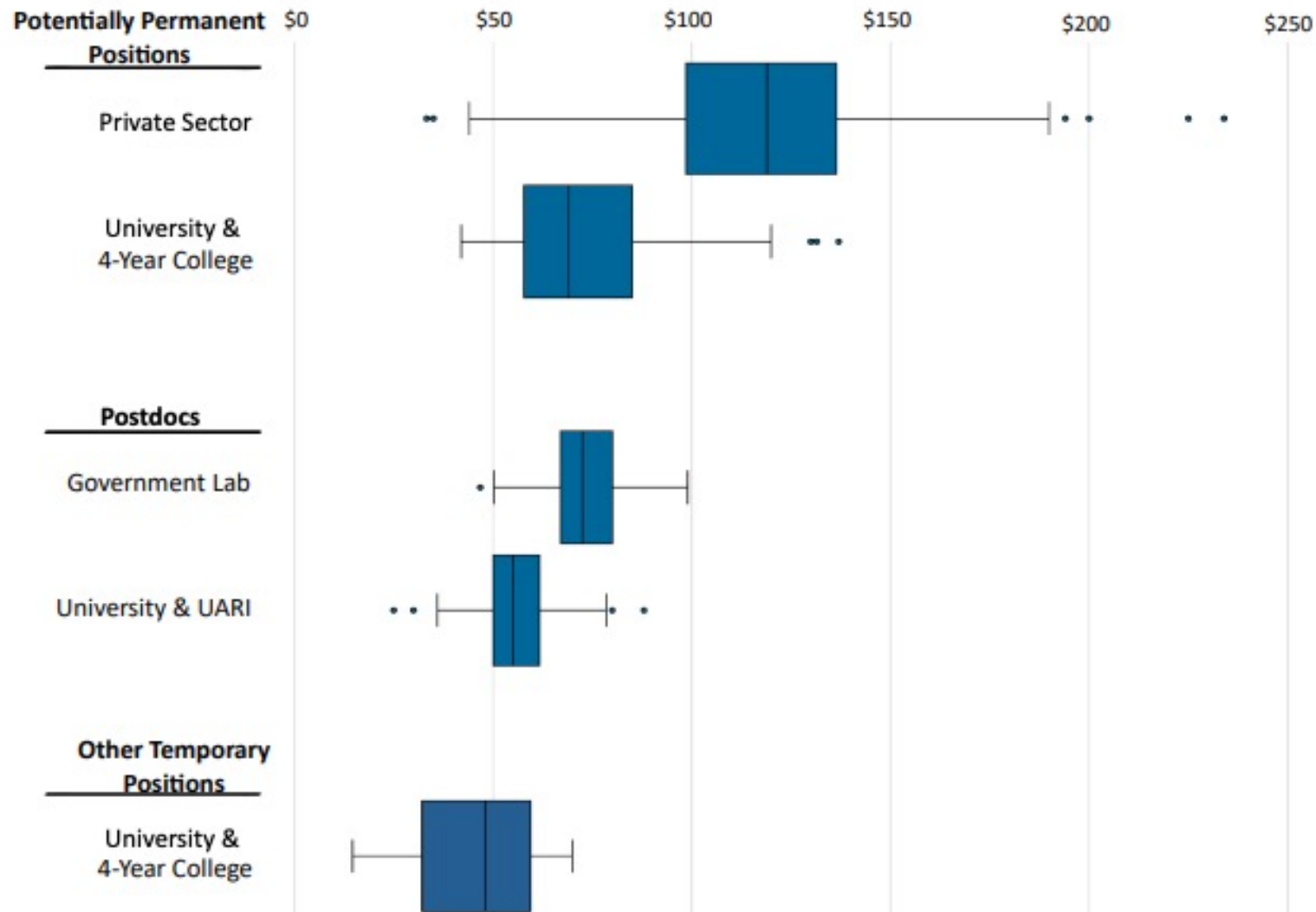
Other

CEO/CTO
Medical Physicist
Lab Specialist
Technical Staff

See Full List: aip.org/statistics/common-job-titles-new-physics-phd-recipients-potentially-permanent-non-education-physics

How much can you earn with a PhD in Physics?

Salaries (in thousands)

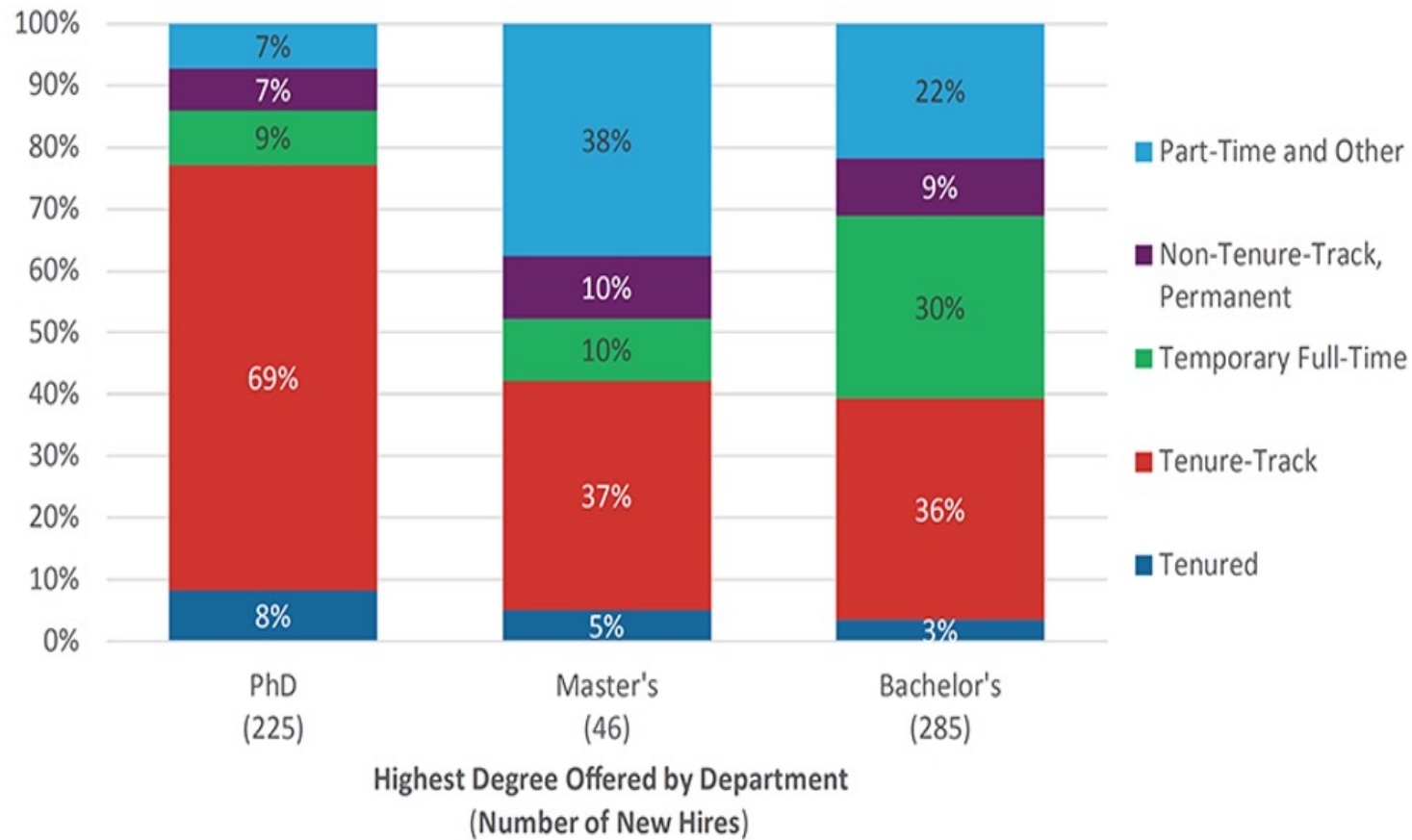


Lines outside box = Full range
Blue box = 25th – 75th percentile
Vertical line = median
Dots = outliers

Data represents only US-educated PhDs who remained in the US after earning their degrees.

