

Fermilab Career Planning and Fellowships

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Agenda

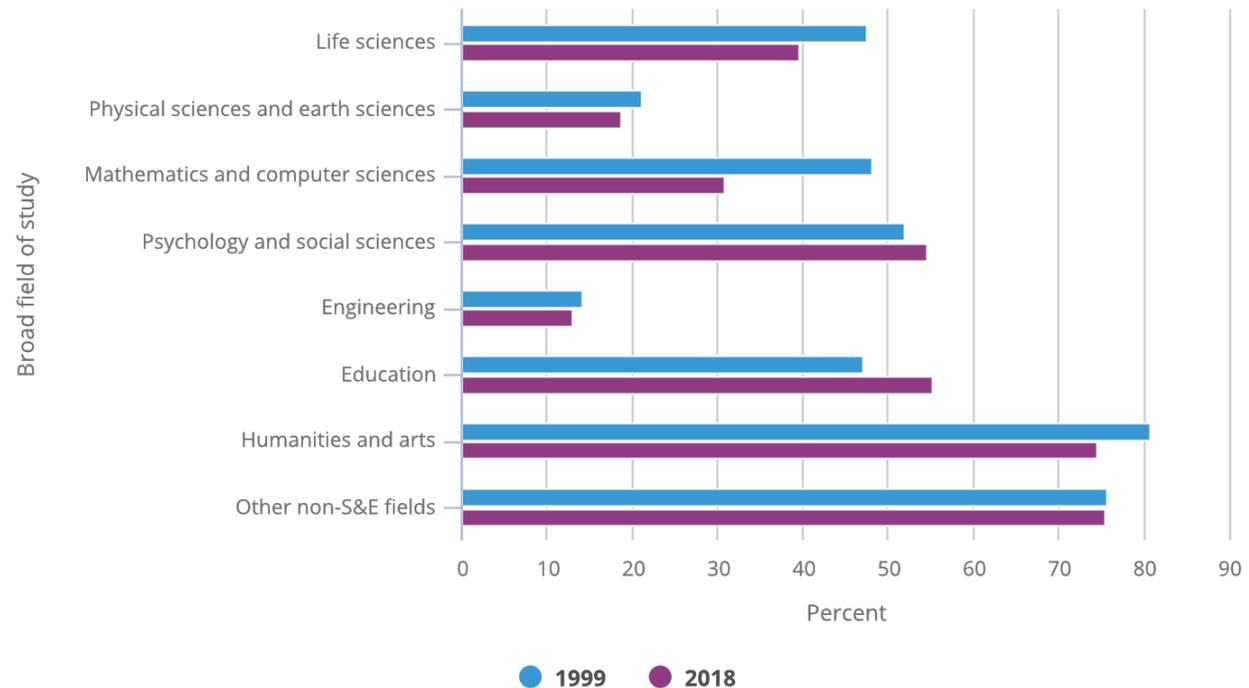
1. Data on PhD Careers
2. Common Paths
3. Fellowships
4. Questions

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- 1. Data on PhD Careers**
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National Trends

Definite employment commitments in academe in the United States, by broad field of study: 1999 and 2018



