

Job searches

Or, what jobs can I do with this PhD, and how do I get them?

Please download the slides!
Go to bit.ly/JINA-job-search or:



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Junior Researcher Workshop
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What are my goals for this talk?

- To give you some sense of the **breadth of jobs** that are available to people with (astro)physics PhDs
- To give you some sense of the **skills you have that are transferable** to jobs outside of your current institution (i.e., large, research-intensive universities)
- To give you a **framework for thinking about choosing jobs** that suit your goals, skills, and personality.
- To give you some suggestions for how to make yourself a **more compelling job candidate**, and **communicate** that to your employer.

Why should you listen to me?

- Professor in MSU's Departments of Computational Mathematics, Science and Engineering (CMSE) and Physics and Astronomy. Postdoc at LANL.
- Founder and Graduate Director of CMSE; have spent lots of time talking to people in many different industries, career offices, and recruiters at career fairs.
- Many of my students and postdocs have gone on to industry, national lab, nonprofit jobs - I still talk to many of them and listen to what they say about their jobs and industries.
- Also: you shouldn't listen to **JUST** me! Your choice of career is important, and you should seek out lots of advice and opinions.

First, the bad news:

- Faculty members at your institutions have worked hard to make you think mostly about academic jobs, but you need to go beyond that!
- In 2019, ~2,050 physics+astronomy+astrophysics PhDs were granted (~15% growth since 2009). Source: aip.org/statistics
- In the same year, 369 t-t faculty hires were made, with 215 in PhD-granting departments (~7% growth since 2009). Source: aip.org/statistics
- Anecdotally, faculty jobs have become more challenging over time (increased demands, work-life balance, burnout)

Sources:

<https://www.aip.org/statistics/reports/faculty-job-market-physics-and-astronomy-departments>

<https://www.aip.org/statistics/reports/number-faculty-members-physics-departments>

<https://www.aip.org/statistics/faculty>

But, there is good news!

There are tons of very fulfilling jobs out there that don't require turning into a clone of your advisor!

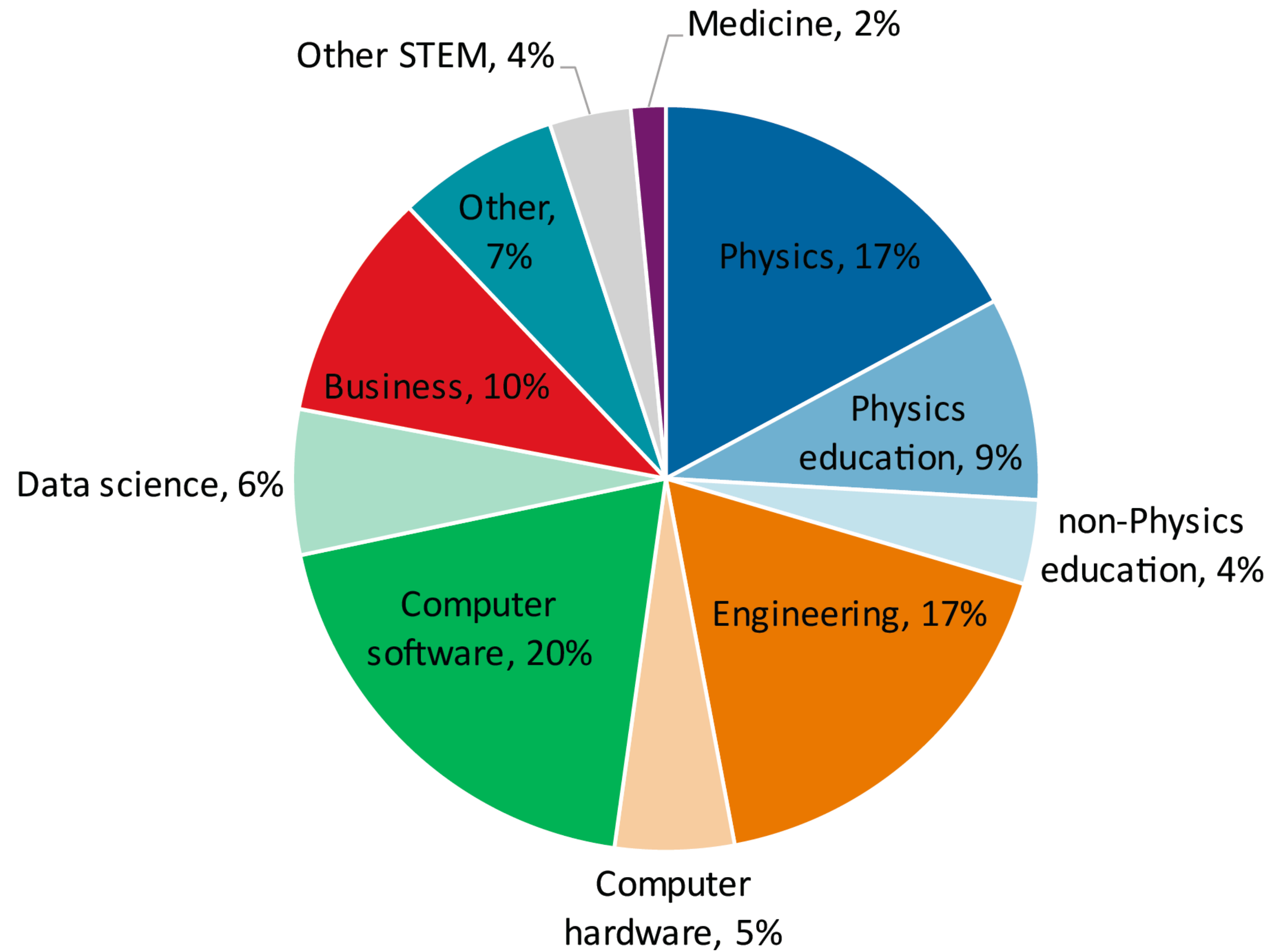
Job opportunities for (astro)physics PhDs, Part 1

