

# Career development: postdocs

Jake Bennett  
University of Mississippi  
August 2022 Belle II Summer Workshop

\*\*\*caveat emptor: these are the opinions of a small group of university faculty, who may not represent “real life”



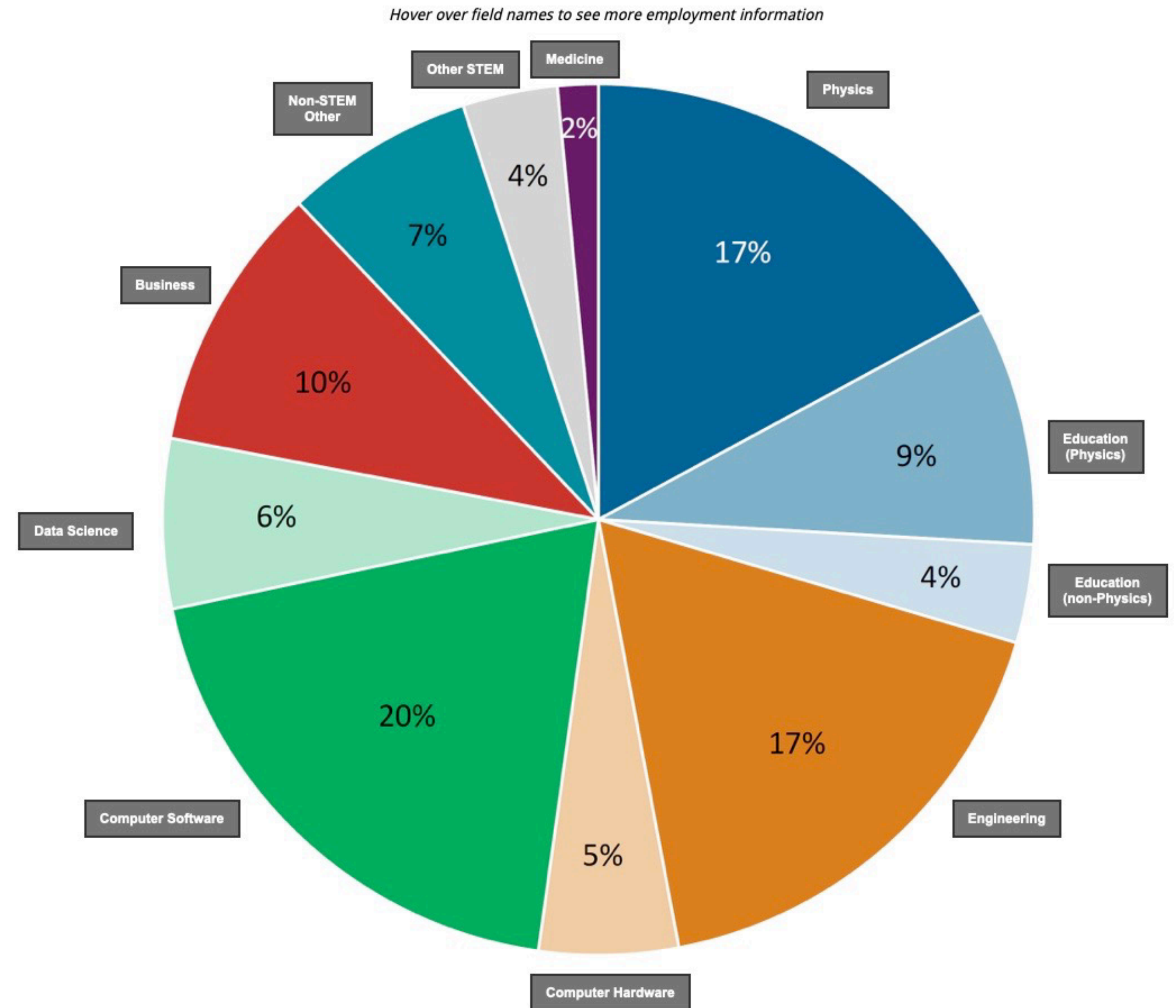
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# Common career paths

- Three common paths
  - Industry/startup
  - Staff scientist
  - Academic research