Academic Sector Demand

Position Status of New Faculty Members Hired, 2017-18 Academic Year



Faculty position types vary widely by institution.

Total of 556 new faculty hires (including all position types).

While ~1600 physics PhD's looking for jobs annually

Academia, Industry, & National Labs

Academia Offers

- More control over your research
- Flexible working hours
- Mentorship of next generation of physicists

Industry Offers

- High pay
- Work-life balance
- More options for where to live

National Labs Offer

- Mid to High pay
- Work-life balance
- Some control over research

**There are lots of jobs out there,
and they pay well.**

You will be fine with whichever physics degree
you choose to pursue.

PhD employment over time

Many switch sectors over time, with over 50% working in the private sector



Education



Business



Government

4-year colleges and universities

2-year and pre-college institutions

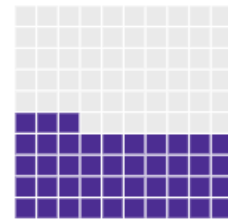
For-profit companies

Non-profit organizations

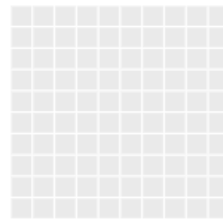
Federal government

State & local government

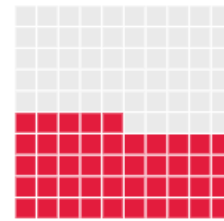
10 - 14 years since receiving degree



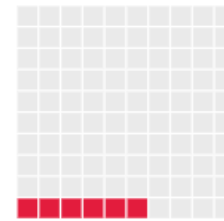
43%



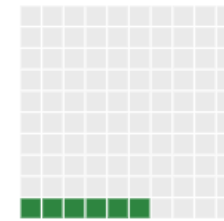
5



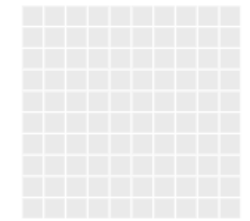
45%



6%

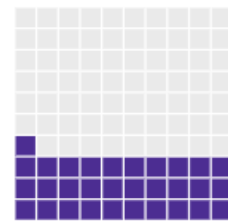


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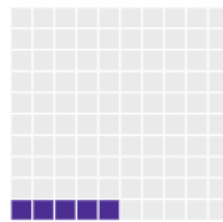


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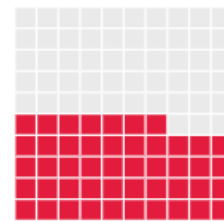
15+ years since receiving degree



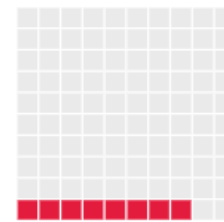
31%



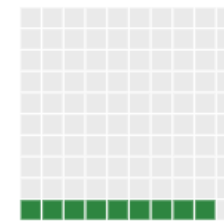
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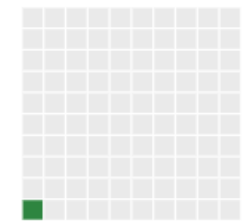
47%



8%



9%



1%

Source: NSF Survey of Doctoral Recipients, 2001 - 2013

How can you start preparing?

Perform a Detailed Self-Assessment

- Includes what you are good at doing and what you enjoy doing. Values are important!
- Reflect on your working style: collaborative, independent, goal-oriented?

Keep a Career Notebook/Doc

- Track insights, skills, and contacts
- Note when you're happiest and when you are the *least* happy.
- What is important to you?
- Work-life balance? Money? Location?
- Flexible schedule? Control over research?

Document Skills

- Record your skills – technical and non-technical. These will be the building blocks of every resume you'll write.



How can you start preparing?

Build Your Network



- Join LinkedIn
- Attend alumni mixers, career fairs, conferences, etc.
- Volunteer (e.g. chair a conference session)
- Find internship

REU/internship listings:
careers.aps.org

Connect with Academic Mentors

- **APS National Mentoring Community** is specifically designed for Black, Indigenous, and Hispanic/Latine physics students: aps.org/nmc
- The program provides access to academic mentors around the world!
- Emergency funding is available for registered mentees.

Find Industry Mentors

- Join the **APS IMPact** program to find industry mentors: impact.aps.org
- Ask faculty mentors to connect you to industry professionals/past students

Using LinkedIn

LinkedIn Search Feature

- Order of connection:
- 1st – searches through your current connections,
- 2nd – connections of your connections, etc.
- Location, company (current or past!), school, industry, job title, etc.

Inviting New Contacts

- Tailor/personalize each invitation
- If you know them, good idea to remind them how
- Find something in common
- Be enthusiastic/give reason for why they would want to connect

Services | All filters

Filter only People ▾ by ×

Connections

1st 2nd

3rd+

Connections of

+ Add a connection

Locations

United States Washington DC-Baltimore Area

India California, United States

San Francisco Bay Area + Add a location

Current company

Amazon Booz Allen Hamilton

Microsoft Facebook

Google + Add a company

Past company

IBM Microsoft

Reset [Show results](#)

How can you start preparing?

Attend Informational Interviews

Reach out to contacts in different types of roles and ask for a 30-minute chat. Here, You get to ask the questions:

- Tell me about your career path
- What is a typical work day like?
- What aspects of your work do you like? Dislike?
- How can I prepare if I want to pursue a similar career path?
- Don't ask for a job!



Tips on Resume Writing

CV

- Several pages
- Can be used for multiple applications
- Lists all experiences
- More common in academia

Resume

- 1-2 pages,
- Specifically tailored to job posting,
- Only lists relevant skills and experiences
- More common in industry

Writing a Resume

- Carefully read the job description and highlight required skills
- Use bullet points to describe experiences and accomplishments –use language from job description
- Purpose of resume: get you an interview (not the job)

Interviewing Process

Typical Interview Trajectory

- Phone interview with HR – usually to determine if you meet basic requirements
- In person (or virtual) interviews with specific department and team members
- Presentation to department on your research or other work relevant to the position (sometimes required)

Preparing for Interviews

- Review job description – be able to provide examples of how you qualify for specific requirements
- Practice answering common questions
 - “Tell me about yourself” “Why are you interested in this position?”
 - “Tell us about a time when you...”
 - Dealt with a conflict, worked with someone difficult, etc.
- Test out any technical issues for video calls beforehand

Resources to start preparing

APS Careers 2023/2024 Guide

- Breadth of opportunities for physics graduates
- Advice from professionals
- List of companies hiring physicists

go.aps.org/careersguide

SPS Careers Toolbox

- Lists common job titles
- Effective job searching tips
- Resume, cover letter help
- Tips for interviewing

spsnational.org/sites/all/careerstoobox

APS Careers Website

- APS Job Board
- Career Navigator Guidebook
- Physicist Profiles
- Common Careers Paths

aps.org/careers



What about non-U.S. citizens?