- Faculty at research-intensive universities, regional comprehensive universities, liberal arts colleges, or community colleges
- Other roles in academia: lab manager, academic advisor, software developer, engineer/technician, teaching specialist
- K-12 teaching (particularly physics, astronomy/earth science, computer science)
- National laboratories (technical staff member) - Department of Energy, Department of Defense.
- Civil service (federal or state government positions outside of national labs) - e.g., National Institute of Standards and Technology, Consumer Protection Agency, NASA
- Outreach: museums, planetariums, science writing or other science communication
- Non-profit organizations (e.g., Union of Concerned Scientists, Doctors without Borders, American Red Cross)

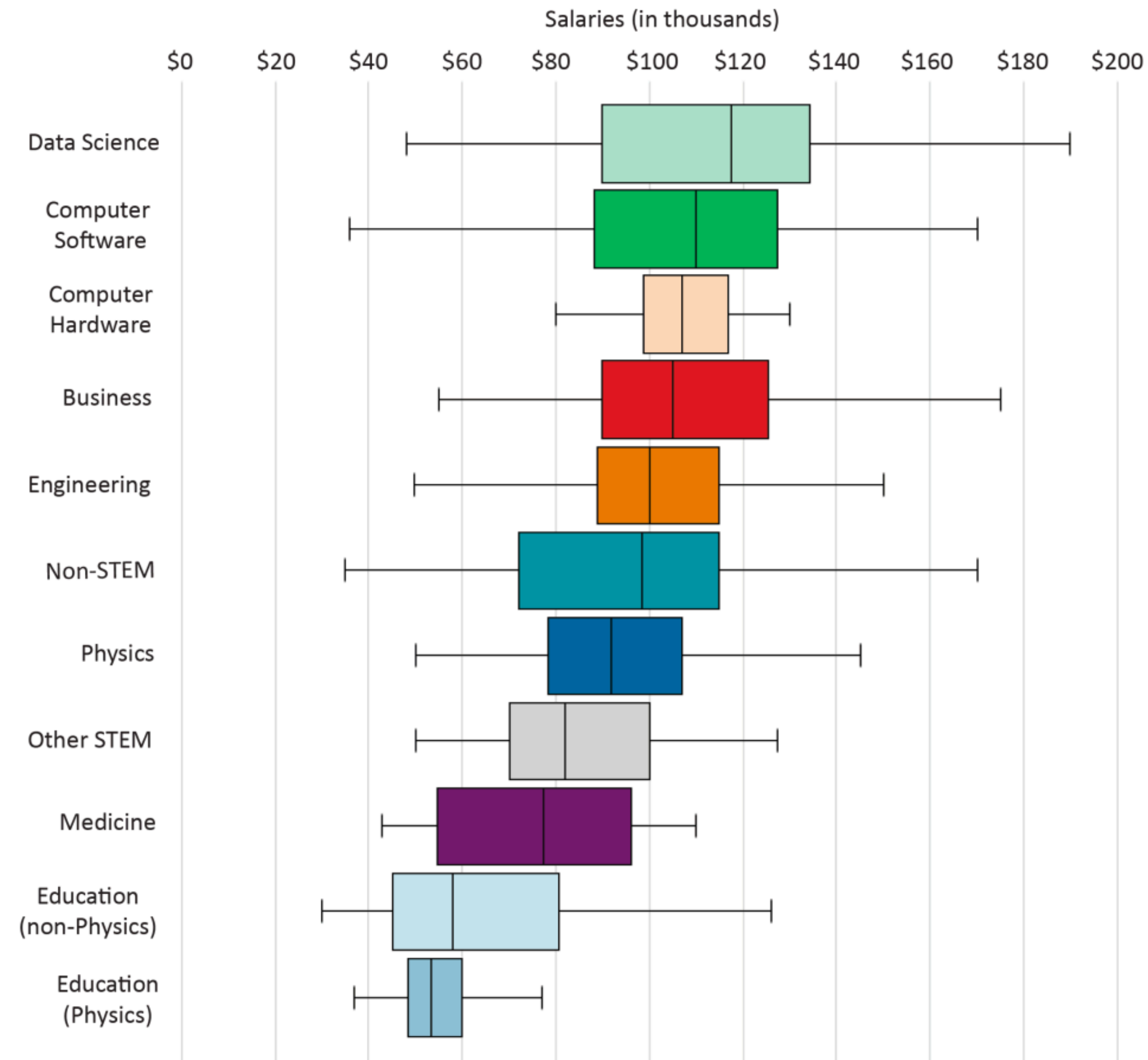
Job opportunities for (astro)physics PhDs, Part 2 (Industry)

