WAYNE STATE UNIVERSITY

Early Career Forum Pheno 2026

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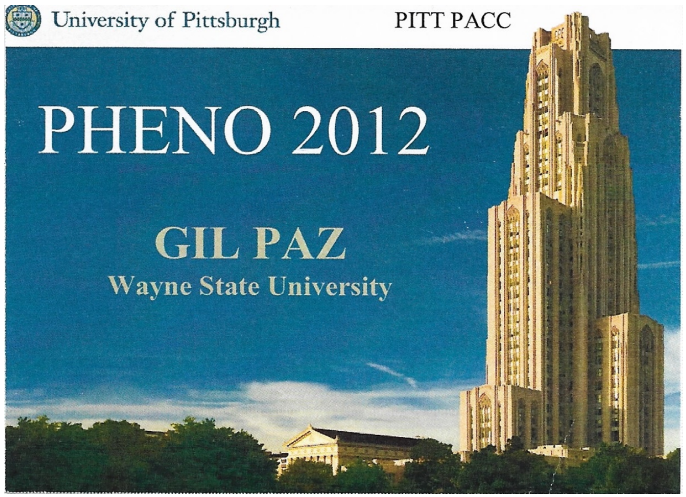
Outline

- Who am I professionally
- Early Career: Grad Student
- Early Career: Postdoc
- Conclusions

Who am I professionally



Who am I professionally

- Full professor at the department of physics and astronomy at Wayne State University in Detroit, Michigan, USA

- Academic Career
  - Professor, Wayne State University, 2023 -
  - Associate Professor, Wayne State University, 2017 - 2023
  - Assistant Professor, Wayne State University, 2011 - 2017
  - Postdoc, The University of Chicago, 2009 - 2011
  - Postdoc, Institute for Advanced Study, 2006-2009

- Education
  - Ph.D. Physics, Cornell University
  - M.Sc. Physics, Cornell University
  - M.Sc. Physics, Technion - Israel Institute of Technology
  - B.A. Physics, Summa Cum Laude, Technion - Israel Institute of Technology
  - B.A. Math, Summa Cum Laude, Technion - Israel Institute of Technology

- 15 years as a faculty advising postdocs and grad students

Disclaimer

- The opinions and advice I give are mine
- They do not represent my university or the Pheno symposium
- Not everyone would probably agree with my opinions and advice
- That is ok
- Other perspectives are at Early Career talks in previous Phenos

Early Career: Grad Student

Grad Student

- Your goal is to learn how to do research

- Skills
  - Read and understand and even reproduce papers
  - Conduct original research solving problems not solved before
  - Communicate your work in talks and posters
  - Often get experience teaching

Grad research cycle

- Grad research cycle

1. Work on a research project
2. Write a paper
3. Present your work in a conference

- Repeat steps 1-3 on a new project

Doing Research I

- Typically your advisor suggests a research project
  and recommends papers to read

- Read the papers, understand them and try to reproduce
  at least some of the calculations

- Strive for understanding. Sometimes things are not clear because:
  - You are missing some background
  - The authors implicitly assume that "everybody knows that..."
  - The authors don't state their assumptions

- If you put in the time and it is still not clear, ask your advisor!

Doing Research II

- Meet your advisor at least weekly to ask questions and show progress
  It's part of their job

- Faculty are busy and getting busier every year
  Don't hesitate to remind your advisor about
  meetings, requests, forms to sign etc.
  they are actually grateful that you do

- In your research you should go on tangents and explore
  If we knew the answer, it's wouldn't be called research

Writing papers

- It's useful to get practice in technical writing, e.g. papers
  The more you write, the better it will be
- Get used to writing even if your advisor is writing the paper
- AI effects are too early to judge

Giving talks: General

- Giving talks is part of our work
- It's a skill that can be improved with practice
- Practice your talk! Even professional actors **have to** rehearse
- Practice your talk by yourself and in front of your research group to get feedback
- Consider giving talks at local APS meetings where the stakes are lower it can help build confidence for giving talks at larger conferences
- You **want** to share the great work you have done with the audience This can help to overcome shyness and insecurity

Giving talks: Technical advice

- Avoid large blocks of text, e.g.,

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- If you are worried you will forget something, practice your talk!
- Make sure your name and institution appears visibly on **every** page
- Have page numbers but avoid countdown pf pages, e.g., "10/15"
- Anything you put on a slide can and will be used for questions
  If you can't explain it, don't put it on the slide!
- If you don't know the answer, say you don't know or don't remember

Giving talks: Cognitive aspects I

- Some people have visual memory and some auditory
  Write what you say and say what you write to address both types

- No need to form complete sentences
  The line above isn't... Neither this line :0)

- Be careful about line
  breaks

- Be careful about line breaks

- Don't fill every white space on the page
  (Typical problem in experimental talks)
  More can be less

Giving talks: Cognitive aspects II

- Separate **your work** from background and other people's work
  I like to do it by inserting a new section slide

- Beginning of the talk

> Other people's work
>
> [refs?]

