

Thoughts on PhD Applications

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What is this talk about?

- General advice on applications to PhD programs
- Asking for letters, selecting programs, adviser search, fellowships...

Let's keep it interactive: stop me anytime or ask questions via chat

Disclaimer

- Advice = opinion informed by apps, talking to colleagues, and,
- Mor Harchol-Balter's essay: <https://www.cs.cmu.edu/~harchol/gradschooltalk.pdf>
- Advice is cheap, influenced by my context and your mileage may vary.

A little about PhD

It is the best of times; it is the worst of times.

- A **long** (~5 years), **in-depth** exploration of a research area.
- **Classes** you take **do not matter***.
- One-one **relationship with adviser**(s) is central.
- Periods of **frustration** and great joy.
- Fully funded** – by RAs, TAs and fellowships.
- Post-PhD career: research / teaching in academia / industry.
- *The experience, the triumphs, the failures are different for different people.*
- Your research and happiness both matter.

*except for clearing the requirements of the program .

**if not, do not join the program.

- I got a Bachelor's degree in Electrical Engineering.
- Did a little bit (but not much) of research during my undergrad.
- Had a paper but not exactly in my target area (theory).
- Applied to 6 places, got offers from 2, went to UT Austin.
- A Simons fellowship helped me in the last couple of years of Ph.D.
- Loved my PhD days, my adviser had to sort of force me to graduate.

WAY more competitive now.

In 2021, I won't get into any of those 6 places.

Application Components

- Transcript -- Grades, Classes (Your GPA in math/CS classes matters)
- GRE/TOEFL scores
- Personal Statement (this is a *research* statement...)
- Research Experience (likely the most important component)
- Letters of Recommendations
- Relevant Awards, Extracurricular Activities (e.g., TAing...)

Application Components

General Advice

- Admissions committees decide based on your potential to do great research and fit with the advising capacity of the department.
- This process is **inherently noisy and very competitive** – apply broadly.
- You have few “actionable” steps by the time you come to sending your applications...just put your best foot forward.

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Letters of Recommendation

Admissions committees want demonstrated ability to do research:

- come up with tangible new ideas
- do a “local search” around ideas to get to solutions
- write ideas clearly and completely.

This appears (and perhaps is) a little circular...but that is where we are.

Letters of Recommendation

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The heaviest component of your app that evidences this is:

- your letters of recommendation.

Do I have to have a paper? How many?

- having published papers can help.
- one vs multiple doesn't make a huge difference

so long as you contributed some key idea(s) and did most of the work.

Who should I get letters from?

Impactful letters are from those who you did substantial research with...

- must talk of your original, tangible contributions to the work.
- letters from professors in the area you apply matter the most.
- don't ask PhD students / postdocs,
- ask them to “co-write” with the professor if needed
- **I've seen effective letters with quotes from Phd students / postdocs**

Committees read letters carefully (and read between lines)

- if your main research adviser doesn't write a letter – **red** flag!
- if they talk only about the work but not what you did – **red** flag!

Who should I get letters from?

Letters from those who you did not do research with...

- DWIC (did-well-in-class) letters amount to zero.
- Letter about your TAing can help a little.
- Letters from industry can help demonstrate "coding skills"
- Letters about science communication / outreach help fellowship apps

How should I ask for a letter?

- Be direct, send CV.
- Should be clear what the professor is going to write about (can remind)
- Letter writers may want to read your research statement.
- Ask early! Even those enthusiastic about you can be insanely busy.
- Unenthusiastic letters hurt your app.
- Letters from “famous” people help only if they know your work well.

Be tactful

- Allow the professor an “out”:
- *“I understand you may be busy, and may not have time to write a letter, but...”*
- Can say: *“Would you be able to write me a strong letter.”*
- Gauge the strength: ask recommendations for programs to apply to...

high-level bulleted list of relevant experience / accomplishments.

- Find sample CVs: online, friends, PhD students,...
- Publications / preprints with links (mention what YOU did)
- Fellowships you might have already received.
- Awards like math / physics / informatics Olympiads.
- TA experience if any (or leading reading groups etc.)
- Science Communication / Outreach activities.