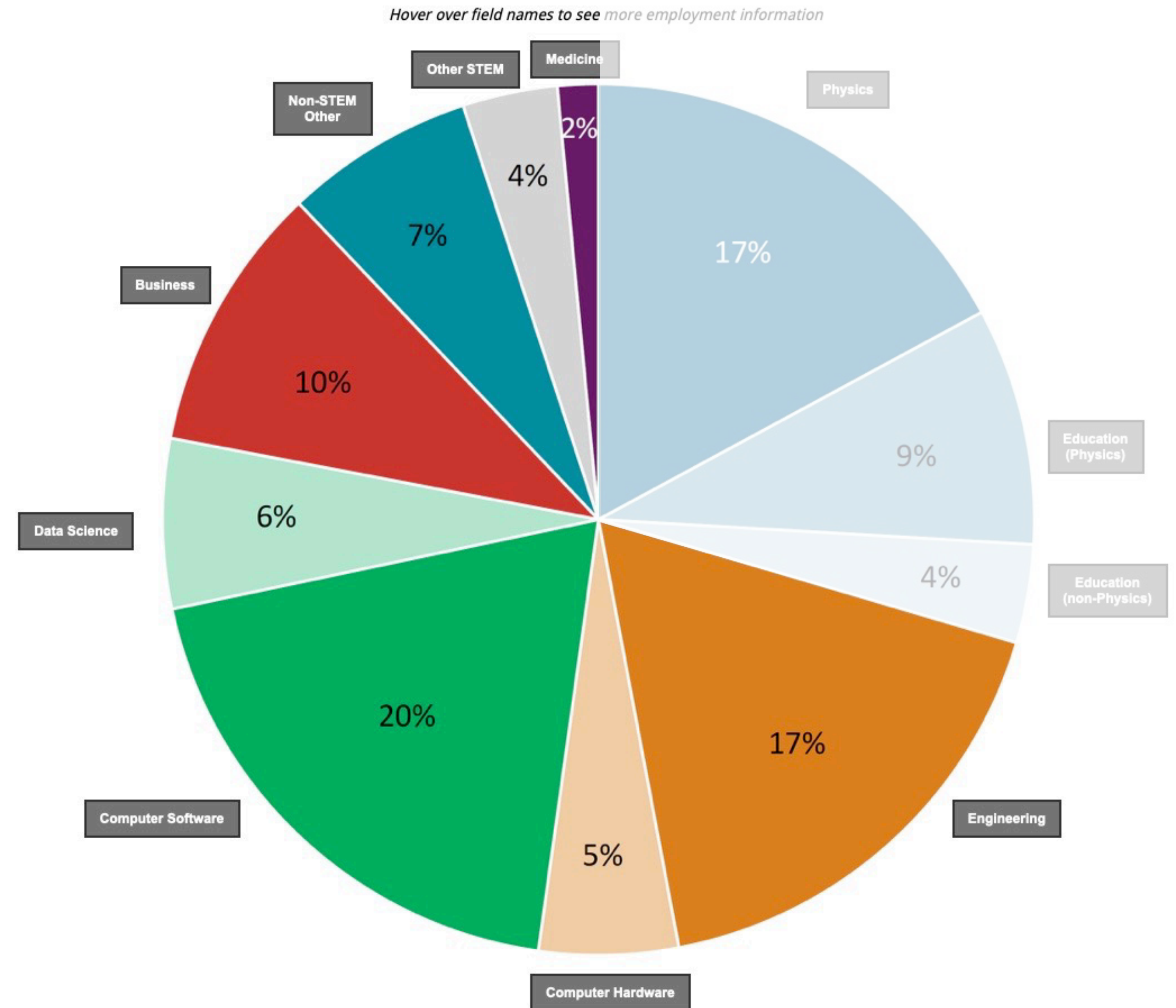
Employment fields for new physics PhD recipients in potentially permanent positions, classes of 2013 through 2018



# Common career paths

- **Industry/startup**
  - The commercial world likes to hire people who have:
    - **Problem Solving Skills** - finding answers to questions to which no one knows the answer
    - **Technical leadership** - organizing a team to work on/ solve technical problems
    - **Expertise and capabilities** in instrumentation, computing, etc.

