

# Comments on Graduate School

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Various things I learned over my career,  
which I wished I had known earlier.

# 0. You might have had lousy advising / mentoring

- To succeed, it helps if you understand how things work.
- At some point, I realized that I had nearly no advice on how to succeed in physics – occasionally I learned things by noticing what others did well or poorly
  - No family background of science / technology
  - Mainly absent undergraduate adviser – no explanation of what you should do as an undergraduate to position yourself for getting into graduate school
  - No formal programs / talks in graduate school, but learning on the job
  - No formal programs / talks as a postdoc, more learning on the job

# 1. Graduate Student Timeline

1. Apply, thinking of becoming a professional scientist / academic.
2. Year 1: Take more advanced courses ← You are here!
3. Year 2: Pass qualifier.\*
4. Full-time research.\*\*
5. Graduate, find postdoc or permanent job.\*\*\*

\*Most stressful – but all of these can be stressful.

\*\*Most fun!

\*\*\* Also potentially quite stressful.

## 2. You are working too much\*

- I recall from grad school lots of physics – working on equipment, running experiments (for months at a time), analyzing data, writing papers, writing proposals for new experiments, going to meetings, giving talks, ...

\* Probably. Almost certainly.

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- I recall from grad school lots of physics – working on equipment, running experiments (for months at a time), analyzing data, writing papers, writing proposals for new experiments, going to meetings, giving talks, ...
- I also recall lots of bike riding and gym time, hikes in the mountains and national parks, dinners in Santa Fe, “parties” with colleagues, ...
- Time off will improve your mental health and your overall productivity.
- In all my years at Rutgers, I only had one student / postdoc who took off too much time.

\* Probably. Almost certainly.

### 3. You might be wondering if you belong here

“Imposter syndrome”

<https://www.npr.org/2021/01/22/959656202/5-steps-to-shake-the-feeling-that-youre-an-impostor>

In 1978, as graduate students, Suzanne Imes and Pauline Rose Clance realized they both felt like they weren't good enough to be doing their graduate studies, and many of the female students they were teaching felt the exact same way...

- For most of you, more than ever in the past, you are among a group of really talented people.
- You are perhaps starting to look forward to the future, comparing yourselves to your fellow grad students and faculty, wondering how you can ever be that good.

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- You are perhaps starting to look forward to the future, comparing yourselves to your fellow grad students and faculty, wondering how you can ever be that good.
- A lot of us wondered that too when we were in graduate school.
- The game is fixed.

### 3. You might be wondering if you belong here

- Many skills contribute to your success as a professional academic / scientist, beyond the intuition and math skills that determine much of your success in classes
  - Recognizing interesting problems that you can contribute to
  - Ability to give good science talk / teach a class
  - People / “political” skills
  - Organizational skills
  - Coding skills
  - Self direction
  - Determination
  - ...



4. You are probably worried about  
your qualifier next fall

## 4. You are probably worried about your qualifier next fall

- “We” got really worried before our quals – about 50% pass rate then.
  - I picked a school with only written qual; yours is much more aligned to professional activities.
- I find I do better if I am a little worried, about giving a good talk, etc. But not too worried.
- So... worry appropriately.

## 4. You are probably worried about your qualifier next fall

- So... worry appropriately.
  - What is appropriate?
- Recent qual results:
  - 2021-2022: 11 passed, 3 to redo parts, 1 with course to pass, 3 delayed (2 w/ courses to pass)
  - 2020-2021: 19 passed, 2 left w/o taking qual
  - 2019-2020: 9 passed
  - 2018-2019: 21 passed, 1 left w/o taking qual
  - 2017-2018: 21 passed, 3 failed

# 5. Doing research

- Faculty generally want students who are productive and self-supervising, who quickly become equals and colleagues, rather than remaining someone who needs to be told what to do.
- In addition to being deeply focused on your particular research,
  - think about what is the next step or project.
  - is there something you learned / heard about from elsewhere that could help your research?
- Give talks on your work! One of the most important things we do – learn to do this well!
- Writing peer-reviewed papers is not a program requirement, but it is something that most faculty consider either very important or required for your professional success.

## 5.a Giving talks\*

- Take notes on what others do poorly. Do not imitate them.
- Be interested and excited in you talk. If not, why should your audience think it is interesting or exciting?
- Think about your audience; only give them the needed technical details, at an appropriate level
  - I only hear about 1 talk per decade that is too simple.
  - Almost no one can follow the algebra.
  - Your experimental details are very exciting to you.
- Avoid “you know”, “uhhhhh”, sighs, etc.
- Know what you talk about; arrange your talk to talk about things you know.
- There should be reminders on the slide for everything you want to say – but don’t read it.
- End seminars a couple minutes early.

\* This slide is too busy.



## 5.b A pretty slide

- Your beautiful slide transitions are distracting.
- Your fonts are too small.
- Your figures are too small, and there are too many on the page.
- Your lovely slide background adds noise and confusion.
- The contrast is poor.
- Your margins are too narrow.
- At least you did not put every word in a different color / font to emphasize everything.
- Did I provide references for these figures? None are my work.
- Some rooms have small screens.
- Green may not project well.



Hard to see postage stamps, limit to 1-2 figures per slide.



## 6. Getting ready to be hired (for a postdoc position)

- Faculty often hire postdocs to support a particular technical project, rather than trying to find the “best” person
  - But some of us think: this is a chance to hire someone who will work with / for us for decades
- You are the product. What does your customer want?
  - Explain why you want the position, but also how hiring you benefits them.
- Don't take the last plane flight the night before.
- Learn from the mistakes of others.

## 7. Things that can get you into trouble

- Academic integrity violations.
- Being unprofessional / abusive / harassing.
- Being irresponsible – in your classes or as a TA or ...



Thank you for listening

Thank you