Preparing for an academic career

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Goals for today:

Answer three main questions:

1. What types of postdocs opportunities are out there?
2. How can I apply for them?
3. Once I'm there, what can I do to prepare for a faculty career?

Followed by a Q&A session featuring two esteemed panelists:

Zhen Liu, Assistant Professor at University of Minnesota since 2020

Keith Dienes, Professor at University of Arizona since 1999, Program Director at NSF

Working within “the system” - MY views

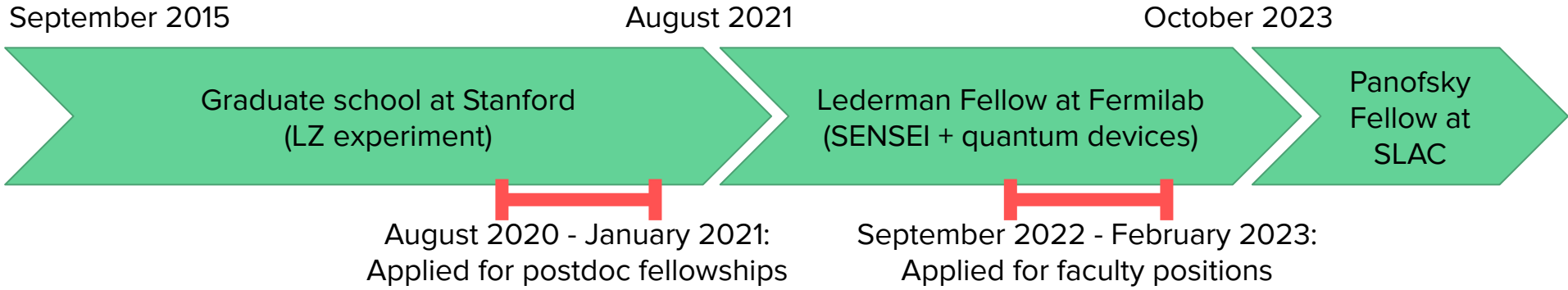
There are many ways that our academic system, and specifically our system of academic hiring and promotion, is unjust. It can be particularly disadvantageous for groups that are historically marginalized in our community.

I am not promoting the current academic hiring system as optimal or fair. But…

> “When you attend a board game night, you have to play the game with the rules chosen by the host. Once you are hosting your own game night, you can choose the rules.” - Aviv Simchony

I will address how to work within the current system (to the best of my knowledge).

My academic path (so far)



Key points:

1. I've been through both stages of academic applications very recently, *BUT...*
2. I am an experimentalist
3. I haven't (yet) been on the hiring side

So take my thoughts with a grain of salt.

Don’t just take my word for it!

History of excellent Early Career Fora at previous Pheno conferences:

2017, 2018, 2019, 2020 (youtube), 2021 (youtube), 2022

Many other resources available:

APS “Postdoctoral positions in an academic institution”
Taylor Hutchinson’s “Job Cycle Tips & Tricks” (and references therein)
Astrobites “Guide to Astro Postdoc Applications”

Every slide today could be an entire talk - I apologize for the wordy slides.
I pulled inspiration from many of these sources in preparing this talk.

What is a postdoc?

“Postdoc” = post-doctoral ➜ position that you can have after earning your PhD

Period of continued training that can be a stepping stone between PhD and faculty

No required classes or teaching ➜ time to focus on your research!

Potential goal: to become an independent researcher with individual science agenda

- Other possible goals if not planning to stay in academia

Logistics:

- Temporary position, term is usually 1-5 years (often 3)
- Not uncommon to do more than one

Not all postdoc positions are alike

Fellowships: Money comes from an organization or an institution, which often allows for a greater flexibility in choosing what you work on. Recognition within the field is nice, but it can come at the cost of more intense applications and less direct oversight. Various types (NOT exhaustive):

- **National:** NSF AAPF, NASA Postdoctoral Program, NASA Hubble, Ford Foundation, Branco Weiss
- **Institutional:** Pappalardo (MIT), KITP Scholars (UCSB), Burke Fellows (Caltech), Kadanoff Fellows (UChicago), Gates Fellowship (Fermilab), Porat Fellows (SLAC)

Grant-based postdocs: Hired to work with a specific advisor or group, and sometimes on a specific project. Likely less flexibility, but potentially more direct mentoring, support, and advocacy.