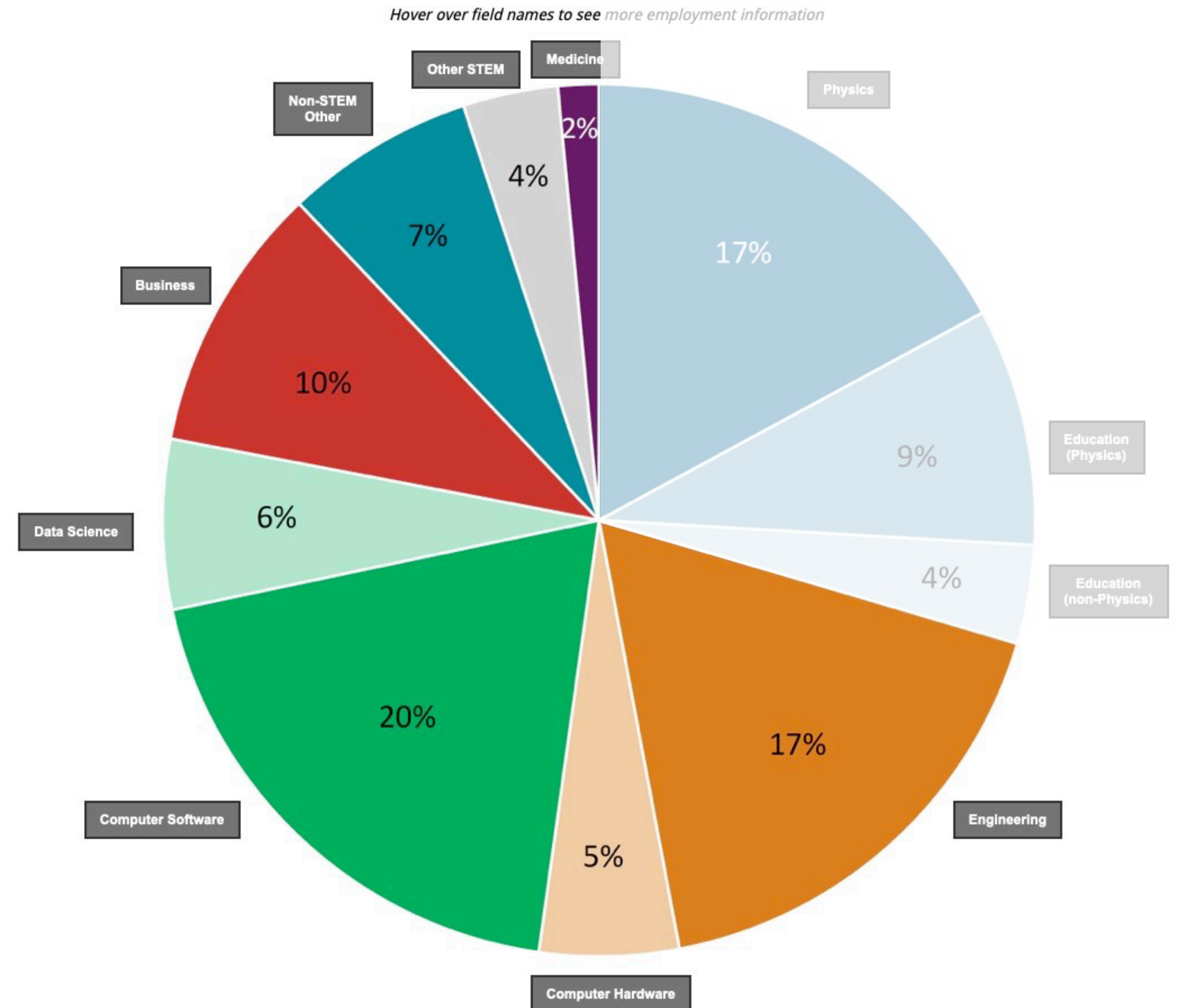
Employment fields for new physics PhD recipients in potentially permanent positions, classes of 2013 through 2018



# Common career paths

- **Industry/startup** practical advice:
  - **Learn git**, get a GitHub, add a practical project to it, mention it in every interview and conversation
  - A **software CV** derived from your GitHub (not an academic CV!)
  - **Learn SQL, Python, Machine Learning/AI**
  - **Have a profile** on (e.g.) LinkedIn and use connections to search for opportunities
  - **Networking is very important.** Work your network!

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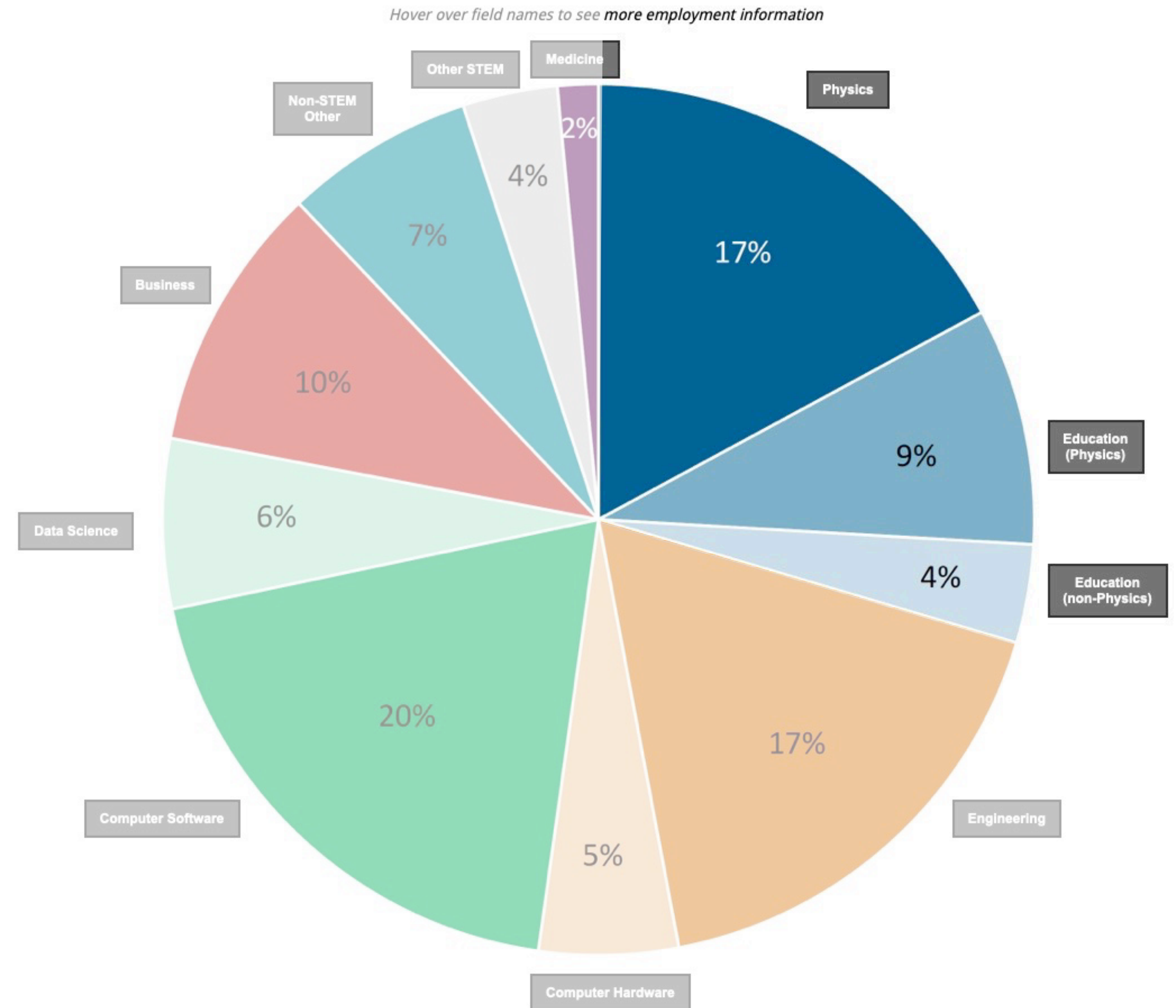