Recent policies
hindering international
physicists' employment in the
United States

APS Government Affairs is
advocating for better policies

Important Resources

- APS International Affairs Website
aps.org/programs/international/
- APS Office of Government Affairs Website
aps.org/policy/
- APS IMPact Program
Effort to add more mentors from non-US backgrounds
impact.aps.org
- APS Webinar Series on
Career Development for International Physicists
aps.org/webinars
- Employment Resources for International Members
aps.org/careers/guidance/international/index.cfm

In Summary

My Takeaways

- Your values and interests may change over time
- Be open to new career paths
- Have conversations with people

There are many types of career options for physics degree holders.

Most roles involve applying your physics knowledge and training. You can start preparing now by expanding your network and using APS Resources

Tell us what you think!

Scan QR to take a quick survey.



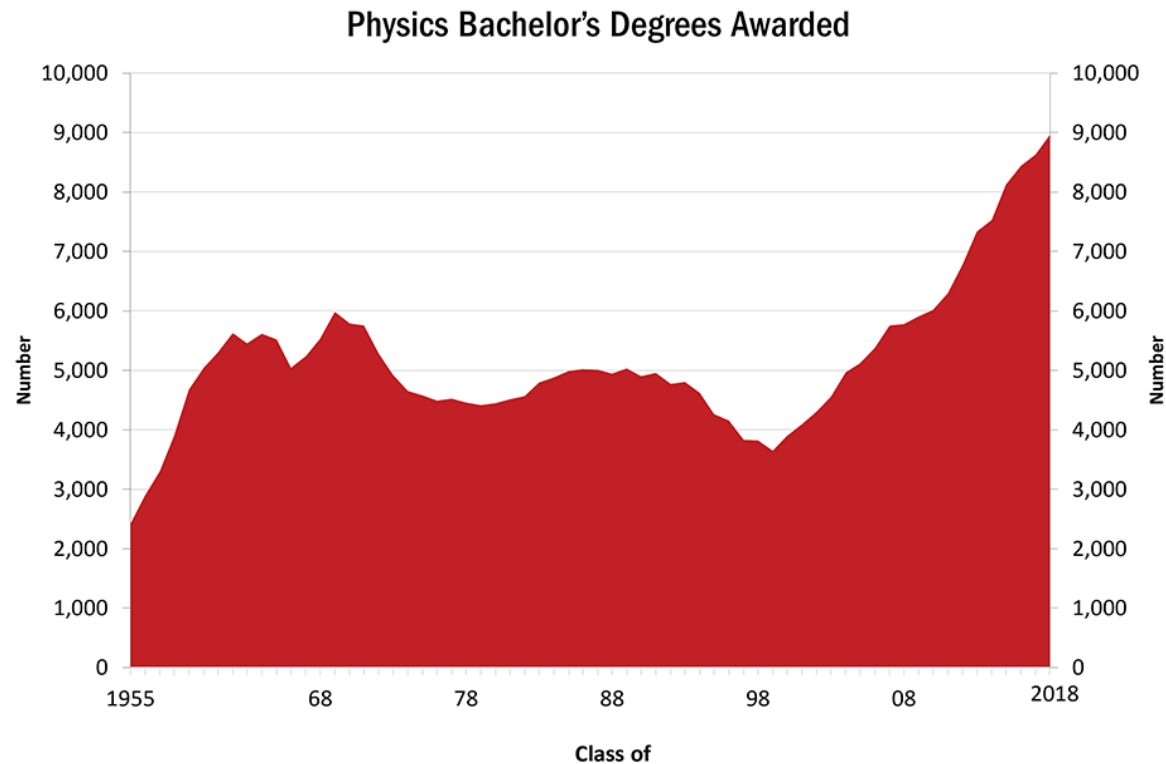


Appendix and Supporting Materials



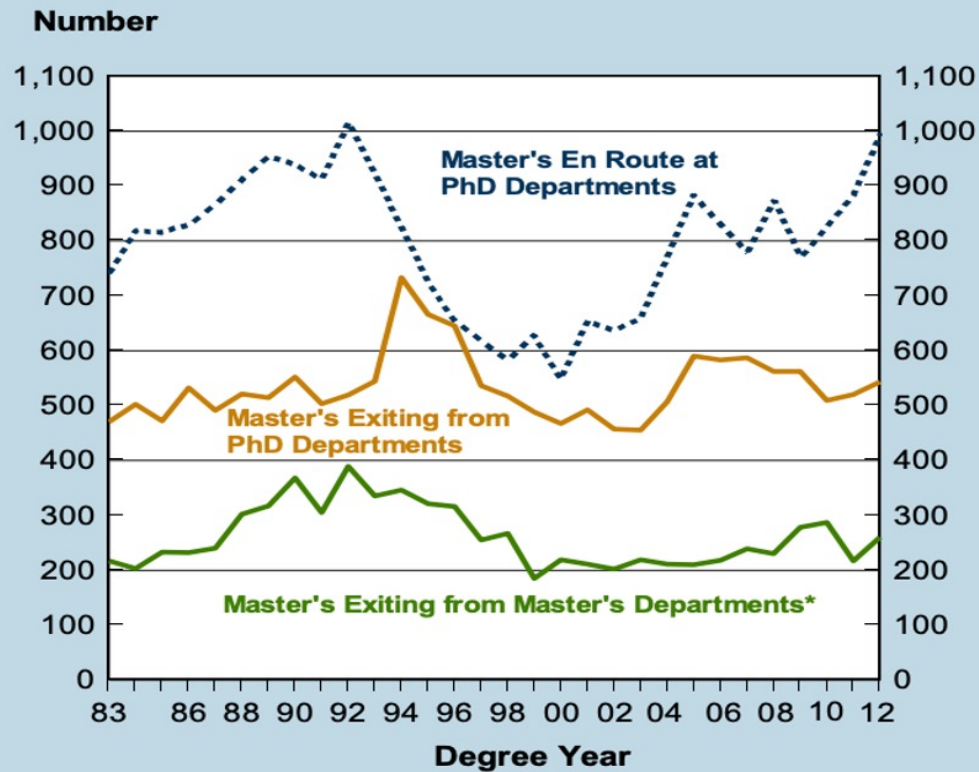
Appendix A: More data on physics degree holders and career paths