NSF - Rates of academic employment commitments

*These data exclude postdoc positions

Source: NSF Survey of Earned Doctorates

<https://nces.nsf.gov/pubs/nsf20301/report/postgraduation-trends#job-market>

UChicago PhD 5-Year Placement

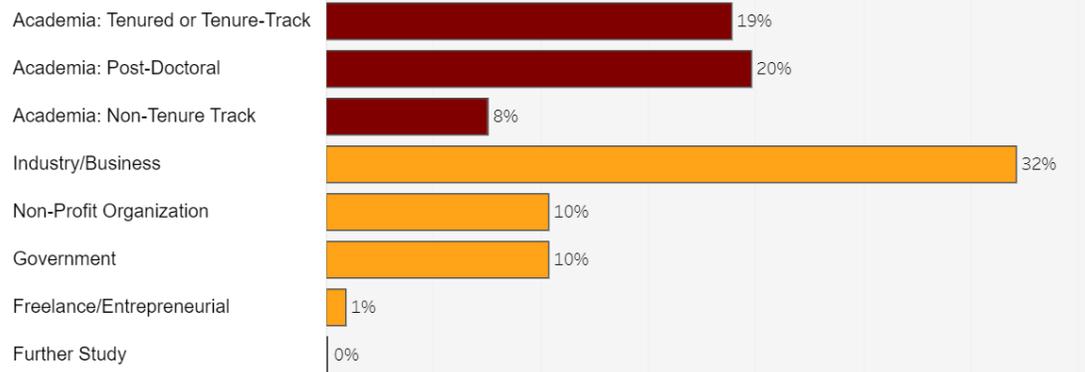
Physics

Career Outcomes 5 Years Post-Completion

Academia and Non-Academia Career Outcomes



Academia and Non-Academia Career Outcomes Breakdowns



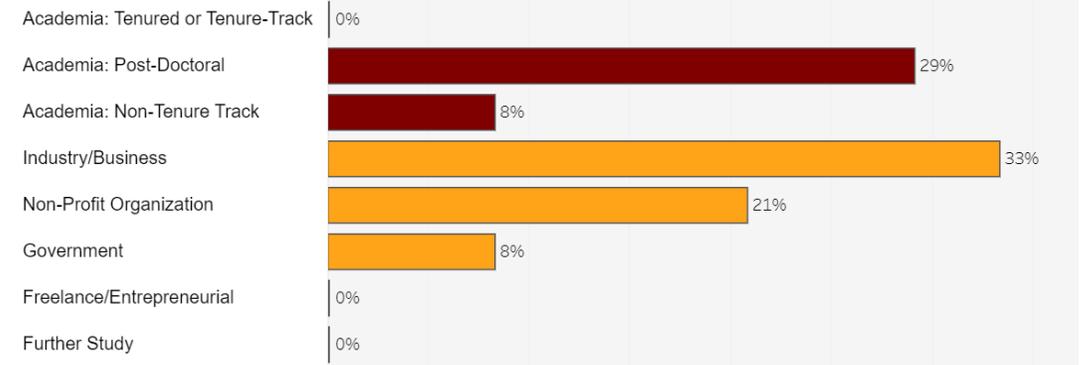
Astronomy & Astrophysics

Career Outcomes 5 Years Post-Completion

Academia and Non-Academia Career Outcomes



Academia and Non-Academia Career Outcomes Breakdowns



<https://provost.uchicago.edu/initiatives/phd-program-data>

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Common Paths for Physics PhDs

- Academic postdoc positions
- National lab postdoc positions
- **Data science**
- **Industrial research**
- **Consulting**
- **Quantitative finance**
- and more...

Data Science

Data Scientists

- Apply data analysis to a variety of industries that use large data sets: hospitals, insurance companies, tech companies, trading firms, governments, educational institutes, etc.
- Preferred computer skills include programming and statistical analysis

Software/ML Engineers

- Design, build, and deploy high-performance deep learning models
- Build data pipelines to take in and process data at scale to produce predictive features



Bing Li
PhD Physics 2016
Data & Applied Scientist
Microsoft



Vishal Soni
PhD Physics 2019
Lead Data Scientist
Blue Cross Blue Shield

Industrial Research

Scientist/Researcher positions

- Sometimes prefer postdoc experience, strong publication record, specific technical abilities
- Career progression can include managing a team or transition to business roles

Postdoctoral Positions

- Industrial postdoc programs less common but can be another way to transition into industry

Sectors

- Quantum computing
- Semiconductor
- Aerospace
- Energy



Jacob Johansen
PhD Physics 2017
AMO Scientist
Quantinuum



Lichung Ha
PhD Physics 2016
Physicist
Microsemi Corporation

Consulting

Management Consultants

- Apply general scientific logic and problem solving in business contexts
- Work at large, global strategy firms
- After ~2 years, opportunities to move into other fields including management within scientific industry or entrepreneurship

Data Analytics Consulting

- Data science division of large consulting companies
- Boutique consulting firms that provide data analytics services to clients



Hillary Child
PhD Physics 2019
Project Leader
Boston Consulting Group



Prateek Bajaj
PhD Physics 2014
Consultant
ZS Associates

Quantitative Finance

Quantitative Analysts

- Apply mathematical and statistical methods to financial and risk management problems
- Usually the entry point for PhDs in hedge funds, proprietary trading firms or investment banks
- Other related roles include quantitative trader, quantitative developer, quantitative engineer
- PhDs typically come from mathematics, physics, statistics, computer science, or economics
- Demonstrated interest in finance can be helpful but is not required by all firms