# Common career paths

- **Staff scientist**

- National Lab Staff/University Staff Scientist
  - Maintaining software, computing
  - Technical work on the detectors, infrastructure, etc.
  - Interfacing with experimenters to ease the use of lab resources
  - **Expertise and capabilities in Instrumentation, Computing**

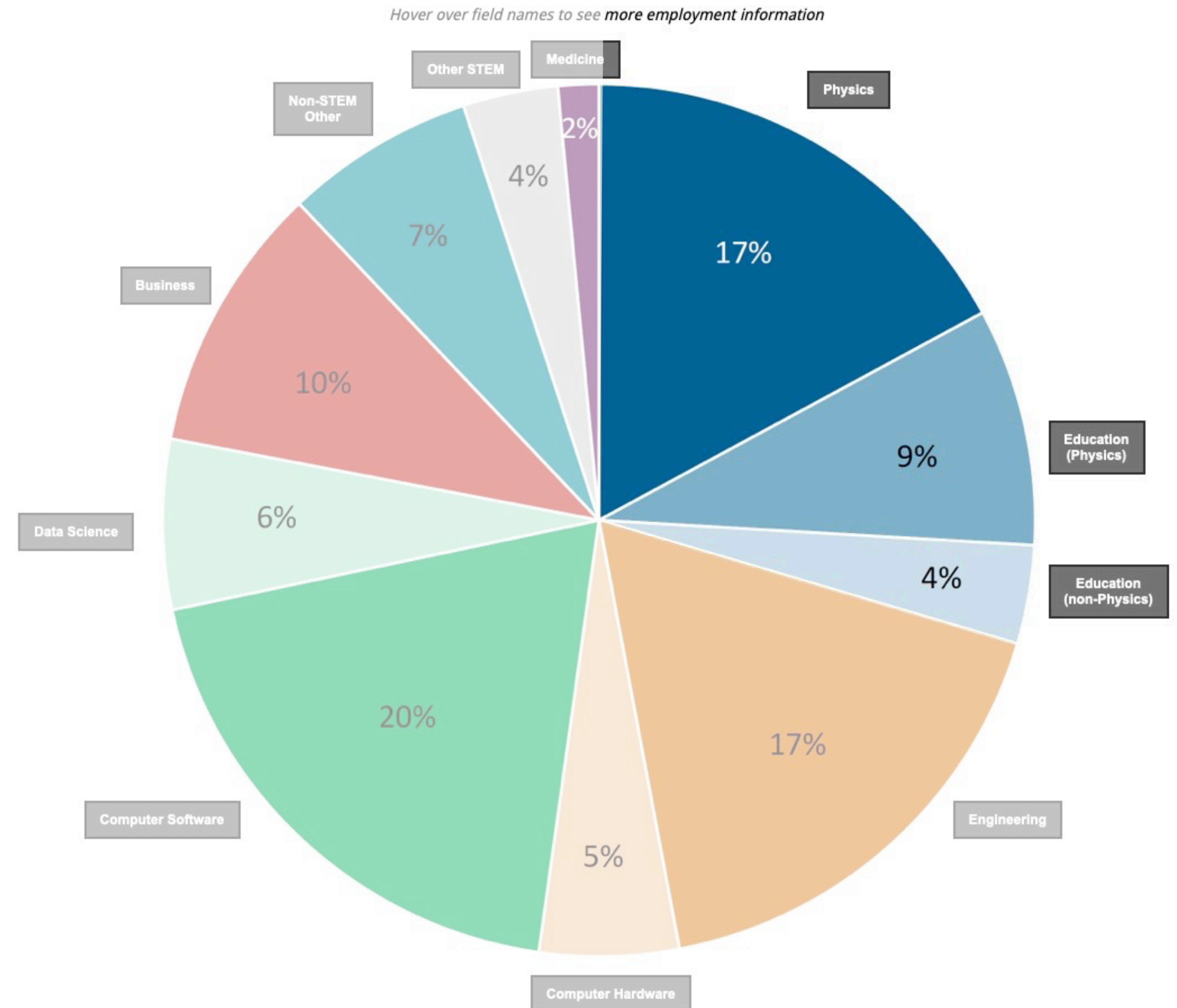
Employment fields for new physics PhD recipients in potentially permanent positions, classes of 2013 through 2018