Not all postdoc positions are alike

Most types of postdocs can be at different institution types, with different pros/cons:

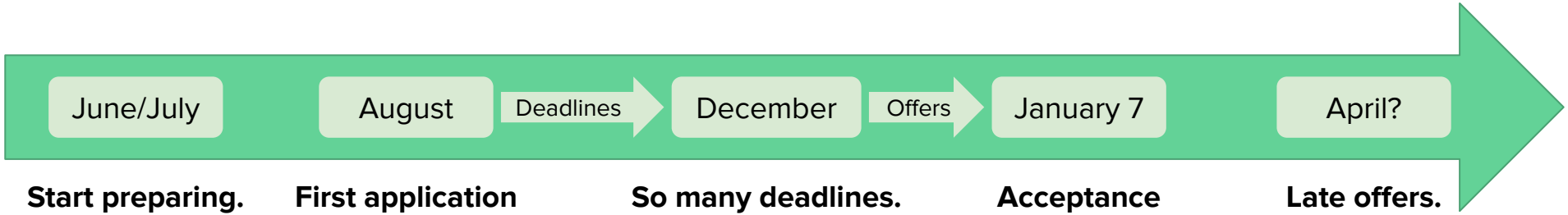
Universities:

- Within a physics department and University that works on many different things ➔ lots of opportunity for cross-disciplinary work and academic cross-pollination
- More opportunities to teach and interact with students

National Labs:

- More focused, which may mean larger groups and more people working on what you are interested in
- Often working on larger-scale projects
- Sometimes means more resources

Postdoc application timeline*



Start preparing. Are you going on the market this year? If so, start looking for openings, drafting materials, asking for letters, etc.

First application deadlines. Some Fellowship have very early deadlines! Don't miss a great opportunity because you didn't start early enough.

So many deadlines. Amount of deadlines will continue to increase. Many are in October or November, and also continue into December.

Acceptance deadline. Community-wide date that no acceptance can be required before this date. (Theory only)

Late offers. Some of the non-HEP-specific Fellowships may have a later schedule, and it will take a while to hear back from them.

*Note: Sometimes, there are non-theory postdocs that open up at various points throughout the year.

When you know you are going “on the market” soon

Possibly contrary to outside belief, physics is a very social field! Should take advantage of that when you know you are going to be applying for jobs in the next ~year. This may include:

- **Talk to people who have open positions:** Tell them you are thinking about applying! Ask them about the position, what they are looking for, etc.
- **Talk to people who don’t have open positions:** If if they aren’t hiring, senior members of the field will have a good sense for who might be hiring, and where your work might be a good fit.
- **Go to conferences and advertise your work** (just like you are now!)
- **Talk to your mentors:** They may have connections to various institutions, could ask for you to be invited for a talk, etc.

How do I find open positions?

Many options (not exhaustive):

- Ask senior members of the field - they will often gets ads mailed to them
- If there is ongoing work or recent publications you are interested in, can reach out directly to involved groups
- AcademicJobsOnline.org
- inspirehep.net/jobs
- HEP Theory Postdoc “Rumor Mill”
- #job-opportunities on Snowmass Slack
- Physics Twitter - very active!
- Google

How to decide where to apply?

All comes down to “fit”, but many factors can contribute to that:

- **Research topic:** Are there others working on what you are interested in? Does the institution have the academic community you are looking for? (Note that you CAN switch fields)
- **Potential PI:** What is their advising style? Does it match your needs? What is their standing in the field? Do they write strong letters?
- **Institutional climate:** Are people happy? Do people work in the office, or remotely? Are there identity-based groups to join?
- **Location:** Weather, cost of living, city vs. rural, access to hobbies, partner job opportunities, resources for kids, distance to family, healthcare, safety, etc.
- **Everything else:** “Prestige”, salary, research/travel funds, benefits, visas, etc.

Bottom line: What is important to you? Go where you will be happy.

How to decide where to apply?