- Later in the talk

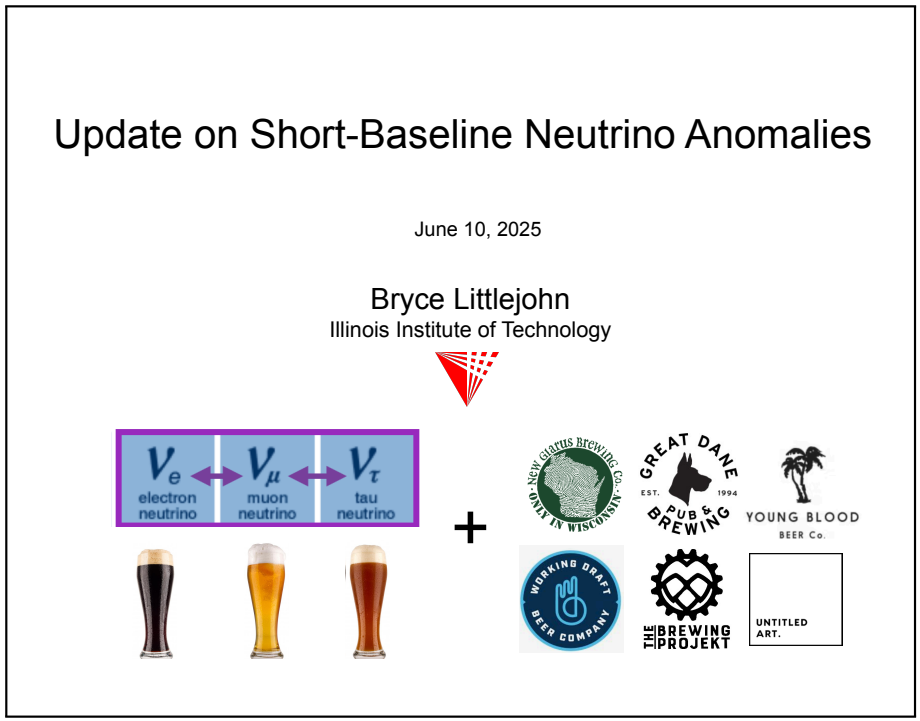
> Your work
>
> Your name et al. arXiv:...
> or
> Your name et al. *in progress*...

Giving talks: Make it interesting

- A talk should be interesting
- Does your work tell a story?
- Can you ask questions and answer them later in your talk?
- Make (appropriate) jokes
  Physicists are the easiest audience in the world
  we laugh from everything

Giving talks: Make it your own

- Make it your own
- You can incorporate your interests to make the talk more interesting
- For example, pictures of your pets or something else
- Example: Talk by Bryce Littlejohn at CIPANP 2025



Conference attendance

- Great networking opportunity
- If you are shy, follow your advisor or people you know
- Join impromptu gatherings during coffee breaks
- Don't hesitate to introduce yourself to more senior physicists
- Have an elevator pitch ready to answer the question "What are you working on?"

Further you education

- You should go to a summer school at least once during your PhD
- Ask you advisor about that. It's part of your education
- Examples of summer schools: TASI, CTEQ, PiTP

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Further your education

- There are opportunities to visit places like KITP, Fermilab, etc. for extended periods of time. Take advantage of them

Travel funding

- Don't hesitate to ask for travel funding from your advisor, department, university, local host, event organizer
- Often there are **dedicated** funds for students and postdocs
- Nobody will go hungry because you got financial support

Diversify your portfolio

- Expertise in a subfield is great
  but it is also good to work on different projects in different areas

- Try to write a paper with someone else in your group,
  a student or a postdoc, or a different member of your department

What to do when things do not go as planned

- Grad school and research are not linear. You can get "stuck"

- What to do?
  - Work: sometimes things are resolved when you put more work
  - Work on more than one project, when one is stuck
    you can work on the other
  - Look for support: Other grads or faculty, university counseling services

- Take ownership and responsibility: It's **your** PhD not your advisor's

- Something I heard from Helen Quinn at APS 2005 April meeting:
  There will be ups and downs in your career,
  but later nobody will not remember the downs

Life after grad school

- What is your next step?

1) Applying for a postdoc position?
2) Applying for a job in the industry?
3) Career change?

- In the following I only discuss the first option

- For advice about other options it's best to try and contact people with such an experience

Applying for postdocs I

- It's an **international** playing field

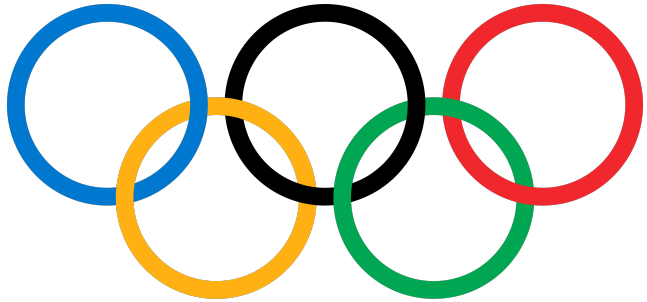


Image source: `https://en.wikipedia.org/wiki/Olympic_symbols`

- USA postdoc positions have been limited in recent years

- Consider also other countries and continents if you can

Applying for postdocs II

- Apart from
  - your previous work
  - your interactions with other physicists at conferences and beyond
  - your letters of recommendations