- Software engineering/software development
- Information Technology
- Data science / data analytics / business analytics
- Engineering
- Consulting (business or technical)
- Finance (banks, hedge funds, private capital management, etc.)
- Private sector research & development (e.g., Microsoft Research, Intel Labs, medical instrumentation companies)
- Sales and marketing (typically in technical industries)
- Management (various industries; typically later in career path)
- Startup companies in various industries

Field of Employment for New Physics PhDs in Potentially Permanent Positions, Classes of 2014 through 2018



Starting Salary Ranges for New Physics PhDs in Potentially Permanent Positions, Classes of 2014 through 2018



The full starting salary range is represented by the lines extending to each side. The box represents the middle 50% (25th to 75th percentile) of salaries. The vertical line within the box represents the median starting salary in the field

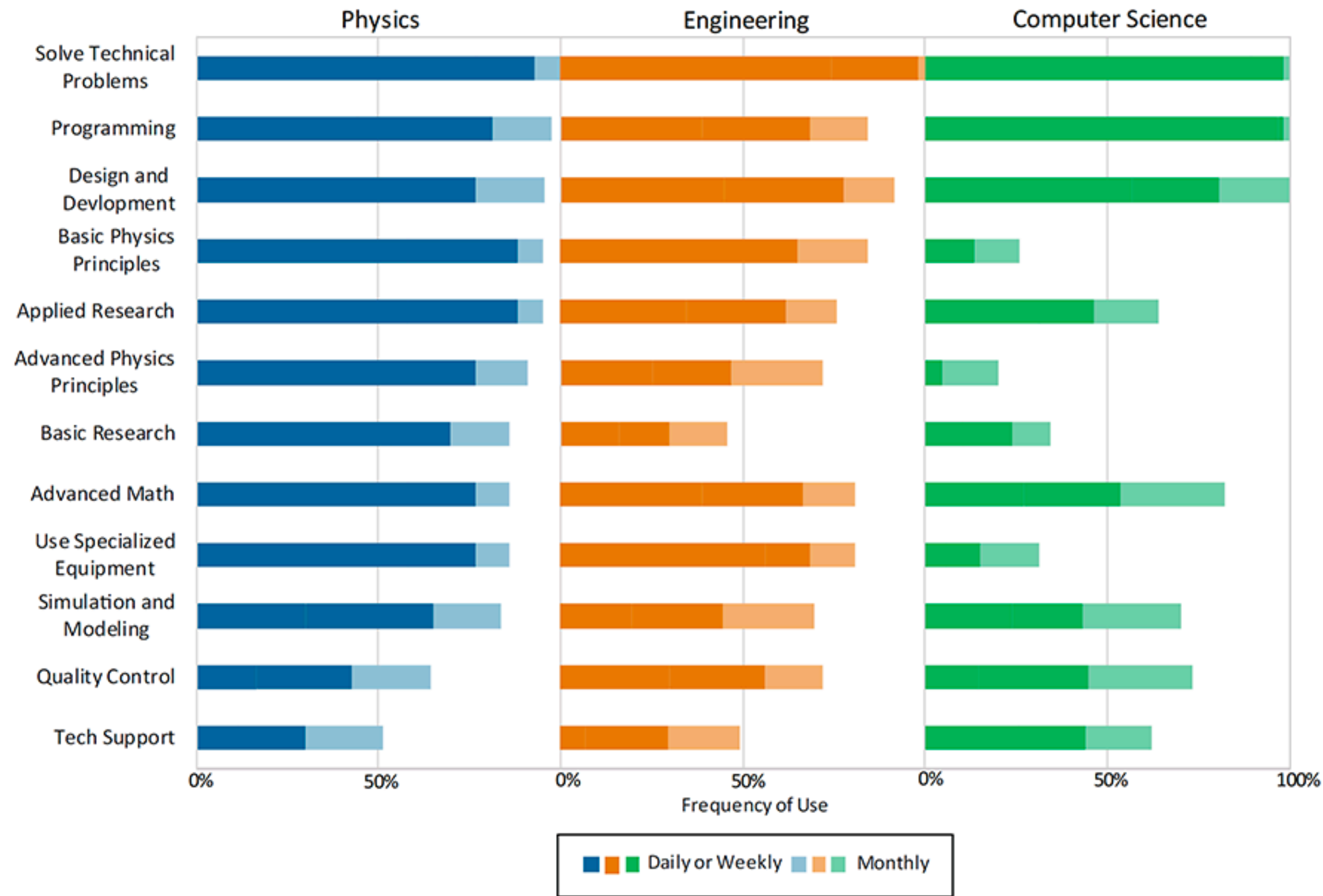
What do you most want out of your career?

- To make the world a better place
- To be highly paid (or high paycheck-to-effort ratio)
- To teach
- To do research
- To interact with lots of people
- To have the opportunity to learn new things and develop new skills
- To solve interesting and/or challenging problems
- To have good work-life balance
- To live in a specific location
- To have a high level of financial stability
- To feel like your job has meaning or purpose beyond getting paid

What are some of the general skills you have from your (astro)physics PhD?