Physics Bachelor's Degrees Awarded Annually



More than 8500
Physics Bachelor's
degrees are awarded
annually

Physics Master's Degrees Awarded Annually

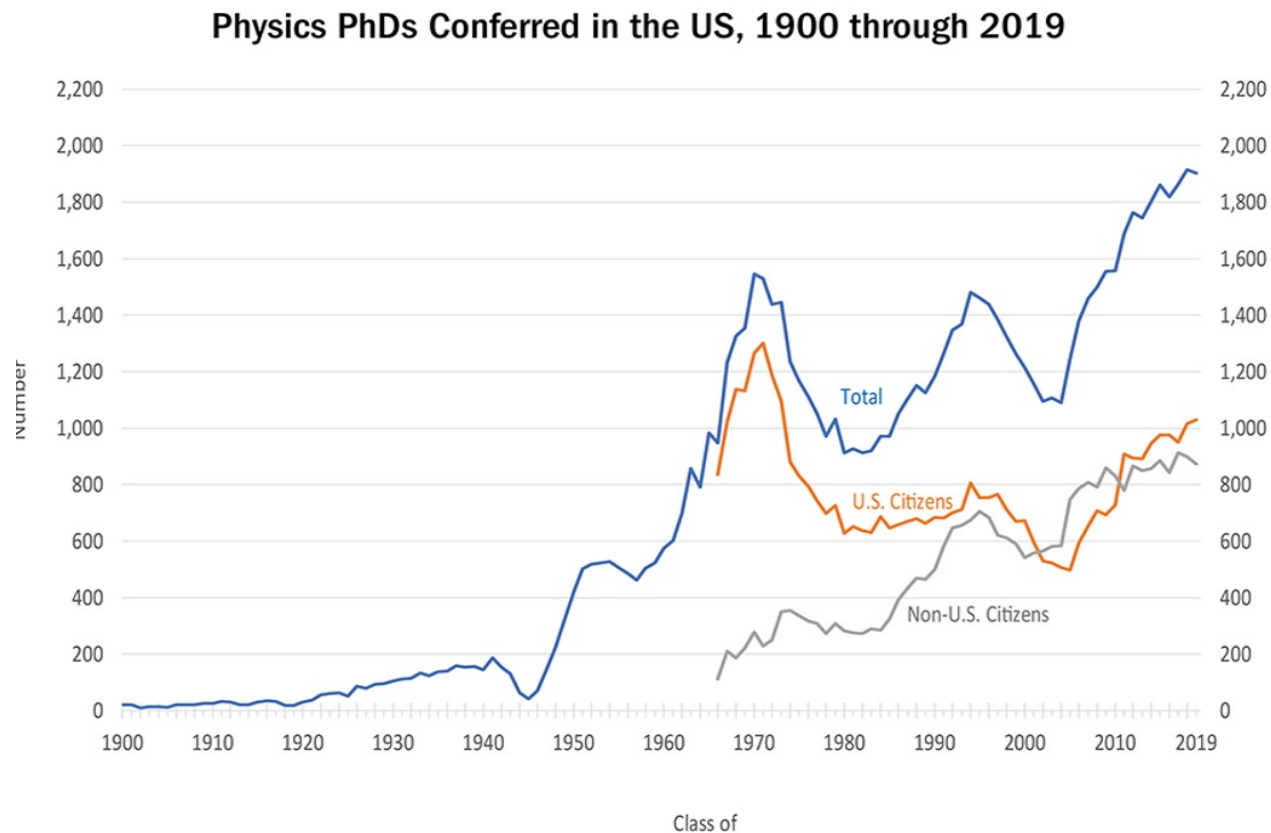


*These departments offer a master's as their highest physics degree.

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

Additionally, of ~700 new Physics Master's holders, **>300** also look for jobs (or continue employment) every year.

Physics Doctoral Degrees (PhDs) Awarded Annually



The number of Physics PhDs granted in the U.S. has **almost doubled over the last two decades!**

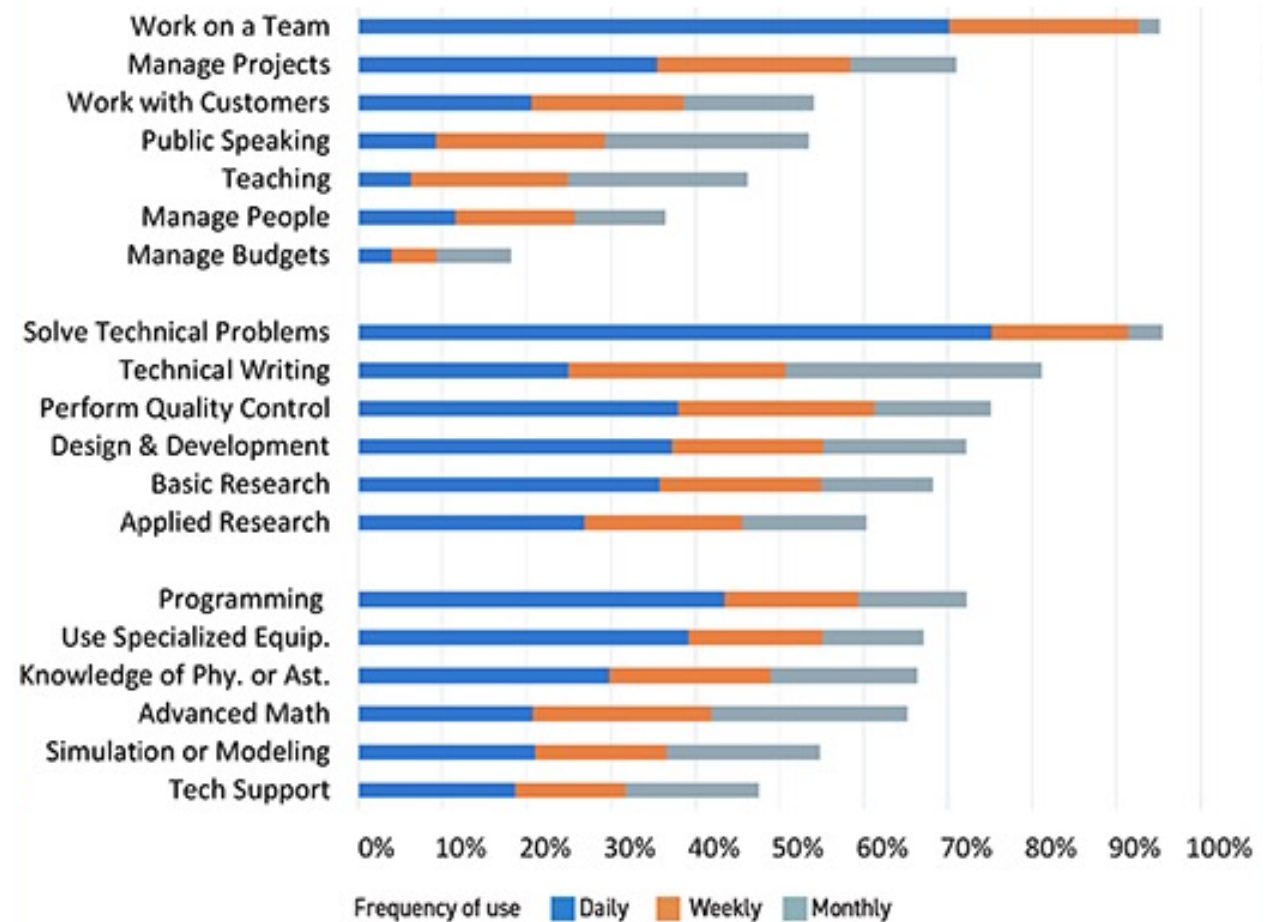
What are they doing? Bachelor's Degree

Classes of 2019 and
2020, combined

(excludes non-STEM
jobs)