Todd Seiss
PhD Physics 2021
Quantitative Analyst
D.E. Shaw Group



Jing Zhou
PhD Physics 2015
Quantitative Researcher
World Quant LLC

Additional Paths

- **Nonprofit Research Institutes**
 - Postdoctoral fellow
 - Research scientist
- **Entrepreneurship**
 - Working at startups
 - Founding a new company
- **Government & Policy**
 - Science policy
 - Think tanks
- **Intellectual Property**
 - Tech. specialist/patent agent
 - Patent attorney
 - Technology transfer
- **Science Communication**
 - Academic journal editing
 - Science journalism
 - Museum outreach
- **Teaching**
 - College teaching
 - K-12 teaching
- **Administration**
 - Research administration
 - Education administration
- **Scientific Industrial Products**
 - Field application scientists
 - Technical sales rep

Resources

Online Resources

- [APS Careers](#)
- [Science Careers myIDP](#)
- [Versatile PhD*](#)
- [Cheeky Scientist*](#)
- [University Websites*](#)
- [LinkedIn!!!!!!](#)

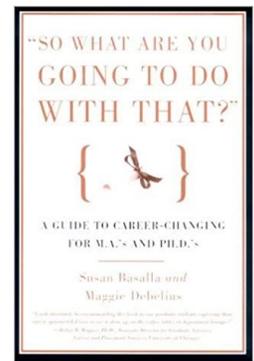
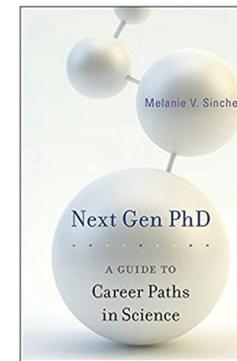
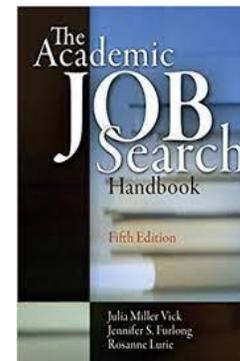
*some content restricted to subscribers

Books

- [Academic Job Search Handbook](#)
- [Next Gen PhD](#)
- [Leaving Academia](#)
- [So What Are You Going to Do With That?](#)



The versatile PhD



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3. Fellowships- Searching and Applying
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Prepare Yourself: The Fellowship Search is generally NOT



Fast



Easy

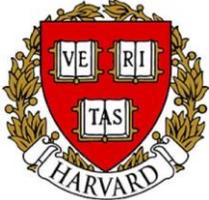


Instantly fruitful

What it Tends to Be



Where to Start Looking



CARAT Database for Grants and Fellowships

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

I Graduate College
Fellowship Finder



How to Use Fellowship Search Sites

- Start with a streamlined site like UIUC Fellowship Finder or UChicagoGRAD's database
- Keep a list of **fellowships that you find with links & deadline dates**
- Expand to a more comprehensive site such as Pivot and more specialized sites like Zintellect
- Get creative with keyword searches. Learn to think from the funders' perspective
- Set up **alerts** if possible
- Go from the search database to the fellowship website and examine what the funder seeks and the review criteria to assess your fit



Applying for a Fellowship

- Start with the solicitation
 - What do they fund?
 - Do you meet the eligibility requirements?
 - Are the review criteria available?
 - Can you find past winners to talk with?
 - When is the deadline(s)?
- Plan your application process
 - What does the application require?
 - When will you have time to think, write, do outreach and compile the needed materials?
 - Begin writing
 - Update your CV
- Get others involved
 - Contact your recommenders
 - Find people to give you feedback



The Research Proposal – Persuasion, not just Facts

General Organization for the Research Statement:

- I. Introduction: State the Big Question/Problem being addressed. Describe the specific research issue your project will address and draw the reader in to the project's importance, novelty and connection to larger issues.
- II. Background: What has been done? By whom? What are the preliminary results? Where is this logically leading you and your team? What method(s) have you chosen? Explain the theoretical basis for the proposed approach.
- III. Proposed research: State your objectives, specific aims or hypothesis; Add background specific to objectives, if needed; Demonstrate validation of your method(s); State expected results; Repeat for each objective.
- IV. Project plan: What will be done? By whom? What is the timeline? How will failures be addressed (contingency plans)? Why are you the right person to do this?
- V. Expected results: Describe what you expect to happen.
- VI. Conclusion: If this work is as successful as you would hope, what impact will it have in your field and /or beyond? How will this project help you reach your career goals?

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What questions do you have?



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