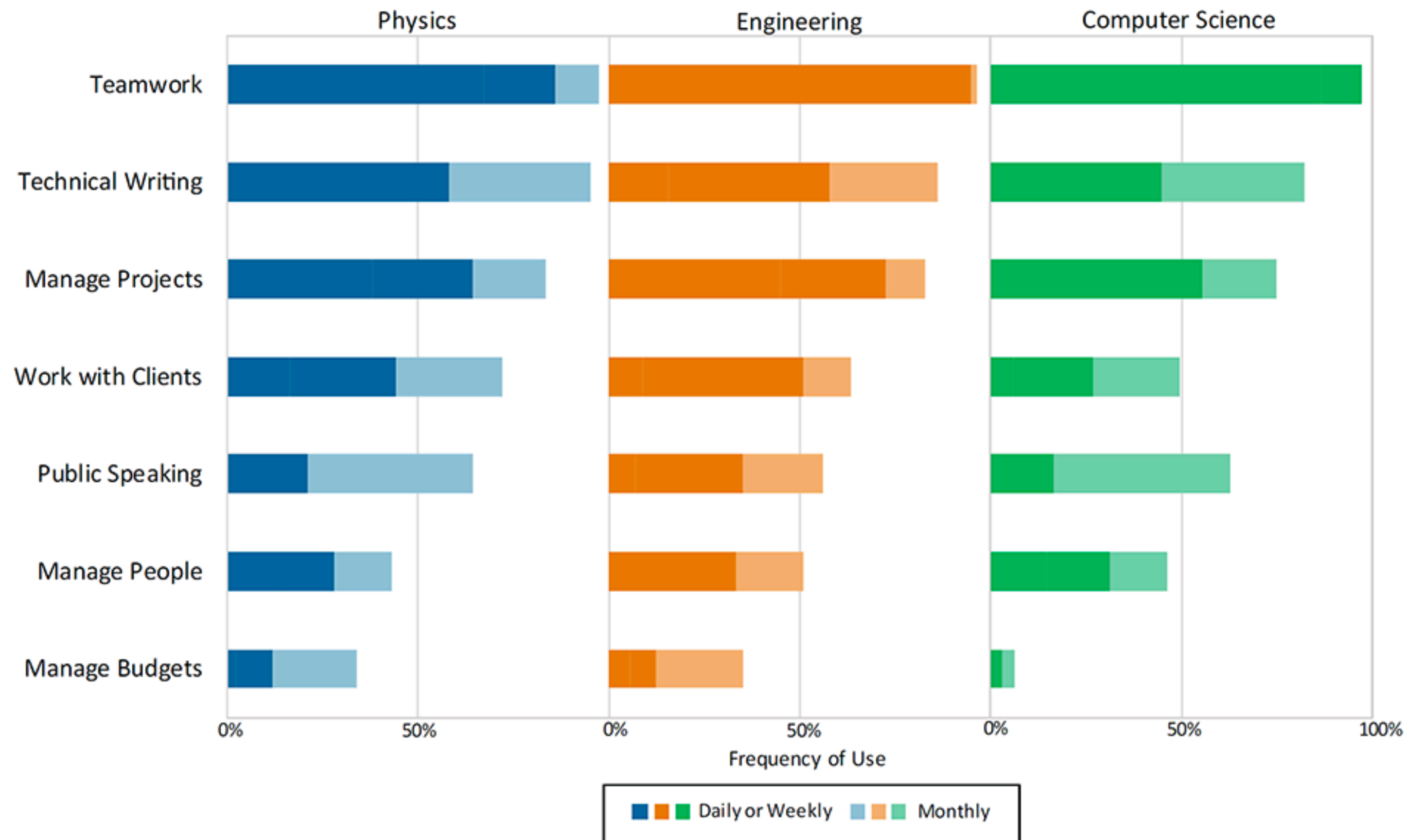
- **Analytical and problem-solving skills:**
 - Analyzing problems, identifying key elements, and making simplifying assumptions
 - Creating models and making predictions with them
 - Conducting mathematical and statistical analysis of models
 - Interpreting graphical data
 - Formulating answerable questions and a plan to answer said questions.
- **Technical skills:**
 - Math and statistics
 - Programming
 - Engineering and operation of devices
 - Computational modeling
 - Debugging (of hardware and software)
- **Professional and interpersonal skills:**
 - Technical writing
 - Giving presentations to a variety of audiences
 - Working as part of a team (including negotiation, conflict resolution, mentoring/being mentored)
 - Conducting literature surveys and rapid self-teaching of complex topics
 - Resilience in the face of challenging problems and situations

Scientific and Technical Knowledge Used by New Physics PhDs Employed in Potentially Permanent Positions, Classes of 2015 & 2016 Combined



Percentages represent the proportion of physics PhDs who chose “daily,” “weekly,” or “monthly” on a four-point scale that also included “never or rarely.” Data only include US-educated PhDs who remained in the US after earning their degrees. Data include responses from individuals working in potentially permanent positions in the private sector, government, and non-profit organizations. It does not include PhDs working in academia. Figure based on 43 PhDs employed in physics positions, 59 in engineering positions, and 67 in computer science positions.

Interpersonal and Management Skills Used by New Physics PhDs Employed in Potentially Permanent Positions, Classes of 2015 & 2016 Combined



Percentages represent the proportion of physics PhDs who chose “daily,” “weekly,” or “monthly” on a four-point scale that also included “never or rarely.” Data only include US-educated PhDs who remained in the US after earning their degrees. Data include responses from individuals working in potentially permanent positions in the private sector, government, and non-profit organizations. It does not include PhDs working in academia. Figure based on 43 PhDs employed in physics positions, 59 in engineering positions, and 67 in computer science positions.

How do you figure out your skills, interests, strengths, and weaknesses?

- Think about what you actually did during your PhD, and what you enjoyed (day-by-day activities, key technical and professional skills)
- Ask a few people you trust about your skills, strengths, and weaknesses, and be prepared for some difficult answers.
- Take aptitude tests (e.g., MSU's Career Interests Self-Assessment)
- Think about what the types of things you want to be doing in 5, 10, 20 years, in terms of types of things you want to do (building, debugging, teaching, talking...)

**How do you find out about jobs you
might be interested in?**

Network your a** off!