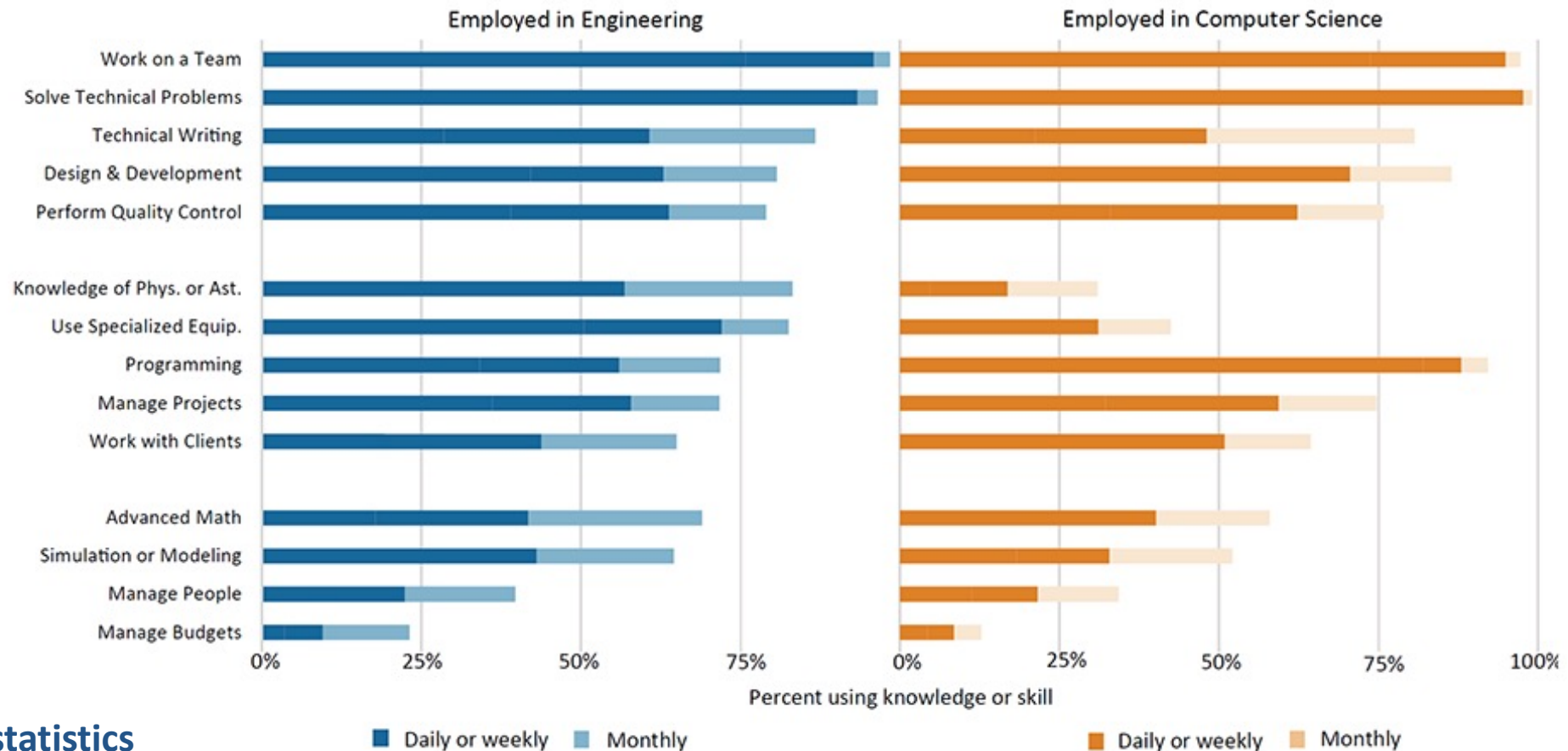
[AIP.org/statistics](https://www.aip.org/statistics)

Knowledge and Skills Used New Physics Bachelors Employed in STEM Fields



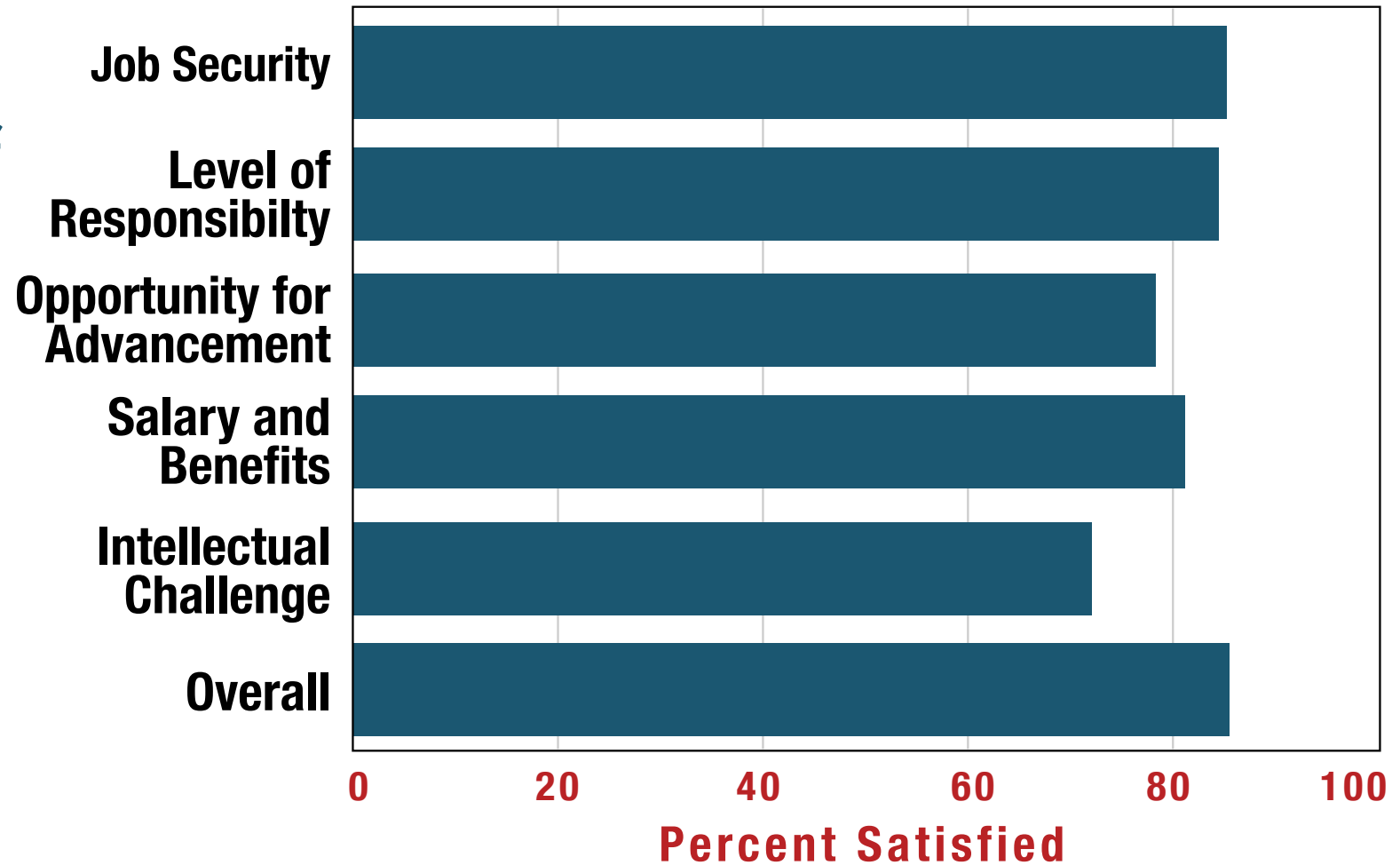
What are they doing? Bachelor's Degree

Knowledge and Skills Used by New Physics Bachelors Employed
in the Private Sector, Classes of 2019 & 2020 Combined