- Your research statement is your way to influence the person who will hire you as a postdoc

Research statement

- Talk about your research but **emphasize** your contributions
- Don't be shy!
  If you came up with an idea, say it!
  If you made an important contribution, say it!
- Use direct language
- Self promoting is not a bad thing
- The person hiring you wants to know you can do the work and contribute to the research

Luck

- We tend to under-appreciate the role "luck" plays in life, namely, things beyond your control
- Example: You are the second on a shortlist for a postdoc position in a well-known institution. The first person on the list is also on a short list for a faculty position somewhere else
- You can do everything right and still not get a postdoc position
- There are much less postdoc positions than physics grad students Statistically, not everyone will get a postdoc position

What to do if you don't get a postdoc offer

- Can you stay another year in grad school and work to be more "marketable"?
- Can you apply more widely next year?
- Reframe: You are more than your research
- You can have a good life outside of academia

Early Career: Postdoc

Postdoc I

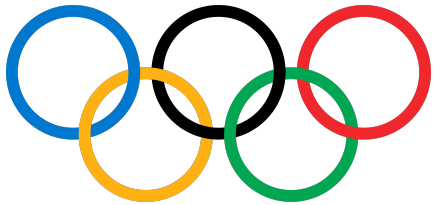
- A lot of advice presented before applies to this stage too
- You are expected to work as an independent researcher
- Laura Vanderkam: "Never waste a transition"
- A new position is a wonderful opportunity to make changes
- You can change research directions
- Example: Flavor physics $\Rightarrow$ SUSY $\Rightarrow$ proton radius and ν physics
- You can start new collaborations

Postdoc II

- You should do more of what we talked about before:
  more papers, more conferences, more seminars
- Inviting yourself is not a bad thing...
- If you are traveling to give a talk at A,
  can you give a talk in nearby B?

Applying for a faculty position

- You should start applying to faculty jobs at least a year before you think you are ready to apply...
- Not every place has a faculty search every year
  Your dream job might be available this year but not next year
- Ask people about possible jobs in the near future
- It's an international playing field



- Are you ok with faculty jobs in other countries and continents?

Job interview I

- Job talk:
  - Make it accessible and interesting
  - Emphasize your work clearly
  - Keep your talk on time

- It's good to get information about the faculty at the place where you are interviewing. What do they value?

- When talking to individual faculty let them guide the conversation

- Job interview is not just about physics
  Faculty want to know what kind of a colleague you will be
  They maybe "stuck" with you for 30+ years

Job interview II

- Your interview might be at a place "ranked lower" than your previous or current institution. Don't be a snob.

- If you do not plan to take a job offer it will show

- Personal questions are illegal. Don't answer questions like
  - Are you married?
  - Do you have a family?
  - Do you plan to have kids and when?

- Let the search committee know if you get such questions

Luck

- We tend to under-appreciate the role "luck" plays in life, namely, things beyond your control

- Example: By the time you are looking for a faculty position at some place, a professor there may or may not retire
  - If they retire there is a job search
  - If they don't there will be no job search

- You can do everything right and still not get a faculty position

- There are less faculty positions than postdoc positions statistically, not everyone will get a faculty position

What to do if you don't get a faculty position

- Can you apply next year and work to be more "marketable"?
- Can you apply more widely next year?
- Your area of research might be more appreciated outside of the USA
- Example: someone who is a now a full professor in a *"top-ten"* university in the world could not get *any* faculty position in the USA
- Reframe: You are more than your research
- You can have a good life outside of academia

Wellness

Work-Life balance

- There is more to life than Physics!
- What we do is important but it's not life and death
- You are **more** than your research
- You want to have a good balance between life and work
  It's good to rely on one when the other is not going smoothly
- Having a balance will make you better at your work
- You don't want to look back at grad school and postdoc period and say that all you did was work
- No professional achievements can make up for a lack of a personal life

Sleep

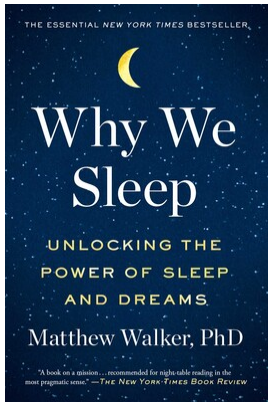


Image source: `https://www.simonandschuster.com/books/Why-We-Sleep`

- You need 7-9 hours of sleep each night. Very few can get by with less
- Lack of sleep severely affects your cognitive abilities
- I can rake leaves with less sleep
- I **cannot** do good research with less sleep
- It's better to take nap of 20 minutes, short enough to not make you groggy, and then get back to work

Other aspects of wellness

- Exercise, both cardio and strength training, is a important
- Nutrition is important
- Humans are social animals. Social life is important
- You want to be a in a good physical and mental shape that supports your work in years to come

Conclusions

Conclusions

- Many things in grad and postdoc stages are under your control, but not everything
- Regardless of your career trajectory, you will have valuable and intellectually stimulating experiences
- These are an important part of a good life
- Thank you and I'd love to answer questions