- Talk to people at conferences (APS, AAS meetings often have a Career Center, multiple networking events, etc.). Get peoples' business cards and contact information and follow up with them!
- Use your alumni network (lab, department, university). Get names from faculty and graduate secretaries! Contact people and follow up with them!
- Find people on (astro)physics twitter and see what jobs they're doing, blog posts, etc. DM them!
- Create a LinkedIn profile, keep it updated, and join groups that you're interested in.
- Directly reach out to people at companies you're interested in to meet and have a resume (not a CV!) attached.

What else?

- Look on APS and AAS Career websites - lots of resources, including career profiles and statistical information
- Look on job boards and see what's interesting (Indeed, Glassdoor, LinkedIn, Monster, ZipRecruiter, CareerBuilder, USA Jobs, etc.). Try to look past job titles to actual job description, and note that not all jobs you might want require a PhD!
- Go to career fairs at your university (or virtual ones if you're an alumni) - start before you're actually on the job market!
- Take advantage of your university's Career Services office (some universities have a PhD-specific one)

What could you ask people who have jobs you might be interested in?

- What do you do on a day-to-day basis?
- What are the aspects of your job that you like the most?
- What are the aspects of your job that you feel are the most challenging?
- What skills from your PhD are useful in your job?
- What new skills did you have to acquire?
- What do you wish you had known when you were in my position? (i.e., when you were a student or postdoc)
- If I were looking for a job in your industry, are there particular times of year when you are hiring or otherwise looking for new employees?
- When you are considering new candidates, what do you look for in their resume or their cover letter?

How can you make yourself a more compelling job candidate?

- Pursue internships in industries that you're interested in
- Take workshops on professional skills - interviewing for jobs, negotiation, teamwork, conflict resolution, mentoring
- Take classes on technical writing, presentation, specific skills (programming, data science, project management, statistical modeling, etc.)
- If you're interested in data science: apply to Insight Data Science Fellowship, Data Incubator, other similar programs
- Pursue opportunities to mentor, teach, organizer workshops/conferences, etc. and document those!
- Build up a portfolio of work (documented on blog, software up on GitHub)
- Create a resume (most jobs) or CV (for academic jobs) and get feedback on it from your university career center, trusted faculty (for academic CV)
- Create a professional website that highlights your expertise
- Social media (LinkedIn, facebook, twitter): join interest groups for things you're interested in, follow individuals or companies you're interested in, etc. Also, think about what your social media posts say about you - companies absolutely look at this!

Some general advice

- **The 10% rule:** Spend 10% of your time in your current position thinking about and building toward your next position. Compound interest is applicable beyond the stock market!
- **Get started early:** First figure out what types of things you're interested in, then make yourself a compelling candidate and build your network, and finally apply to jobs.
- **Take advantage of the resources available to you:** Universities have career centers with staff who can help you with your resume (faculty generally can't). APS, AAS, AIP all have resources for finding various career paths.
- **Networking is really important:** This is the best way to learn about what people actually do, find internships/summer positions, and build a network for when you're looking for a permanent job.

Potentially useful resources

- American Institute of Physics Statistical Research Center: <https://www.aip.org/statistics> ; particularly <https://www.aip.org/statistics/employment/phds>
- AIP Report on Physics Doctorates: Skills Used and Satisfaction with Employment: <https://www.aip.org/statistics/reports/physics-doctorates-skills-used-satisfaction-employment-1516>
- AIP “PhD plus 10” report: <https://www.aip.org/statistics/phd-plus-10>
- APS Careers Center: <https://careers.aps.org/>
- APS “Job prospects for physicists”: <https://www.aps.org/careers/physicists/prospects.cfm>
- AAS Careers Center: <https://aas.org/careers>
- A guide to getting a faculty job: https://web.pa.msu.edu/people/osheabr/academic_job_search.html
- O*NET Interest Profiler: <https://www.mynextmove.org/explore/ip> (may require university subscription)

Key points

- A huge **breadth of jobs** are available to people who have (astro)physics PhDs
- You have a wide range of analytical, technical, professional **skills that are transferable** to those jobs
- You should think about **careers that are a good match** for your professional and life goals, your aptitudes, your strengths, and your weaknesses. There's no such thing as a "perfect job" - just one that's perfect for you!
- There are a wide range of ways that you can make yourself a **more compelling job candidate**, once you figure out what you're looking for!

Questions?