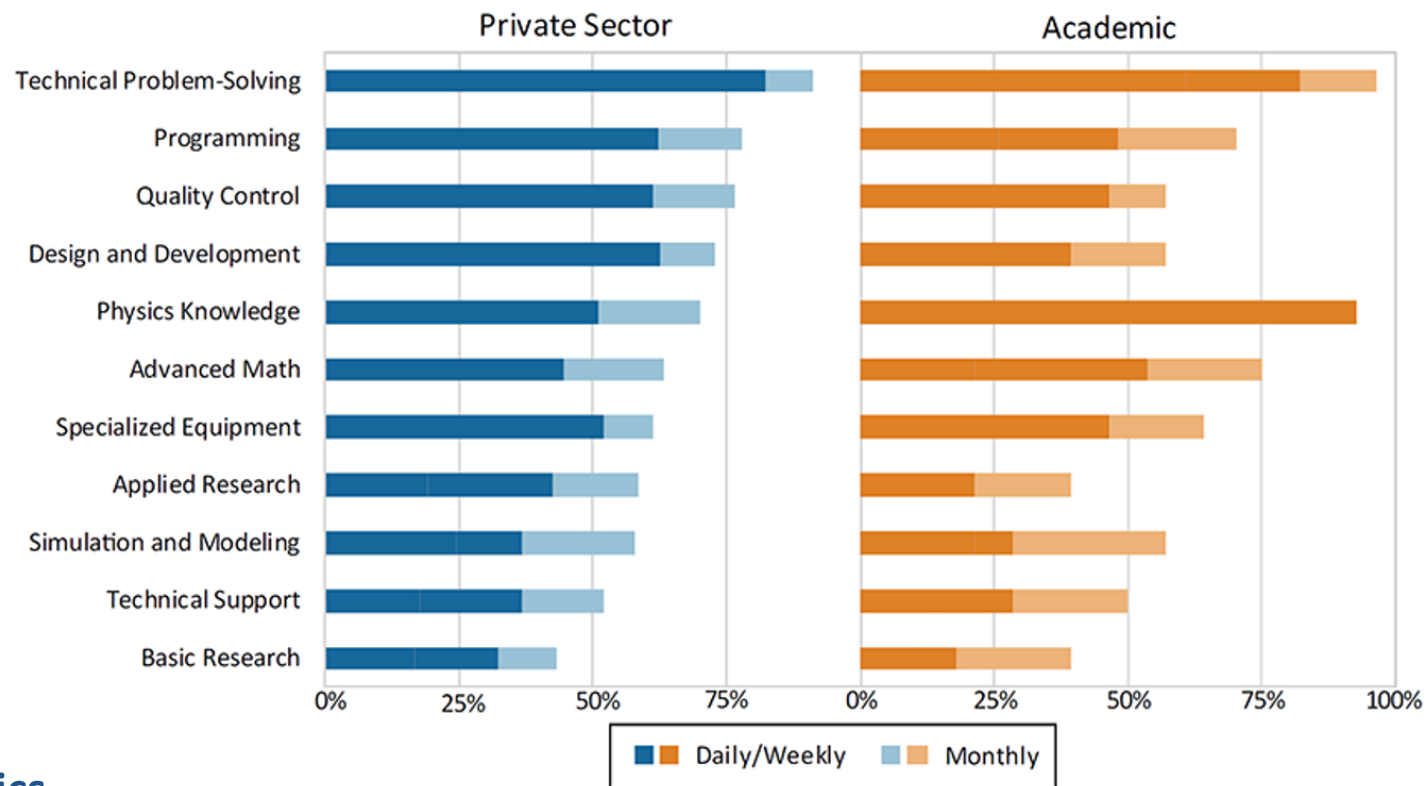
Job Satisfaction of Physics Bachelors In Private Sector STEM Positions (2013 & 2014)

aip.org/statistics



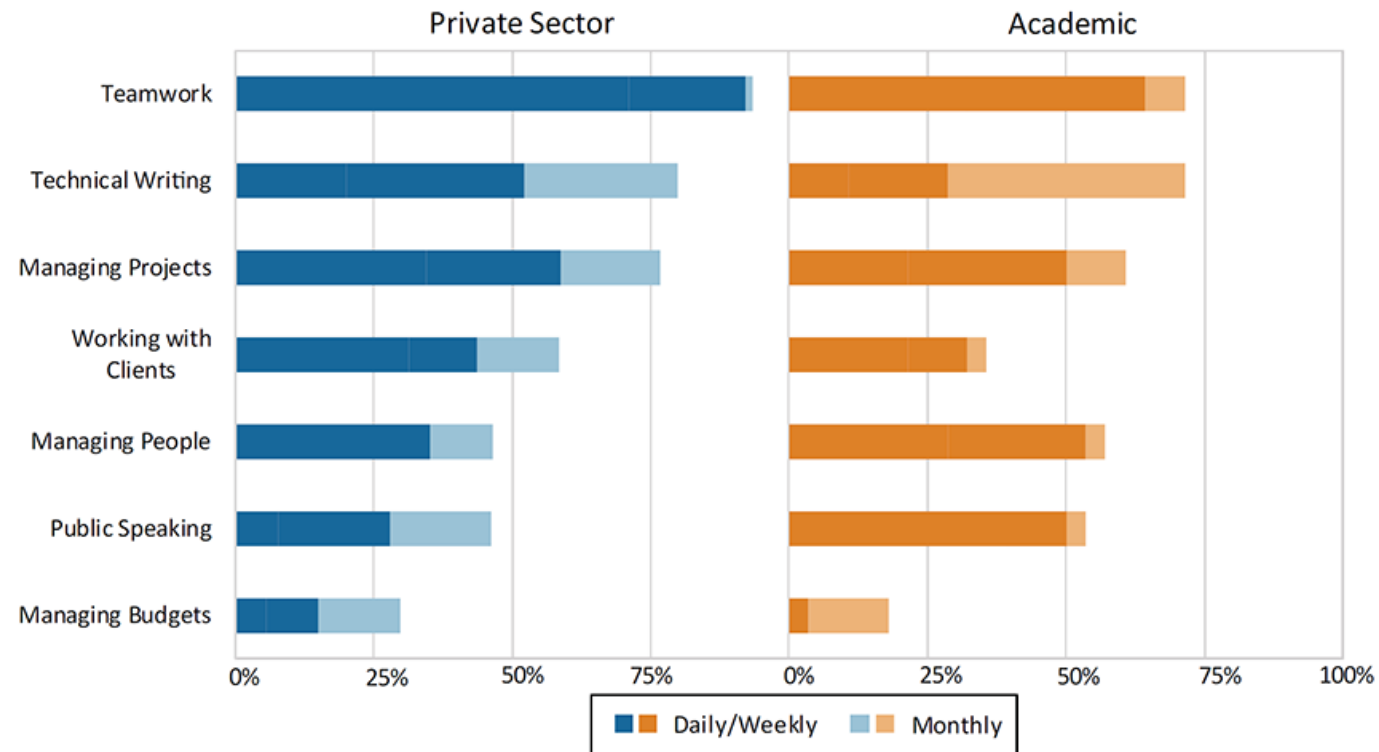
What are they doing? Master's Degree

Scientific and Technical Knowledge and Skills Used by Exiting Physics Masters,
Classes of 2016, 2017, & 2018 Combined