Phone Interviews

Occasionally, you might get “phone interviewed”.

- Can you communicate your research etc. well?
- Your grasp of your research project / paper.
- Your contributions to your paper
- Can you identify key ideas? Are you aware of the context?
- Finding “explanation” for weak points of your app (grades, etc.)
- Almost never a grilling, usually just a casual conversation.
- You might want to ask some good questions at the end...

Contacting Faculty

You may want to write to relevant faculty members about your app.

- You may not get a response.
- Usually doesn't help your application much...

Deciding between offers

How do you decide between offers? Go to open houses, even if virtually.

Some considerations

Adviser, type of funding, placement, dept. atmosphere, city, 2-body issues, ..

About program:

- How many semesters will you have to TA? (e.g., at CMU, = 2)
- How many classes do you have to take? Do you have options?
- How many years to graduation, typically?
- When are you assigned an adviser? Can you switch?

About adviser:

- Who are the people in your research area?
- Who among them are taking students (ask explicitly!)?
- Are their past students doing well? Are their present students happy?

Deciding between offers

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About atmosphere:

- Are there multiple current students in your area?
- Are they happy?
- Do they work together on student-only projects?
- Do they collaborate across areas?
- Do senior students help those starting out?

About city:

- Where/how-far do students live? Places to eat/party etc.?
- Weather??

Deciding between offers

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Some Tips

- Potential adviser = most important component of your decision.
- Meet all your potential advisers – find out their advising style, current research direction and cross-check with their current students.
- Discuss with mentor/adviser. Can give inside scoop at times.
- Rankings are only mildly useful (csrankings.org)
 - can give info of “research activity”, hierarchy not very meaningful.
- Research interests of faculty change – ask, do due diligence.
- Ask about co-advising if that makes sense.

Fellowships

- Offered by your PhD program or an “outside” body.
- Funds are “managed” by your PhD institution.
- Covers your stipend, tuition, research expenses for one or more years.

Why apply?

- An honor that appears on your CV.
- Don't have to worry if your potential adviser has funding for you.
- Schools like applicants who've applied for fellowships.
- If you are good enough to get into good PhD programs, then you are good candidates for such fellowships.

Some general advice

- See sample statements etc. from those who already got it.
- Ask your adviser / friends for help in reading / comments etc.

Some Fellowships to Keep in Mind

Open to first- or second-year PhD students:

- **NSF Graduate Research Fellowship:** 3 years of tuition, other expenses
- **NDSEG Graduate Research Fellowship:** 3 years of tuition
- **Hertz Fellowship:** Slightly more competitive, 5 years of tuition

All three open only to US Citizens / Permanent Residents

Open to third+ year PhD students:

- **Microsoft Research Fellowship:** 2 years of tuition, other expenses
- **Siebel Scholars Program:** Final year students only.
- **NVIDIA, Facebook, Apple, Google, IBM,...**

Some Fellowships to Keep in Mind

Focused on Under-represented Minorities:

- **Microsoft Ada Lovelace Fellowship:** 3 years of tuition, other expenses
- **Google Women Techmakers Scholarship:** \$10K
- **Born Seekers Fellowship:** 3 min video, \$20K
- **Microsoft Research Dissertation Grant Program**
- **ACM SIGHPC / Intel Computational and Data Science Fellowship**
- **Microsoft Research Dissertation Grant Program:**
- **Society of Women Engineers Fellowship Programs**

Many online resources to find out

My information is all from: <https://www.cs.cmu.edu/~gradfellowships/>

NSF GRFP Info Office Hours: 12pm EST, August 11th

Students should RSVP: <https://lu.ma/grfpinfoaug>.

Some other issues...

What if I don't have a research experience?

Apply for summer REUs.

Apply for "research" Master's programs (often funded).

<https://www.cs.princeton.edu/~smattw/masters/masters.html>

What if my undergrad is in a different field?

Research experience is the key component. Research Master's?

Questions?