Putting it into practice (my approach):

1. Make list of all possible options that you are even remotely interested in and qualify for
2. Identify the group, person, or project I would work with at each place
3. Rule out the places where even if I got an offer, I wouldn't want to go
    a. Don't waste your time, don't waste their time
4. Ask my mentors for their advice on each place (3-5 people)
5. Narrow the list down to a *reasonable* number of applications based on "fit" criteria and mentor advice
    a. What is the right number of applications? It depends on many things.
    b. It's a competitive process, so higher = better?
    c. But they take time, and fewer, targeted applications > more, generic applications
    d. I settled on 11

Typical postdoc application package

Application components, in rough order of importance:

1. Letters of recommendation
2. Research statement
3. CV
4. Education, outreach, and/or DEI statement
5. Cover letter

This process is complex, so it:

- **Can take a lot of time.** Set expectations with your advisor on how much time you can devote to this task.
- **Requires organization.** I *highly* recommend tracking all applications, requirements, and deadlines in a spreadsheet.

General application tips

Think carefully about your audience. What do they want?

- They are busy, so it should be succinct and easy to read.
- They want to know about your technical skills, but they need more: What impact have you had? Are you going to be a leader in the field? How will your work fit in at their institution?
- “Scientific virtues”: Can you collaborate? Can you work independently? Are you a creative problem solver? Are you detail-oriented? Show, don’t tell.

This is your chance to BRAG. Say the nicest possible things about yourself (that are still true, of course).

Ask previous Fellows and/or colleagues for their materials (I always share mine when asked).

Ask for help with editing! Peers, advisors, institutional writing centers, etc.

Letters of recommendation

Most important part of the whole package - ensure they will be STRONG letters. What makes a strong letter?

- Pick people who can actually **speak to the quality of your work**.
- Pick people who have **high opinions of you**.
    - If you don't know their opinion of you: "Would be comfortable writing a strong letter on my behalf, that addresses [fill in positive specifics here]?"
    - Another option: "Do you have the bandwidth to write a letter on my behalf?" Gives them an out, if needed.
    - Can shop around: "If I asked you to write a letter on my behalf..."
- **Seniority and name recognition** in the field MATTERS
- It's nice to have people from **outside your institution** - shows you collaborate with others in the field. Cultivate these letters early in your career, if possible.

Ask early! Pls need time to write letters. Be very specific in your ask - what do you want them to address?

Research statement

Typically 2-4 pages. Read the prompt! Often asks for previous work, proposed work, or a mix.

Make it easy to read. Include section headings. Bold sentences if appropriate. Avoid jargon and acronyms. Have a narrative that flows smoothly from one topic to another. *Proofread.*

Clearly explain your responsibilities, the impact you have had on the field, and your vision for the future. Do NOT leave them guessing.

Lead with your conclusions. This goes for the overall statement, as well as individual sections or paragraphs. If your main point is buried, they won't find it.

All above points largely summarized as: ***Tell them what to think.***

CV

Should clearly convey your:

- **Credentials:** education (degrees, fields, institutions) and employment (employer, title, responsibilities)
- **Accomplishments:** research (projects, results, publications), teaching (courses, institutions, topics), leadership roles (within projects, collaborations, or the community)

Make it easy (= fast) to read. List recent items first. List most relevant sections first. Use formatting to draw attention to important items. Avoid jargon. Be concise.

Include the impact. List your responsibilities, but also include what happened because of them. *Example:* I wrote an event classifier algorithm… that served as the basis for all physics analyses in my collaboration.

Outreach/education/DEI statement

These are becoming more common overall, but are more often required for fellowships rather than grant-based postdocs

Comes in many flavors: Outreach, teaching, DEI, community involvement, career objectives, etc. Make sure you read the prompt carefully to understand what they are looking for.

If they ask for it, it is likely NOT just a checkbox - they probably care. **Make sure you can say something substantive.** If you don't have previous experience, consider getting some! At the least, articulate your philosophy around these subjects, as well as your future plans for involvement. Educate yourself around the social science.

Cover letter

In the spirit of not wasting your time OR their time, this should be short but informative. It should be the TL;DR of your application.