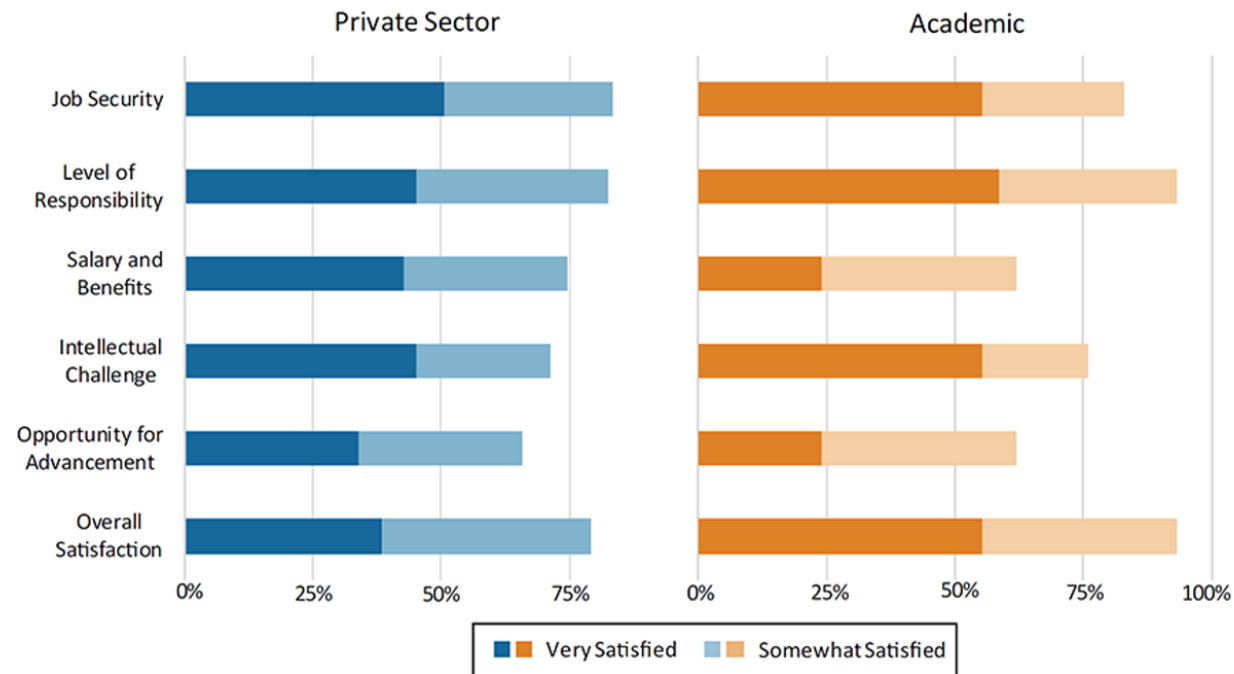
What are they doing? Master's Degree

Interpersonal and Management Skills Used by Exiting Physics Masters,
Classes of 2016, 2017, & 2018 Combined



Job Satisfaction: Master's Degree

Classes of 2016, 2017, & 2018 Combined



Exiting masters are individuals who, upon receiving their master's degrees, leave their current physics departments. Percentages represent the physics masters who chose "very satisfied" or "somewhat satisfied" on a four-point scale that also included "somewhat dissatisfied" and "very dissatisfied." Figure is based on the responses of 91 individuals in the private sector and 29 individuals in the academic sector.

What are they doing? Doctoral Degree (PhD)

Type of Employment of New Physics PhDs by Employment Sector,
Classes of 2019 & 2020 Combined

Sector of Employment	Initial Employment Type			Overall %
	Postdoc %	Potentially Permanent %	Other Temporary %	
Academic	73	18	62	49
Private	1	70	30	32
Government	23	8	3	15
Other	3	4	5	4
	100%	100%	100%	100%

Note: Data includes only US-educated physics PhDs who remained in the US after earning their degrees. Data are based on the responses of 809 postdocs, 650 individuals working in potentially permanent positions, and 99 individuals working in "other temporary positions."

About half of physics PhDs are initially employed in the academic sector.

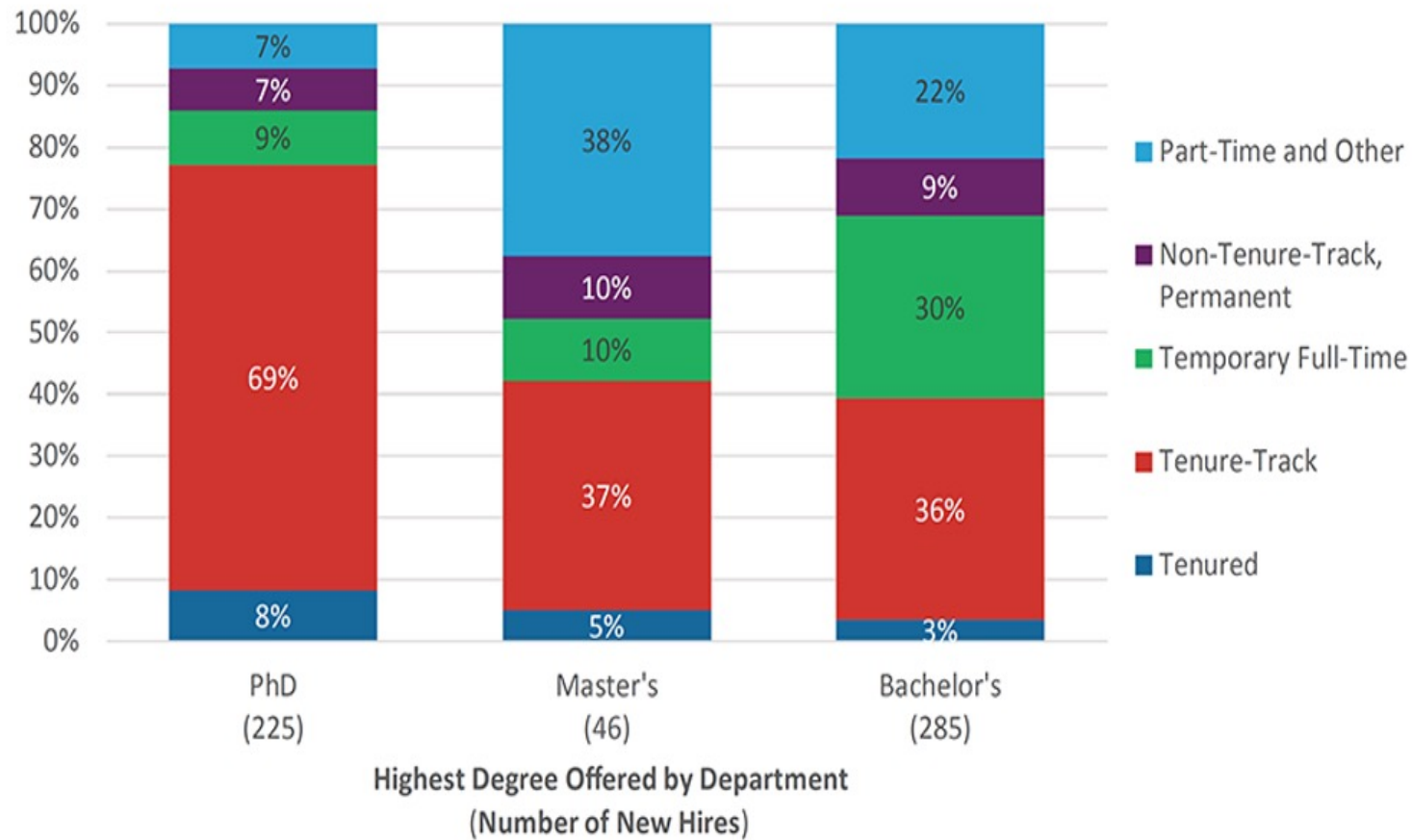
However, ~70% of the potentially permanent jobs are in the private sector.