# Common career paths

- **Staff scientist**
  - **National labs are always hiring** and much like industry are looking for the technically minded who can solve problems independently
  - Often these jobs are skill based (looking for someone with a specific skill), but want **flexibility and ability to learn new skills**
  - Hiring process is similar to university hiring (minus teaching) but still look for mentoring

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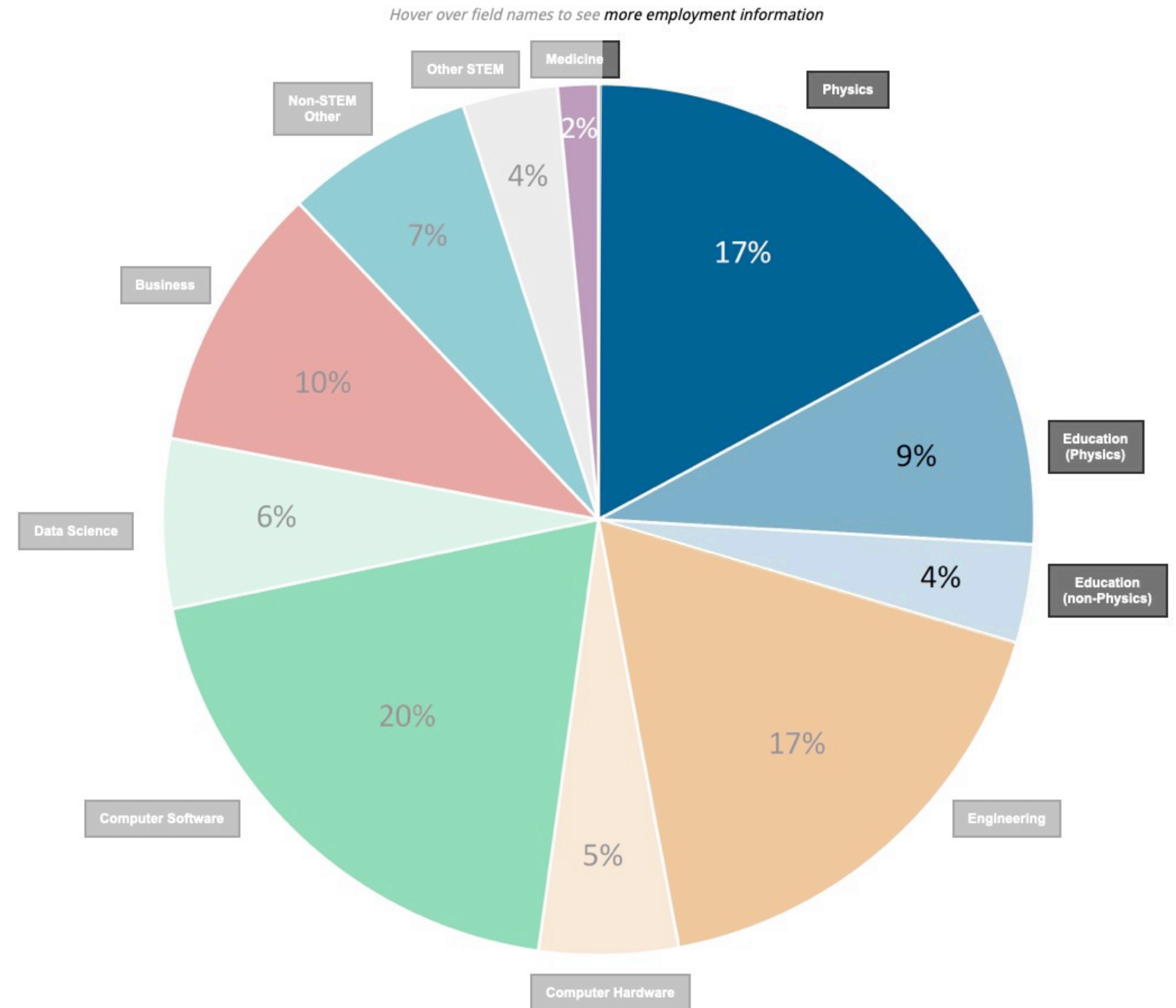


# Common career paths

- **Academic research**

- Jobs are rare and the hiring process is not user friendly
- Looking for people with an **established record of doing high quality research**
- Teaching experience is good, but typically deemphasized
- Similarly, mentoring abilities are important, but proof of ability to do research is a must!
- New(ish) emphasis: diversity statements

Employment fields for new physics PhD recipients in potentially permanent positions, classes of 2013 through 2018