Consider including:

1. Your current institution, your advisor's name, and your expected graduation date
2. A SHORT description of your previous work (1-2 sentences)
3. A SHORT description of your proposed work (1-2 sentences)
4. A summary of why you are a good fit for the job
5. The names of your letter writers, and how you know them

Interviews

Not all openings will have interviews - some may go straight to an offer. Some may have day-long, on-site interviews that include giving a talk (a whole other forum...). Others may have shorter Zoom interviews. Lots of variation!

Use the opportunity to familiarize yourself with the institution: You can tell a lot about a place from the “vibe”.

Things to think about:

- **Look the part.** Don’t underestimate the power of a good blazer.
- **Practice!** Being a good communicator is part of the job, so they will likely be looking for people who are clear and articulate.
- **Enthusiasm helps.** This includes for your work, for your job, and for the institution. They want to make an offer to someone who will accept, and someone who will be happy at their institution.

You've got offers! How to choose?

Remember that sometimes **you can negotiate**! *Example:* I didn't negotiate my Fellowship offer, but a grant-based postdoc who came after me negotiated a match to my salary.

Go back to "fit" considerations from slide 12 - where are you going to be happy? To be productive? To have the resources to reach your goals?

If you haven't already (and if possible), **ask to visit**! Get a sense of the area, of the institution, of the department, etc. Meet your potential advisor and colleagues.

Ask your mentors: "What would you do in my position? Why?" You'll get many perspectives - which one resonates the most with you?

You’re a postdoc! Now what?

If you want to stay on the academic track, a 3 year postdoc is actually pretty short. You may start to apply for faculty jobs ~2 years after you start! Use your time wisely.

1. First and foremost: **Do the work you were hired to do!** They hired you for a reason (because you are a good fit), and you accepted for a reason (because it’s interesting work).
2. **Develop projects that you have ownership over.** When applying, can point to tangible results that are *yours*.
3. **Volunteer for leadership positions.** Institutions want to hire faculty that will be leaders in the field.
4. **Develop your own, unique scientific perspective and agenda.** Continue learning, and refining what you think is important/interesting. Institutions want to hire faculty with an exciting (but achievable) scientific vision for the future.
5. **Socialize your work.** Give talks! Build your reputation. People will associate your unique work with YOU.

What else is out there?

There are LOTS of interesting and important jobs outside of the academic track.

Some options that I looked at or my friend pursued:

- Science policy (AAAS Fellows, APS/AIP Congressional Fellows, many more)
- Project manager at Lyft
- Consultant at McKinsey, BCG
- Research scientist at Google, Raytheon
- Data scientist at Intuit, Grammarly, USAID, Descartes Labs, etc, etc.
- Software engineer at Google, Fennel
- Hardware engineer at Waymo, Atom Computing

Resources:

- AIP statistics on employment of physics PhDs
- APS Job Prospects and Career Guidance

When the going gets tough...

Physics is hard, and being early career is *hard*. Many contributors:

- **Imposter syndrome** is REAL! The people I've heard say, "I have no idea what I'm doing", include:
  - Many PIs
  - Several Department Chairs
  - One National Lab Director
- **Unsupportive colleagues and/or environments:** "You're too young to know how to run a group", "You only got this job because you're a [fill in marginalized group here]"
- **Work-life balance:** The early years of an academic career track are so busy, making it hard to balance anything else with work.
- **Everything else:** mental health, burnout, affordability, child care, other caretaking responsibilities, etc, etc.

Many ways to get connected and involved

There are so many groups who are striving to improve the field for early career people, and for everyone. Join them! Options include:

APS-affiliated groups:

- Forum on Early Career Scientists
- Forum on Graduate Student Affairs
- APS Division Executive Committees (all have early career/student members)
- New DPF-sponsored early career organization - thoughts? Let's talk!

Early career organizations within collaborations

Graduate student or postdoc organizations at your institution

Academic Twitter

Reach out!

@kstifter on Snowmass Slack (preferred)
kstifter@fnal.gov

Q&A panel

Zhen Liu, Assistant Professor at University of Minnesota since 2020

Keith Dienes, Professor at University of Arizona since 1999, Program Director at NSF