Appendix B: More data on academic sector demand

Academic Sector Demand

Position Status of New Faculty Members Hired, 2017-18 Academic Year



Faculty position types vary widely by institution.

Total of 556 new faculty hires (including all position types).

Academic Sector Demand

Estimated Number of Faculty Departures in Physics Departments, 2016–17 Academic Year

	Highest Physics Degree Offered			
	PhD	Master's	Bachelor's	Overall
Number of Departures	202	31	138	371
Percent of Departures Among Faculty Members	3.4%	3.5%	3.8%	3.5%
Percent of Departments with Departures	61%	31%	25%	35%
Percent of Departing Faculty Members that Left Without Tenure	10%	15%	24%	16%
Total Headcount of Faculty Members	6,015	870	3,615	10,500

Note: The total headcount of faculty members is for the academic year of 2017–18. The total number of faculty members in this report differs from the total number reported in “The Number of Faculty Members in Physics Departments”, which reported full-time equivalent (FTE) faculty totals, not headcount totals.

2016-2017 saw 371 total faculty departures. In 2018-2019, there were 571 recruitments, of which 369 were tenured/tenure-track.

Compared to the supply of ~1600 PhD's each year, this is still relatively low.



Appendix C: Tips on LinkedIn, Resume, Interviewing

LinkedIn Basics



Meghan Anzelc · 1st
Head of Data & Analytics at Spencer Stuart | Public Speaker
Greater Chicago Area · [Contact info](#)

Headline

- Subheading under your name, 120 characters
- Job title/company by default, but can be modified:
 - Materials scientist with expertise in quantum optics
 - Data Scientist | Machine Learning Expert | Problem-Solver
- Used in LinkedIn Search Algorithm

Photo

- Extremely important for forming connections
- Should cover >60% of the frame
- High resolution
- Should look like you
- No one else should be in it

Profile Summary

- What combination of skills help you achieve results?
- What motivates you?
- Include skills and accomplishments
- Good place to explain any gaps or why you're switching fields

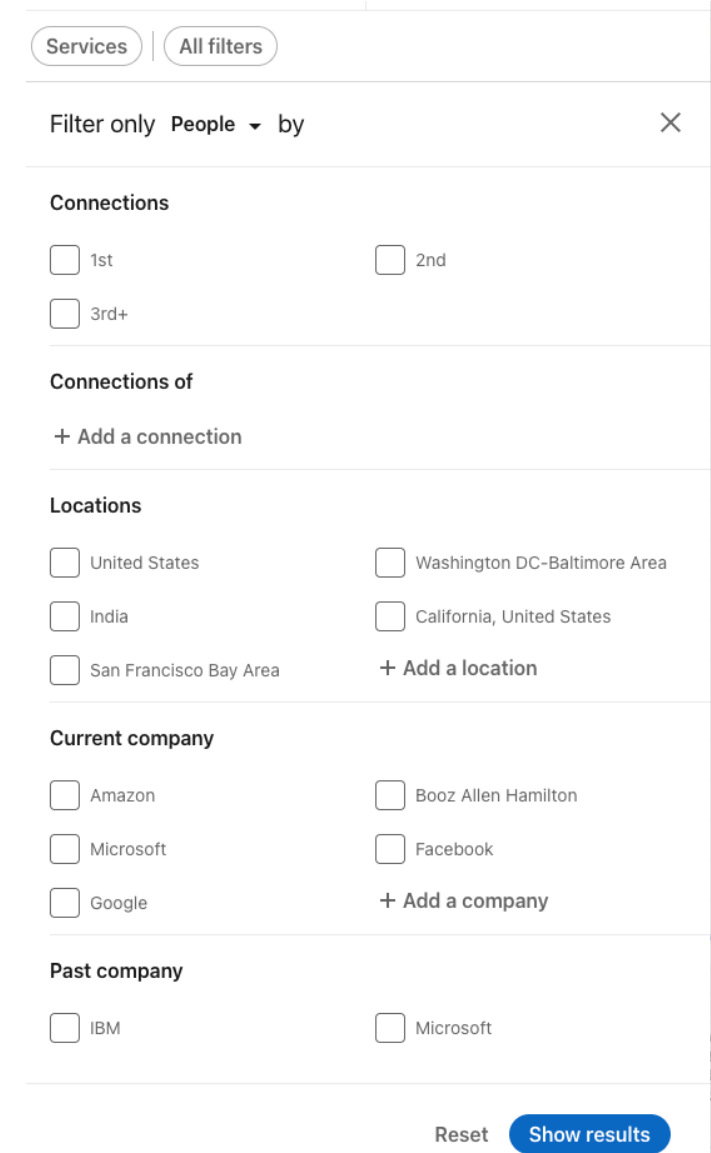
Using LinkedIn

LinkedIn Search Feature

- Order of connection:
- 1st – searches through your current connections,
- 2nd – connections of your connections, etc.
- Location, company (current or past!), school, industry, job title, etc.

Inviting New Contacts

- Tailor/personalize each invitation
- If you know them, good idea to remind them how
- Find something in common
- Be enthusiastic/give reason for why they would want to connect



The screenshot shows the LinkedIn search filter interface. At the top, there are two tabs: "Services" and "All filters". Below this is a filter bar that says "Filter only People ▾ by" with a close button (X). The filters are organized into several sections:

- Connections:** Includes checkboxes for "1st", "2nd", and "3rd+".
- Connections of:** Includes a "+ Add a connection" button.
- Locations:** Includes checkboxes for "United States", "Washington DC-Baltimore Area", "India", "California, United States", and "San Francisco Bay Area", along with a "+ Add a location" button.
- Current company:** Includes checkboxes for "Amazon", "Booz Allen Hamilton", "Microsoft", "Facebook", and "Google", along with a "+ Add a company" button.
- Past company:** Includes checkboxes for "IBM" and "Microsoft".

At the bottom right, there are two buttons: "Reset" and "Show results".

Tips on Resume Writing

CV

- Several pages
- Can be used for multiple applications
- Lists all experiences
- More common in academia

Resume

- 1-2 pages,
- Specifically tailored to job posting,
- Only lists relevant skills and experiences
- More common in industry

Writing a Resume

- Carefully read the job description and highlight required skills
- For those with fewer work experiences, organize resume into sections based on each prominent skill (rather than organizing by job title/experience)
- Use bullet points to describe experiences and accomplishments relevant to each section – use language from job description
- Purpose of resume: get you an interview (not the job)

Interviewing Process

Typical Interview Trajectory

- Phone interview with HR – usually to determine if you meet basic requirements
- In person (or virtual) interviews with specific department and team members
- Presentation to department on your research or other work relevant to the position (sometimes required)

Preparing for Interviews

- Review job description – be able to provide examples of how you qualify for specific requirements
- Practice answering common questions
 - “Tell me about yourself” “Why are you interested in this position?”
 - “Tell us about a time when you...”
 - Dealt with a conflict, worked with someone difficult, etc.
- Test out any technical issues for video calls beforehand



Appendix D: Get the Facts Out to encourage high school teaching career path

See slides here:

<https://docs.google.com/presentation/d/1piqbaKeuWu5qLSZcGxmPwnFP-xIEiR2xAfwQsYvGbF0/edit?usp=sharing>