# Common career paths

- **Academic research**
  - Jobs are rare and the hiring process is not user friendly
  - Looking for people with an **established record of doing high quality research**
  - Teaching experience is good, but typically deemphasized
  - Similarly, mentoring abilities are important, but proof of ability to do research is a must!
  - New(ish) emphasis: diversity statements
- **Start now** to cultivate the experience and achievements that show why you will make a good candidate
  - **Initiative** - are you capable of defining and executing your own research, teaching, etc.
  - **Independence** - can you be trusted to solve problems with minimal supervision
  - **Leadership** - are you capable of training the next generation of physicists



# Curriculum Vitae (CV)

- Academic CV
  - Length: academic - as long as it needs to be, industry - short (two pages max)
  - Name, details, and contact information
  - Education/work History
  - Teaching Experience
  - Grants, honors, and awards
  - Skills, programming experience (especially for industry)
  - Publications

**Jake Bennett**  
University of Mississippi  
Department of Physics and Astronomy  
Lewis Hall 108, University, MS 38677, USA  
jvbennet@olemiss.edu

## Curriculum Vitae

### APPOINTMENTS

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<b>Assistant Professor of Physics and Astronomy</b> <i>University of Mississippi</i>	August 2018 - Present <i>Oxford, MS</i>
<b>Postdoctoral Research Associate / Research Physicist</b> <i>Carnegie Mellon University</i>	June 2014 - August 2018 <i>Pittsburgh, PA</i>

### PROFESSIONAL PREPARATION

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<b>Indiana University</b> Ph.D. in Physics <i>An amplitude analysis of the <math>\pi^0\pi^0</math> system in radiative <math>J/\psi</math> decays</i> with Dr. Matthew Shepherd	<i>May 2014</i>
<b>Indiana University</b> M.S. in Physics <i>Amplitude analysis of <math>\gamma p \rightarrow \pi^+\pi^-\pi^+n</math> in GlueX simulations</i> with Dr. Matthew Shepherd	<i>December 2009</i>
<b>Roanoke College</b> B.S. in Physics & Mathematics (summa cum laude, valedictorian) <i>Honors Thesis Study of Radiative <math>\chi_c</math> Decays</i> with Dr. Matthew Fleenor	<i>May 2008</i>

### PROFESSIONAL SERVICE

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**US Belle II standing committee for Diversity, Equity and Inclusion** *January 2022 - present*  
One of four members of the US Belle II standing committee for Diversity, Equity and Inclusion, to which members are elected for two year terms by the US Belle II Institutional Representatives. Responsible for formation and oversight of the US Belle II bridge program consortium and ensuring equitable and inclusive climate and policies for US Belle II.

**Belle II Computing Steering Group deputy chair** *October 2021 - present*  
Responsible for coordinating the procurement and efficient, stable operation of Belle II distributed computing resources.

**US Belle II executive committee** *January 2019 - present*  
One of three members of the US Belle II executive committee, to which members are elected for two year terms by the US Belle Institutional Representatives. Responsible for coordination of US Belle II activities and mediation of any potential disputes.

# Curriculum Vitae (CV)

- Academic CV
  - Length: academic - as long as it needs to be, industry - short (two pages max)
  - Name, details, and contact information
  - Education/work History
  - Teaching Experience
  - Grants, honors, and awards
  - Skills, programming experience (especially for industry)
  - Publications
    - **Highlight publications you actually produced** (can easily get lost in a long list)
    - Include links to orcid and/or similar sites
- Look for examples
  - Tailor your CV to your needs/experience
  - This often provides the first impression, make it count!

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4. "A model independent partial wave analysis of  $J/\psi$  decays to  $\gamma\pi^0\pi^0$ ," *JLab Advanced Study Institute on Techniques for Amplitude Analysis*, Williamsburg, VA (June 2012).
5. "Simulated amplitude analysis of the  $3\pi$  system with the GlueX detector," *School on Amplitude Analysis in Modern Physics from hadron spectroscopy to CP phases*, Bad Honnef, Germany (August 2011).
6. "Radiative  $\chi_c$  decays," *APS April Meeting*, St. Louis, MO (April 2008).

## SELECTED PUBLICATIONS

ORCID ID 0000-0002-5440-2668

iNSPIREHEP ID J.V.Bennett.1

Google Scholar: Jake Bennett

### Refereed journal publications as a primary author:

1. F. Abudinen *et al.* (Belle II Collaboration), "Measurement of the  $\Lambda_c^+$  lifetime", arxiv:2206.15227 (Accepted at PRL).
2. J. T. McNeil *et al.* (Belle Collaboration), "Measurement of the resonant and non-resonant branching ratios in  $\Xi_c^0 \rightarrow \Xi^0 K^+ K^-$ ", *Phys. Rev. D.* **103**, 112002 (2021).
3. N. N. Achasov, J. V. Bennett, A. V. Kiselev, E. A. Kozyrev, and G. N. Shestakov, "Evidence of the four-quark nature of  $f_0(980)$  and  $f_0(500)$ ", *Phys. Rev. D.* **103**, 014010 (2021).
4. E. Kou *et al.* (Belle II Collaboration), "The Belle II Physics Book", *PTEP***12**, 123C01 (2019).
5. M. Ablikim *et al.* (BESIII Collaboration), "Amplitude analysis of the  $K_S K_S$  system produced in radiative  $J/\psi$  decays", *Phys. Rev. D.* **98**, 072003 (2018).
6. M. Ablikim *et al.* (BESIII Collaboration), "Amplitude analysis of the  $\pi^0\pi^0$  system produced in radiative  $J/\psi$  decays", *Phys. Rev. D.* **92**, 052003 (2015).
7. J. V. Bennett, M. Kornicer, M. R. Shepherd, and M. M. Ito, "Precision timing measurement of phototube pulses using a flash analog-to-digital converter", *Nucl. Inst. Meth. A* **622**, 225 (2010).
8. J. V. Bennett *et al.* (CLEO Collaboration), "Observation of  $\chi_{cJ}$  Radiative Decays to Light Vector Mesons", *Phys. Rev. Lett.* **101**, 151801 (2008).

# Academic hiring process in brief

- Typically you will be asked for:
  - **Academic CV**
  - **Cover letter/research statement**
  - **Teaching philosophy statement**
  - **Diversity Statement**
  - **Names** of those willing to write letters in your support
- Read the advertisement carefully! Use it to learn about what is expected. Supply everything requested!
- **Take advantage of insider knowledge.** If you know someone, do not hesitate to get in touch to ask how you can tailor your application to be most attractive to the search committee.
- Search committee reviews all the applications and determines a short list of those invited for **interview**
  - Colloquium talk
  - Present your plans for research and funding
  - One-on-one interviews with faculty, deans
  - Informal meeting with students
  - Lunch/dinner

# Academic hiring process in brief

- Typically you will be asked for:
  - **Academic CV**                      **Make yourself stand out!**
  - **Cover letter/research statement**      **Research interests, resources needed, and prospects for funding**
  - **Teaching philosophy statement**      **Show that you know what you are talking about!**
  - **Diversity Statement**                      **Be sincere and make realistic (even if ambitious) proposals**
  - **Names** of those willing to write letters in your support      **Someone who knows your qualities!**
- Read the advertisement carefully! Use it to learn about what is expected. Supply everything requested!
- **Take advantage of insider knowledge.** If you know someone, do not hesitate to get in touch to ask how you can tailor your application to be most attractive to the search committee.
- Search committee reviews all the applications and determines a short list of those invited for **interview**
  - Colloquium talk                      **Show that you can present your work clearly and engage students**
  - Present your plans for research and funding      **Show foresight in how to conduct/fund your research**
  - One-on-one interviews with faculty, deans      **These people will make the hiring decision...**
  - Informal meeting with students      **...but these people give input and are the stake-holders!**
  - Lunch/dinner                      **Show that you are well-rounded and will be a good colleague**

# Common interview questions

- Tell me about your research.
- Your experiment has 1000 co-authors on every paper.  
What is your individual contribution?
- How do you plan to get funding for your research program?
- What University resources do you need to carry out that program?
- What is the long term prospects for the research you are doing?
- What will your research group look like?  
How does that fit in with the existing group here?
- What is your teaching experience?  
Have you ever mentored a student?
- What undergraduate courses would you like to teach?
- Tell me about your leadership activities.
- What do you do to relax/de-stress?



# Diversity statements

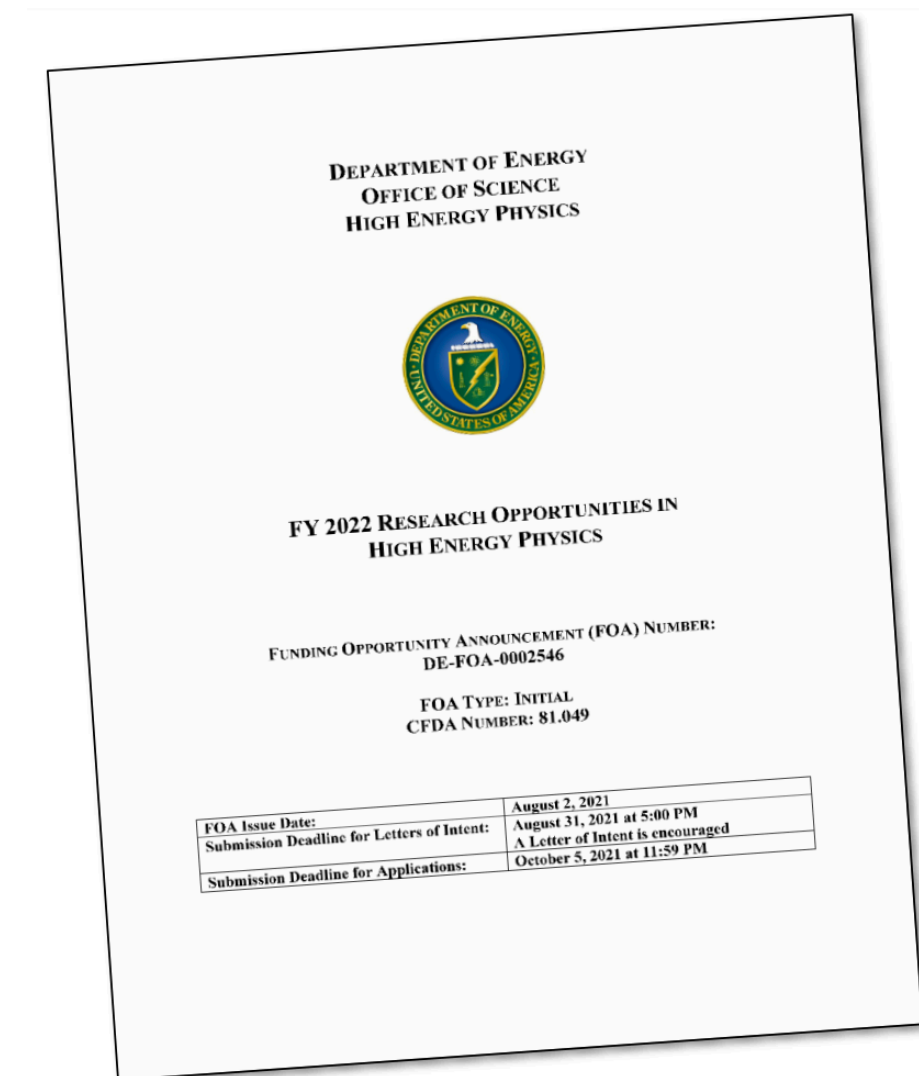
- Fairly new addition to application process
- One or two page document explaining experiences and commitment to diversity including
  - your values related to diversity
  - your experiences working with diverse populations
  - your future plans related to inclusivity
- You may want to tailor your statement based on the institution
  - Does the university have a **diversity or mission statement**?
  - Note that priorities may change depending on the region/population of the school
  - **Consult mentors**, colleagues, friends, internet for examples

# Diversity statements

- Questions on which to reflect when writing a diversity statement
  - What does diversity, equity, and inclusion (DEI) mean to you?
  - Have your past experiences informed your understanding of diversity?
  - Why is DEI important in your classroom/research?
  - **How will you make your classroom/research inviting to a variety of students?**
  - How will you foster diverse student perspectives?
  - Do you have any experience working with underrepresented populations?
  - **What are some ways you will incorporate inclusive approaches to teaching/research?**
- Pitfalls
  - Not being specific
  - Not telling the truth
  - Ignoring your audience
  - False parallels
  - **Writing a “throw away” diversity statement**

# The funding process

- Sources of funding
  - **University start-up package:** supports your research until you get external funding (*you will be asked for a number*)
  - **Research funding agency:** US DOE, NSF, DOD, NIH, etc.
- Basis for funding decisions is peer review (there is only so much to go around)
- Typical funding time line is ([DOE example](#)):
  - Funding Opportunity Announcement (FOA) usually appears in July
  - Proposals are usually due in Oct
  - Proposals are sent out for mail in reviews mid-Oct, due mid-November
  - Review Panels meet in December and January
    - Combine mail-in reviews and panel reviews
    - At least 4 reviews of each proposal



*"Is it just me or are these review panels getting a lot tougher?"*

- Standard basis of review is:
  - **Scientific/Technical Merit** - Is the science interesting and valuable?
  - **Appropriateness** - Are the methods being proposed proper?
  - **Competency** - Are the proposers competent to do the work?
  - **Budget** - Is the budget reasonable?
  - New emphasis: **quality and efficacy of recruitment and mentoring plan**



# Funding proposal reviews

- Peer review panel ranks proposals
  - Each reviewer is assigned 3-4 proposals to review carefully
  - Panel review discusses all proposals (roles: lead, secondary/scribe, reviewer)
  - Funding categories: **must fund**, *should fund*, fund if available resources, ~~do not fund~~
  - Funding levels: **full funding**, *mild budget adjustment*, major budget adjustment
- Policy factors (used in funding decision)
  - Availability of funds
  - **Relevance of the proposed activity to office of science priorities**
  - Ensuring an appropriate balance of activities within office of science programs
  - Performance under current awards, if applicable
  - Commitment to sharing the results and products of research
  - Promoting principal investigators not previously supported by office of science
  - Promoting the diversity of supported investigators and researchers
  - Promoting the diversity of institutions receiving awards

# Advice

- **Get help!** The FOA is daunting. Starting from an existing template is essential.
- **Read the FOA carefully. Make sure all required is there.**
- You must be “Relevant”. Great proposals that are not on DOE/HEP mission do not get funded.
- Make sure you understand “overhead” (the institution usually gets 40-60%+ of the top-line amount)
- **Review your proposal before you submit.** Experienced colleagues, collaborators, university research offices often will help with proposal review services. University grant writing seminars can also be helpful. Get in touch with your Sponsored Research Office!
- **Start early to give time for review and revision.**
- Best proposals tell a coherent story of an interest leading to work on experiment X to do data analysis Y by methodology Z to get result A.
- **Talk to the relevant Program Manager**
  - Many agencies have Principal Investigators (PI) meetings annually and offer other workshops
  - Email for a one-on-one meeting
  - Advice up until proposal is submitted, then can only talk about process
  - Mock panel reviews are great for revealing how reviewers approach/fixate on details