Code to PhD - April Panel “Demystifying Computer Science Research Experiences”

Code to PhD’s April 2025 panel is *“Demystifying Computer Science Research Experiences.”* Having some research experience is critical to a successful PhD application, but these opportunities are hard to find and navigate. Our panelists will be discussing how they found research opportunities, what to expect from research, how to communicate with professors, and will have time at the end for questions from the audience as well.

Who are we? Code To PhD (codetophd.github.io) is a completely *student-run volunteer* initiative of CS PhD students across the U.S. We organize office hours, panels, and a graduate application support program to help answer applicants' questions about CS-related PhD programs and help them find quality mentorship.

Interested in our future events? Stay in touch by filling out this link and add our google calendar.

Time:

📅 Tuesday, April 29th,
8-9 PM ET,
7-8 PM CT,
5-6 PM PT.

📍 Zoom (Link)
Meeting ID: 959 6513 2169
Passcode: 556741

📌 **Submit your questions here**

(If you cannot click, go here or go to https://shorturl.at/938ND)

Outline:

- Obtaining research opportunities inside and outside of your institution
  - Where can students find official research opportunities?
    - As an international student?
  - How should students connect with professors and/or PhD students?
  - What makes a successful research cold email?
- Undergraduate research experiences and expectations
  - What can students expect to gain from a research experience?
  - What are some common hardships/roadblocks faced during these experiences?
  - What are some guidelines for communicating with a PI or mentor?
- Audience Q&A

Panel Notes:

Obtaining research opportunities inside and outside of your institution

- **Where can students find official research opportunities?**
    - Some schools have official listings: look for undergraduate research ambassadors/programs, or major/department advisors.
    - **What about as an international student?**
        - Unfortunately, most of the US summer REUs are geared towards us citizens.
        - One international student panelist applied to a summer program that only supported permanent residents, but with some correspondence was allowed to participate (but was not paid for it).
        - At USC, ICT and ISI are both institutes that have research intern programs that are student-friendly.
        - Our panelist Krisha compiled a list of opportunities!
- **How should students reach out to and connect with professors?**
    - Professors are busy - it can often help to reach out to PhD students as well.
    - New professors are often more likely to be looking for help, and may have more time to help.
    - If you like the content of a course, attend the professor's office hours! Office hours are a great place to make a connection with a professor. Take this chance to show your engagement and interest in the material, and at the end of the course, even if they don't have a research opportunity for you they may know someone in the field who does!
        - This can be true about PhD students as well!
    - Cold-emails are good but professors get many so it's hard to stand out: read below for tips!
- **What makes a successful research cold email?**
    - Try not to use a template or talk only about yourself! Professors can tell if you're using a template.
    - Demonstrate that you are actually interested in the professor's research, and (if possible) how your personal experience ties to any of their publications or current research directions.
        - Flattery about a recent paper they've published can go a long way, especially because it also shows you're actually familiar with their work.
            - Just read the paper and tell them what you think! You don't need to have a perfectly crafted response or incredibly deep insight - your genuine reaction/response is valuable too.
    - Include a CV!
    - Sometimes professors have other requirements listed on their website, make sure to look before you send an email
    - Don't pretend to be interested in something that you're not!

    - Be short and to the point - say who you are, why you're interested, and provide an action item: do you want to schedule a short meeting to discuss? Attend their lab meetings? Something else?
    - You can use ChatGPT to write it, but be really sure to make revisions - people can tell if it's AI-generated, which will leave a bad first impression. Writing the letter yourself and using an LLM to only edit is probably safer.
- **Attending Lab Meetings**
    - Attending a research lab's lab meetings are a great low-lift way to get involved in research - it lets you see the cadence of projects, see professor advising style and expectations, and understand what it would be like to work in the lab.
    - Easier to ask of professors than actually asking for research, but can be a foot in the door.
    - It's okay to not understand everything at first: don't be afraid to show up, and you should take the time to understand things and ask questions as needed
        - Be mindful of not taking up too much of their time though - you can and should ask some questions, but it's also worth spending time outside of the meeting to look up concepts/papers you're not familiar with

Undergraduate research experiences and expectations

- **What's one piece of advice you wish you knew when you started doing research in undergrad?**
    - Being thorough is better than being fast.
        - Of course being efficient is good, but if you are doing work that trades off scientific validity for speed it's only hurting your research and your learning.
    - Try to get involved in the paper-writing process!
        - Faculty advice: "It takes 3-4 papers to know how to write a paper properly."
        - There are a lot of tools and workflow things that are good to learn from someone else with experience (e.g. LaTeX, cmd environments, division of work).
            - Doubly productive idea: You can practice making your CV in LaTeX! It's good practice, plus it'll look good.
    - Don't be afraid to explore other research areas beyond the one you're currently working in!
        - Before you're in a PhD, you're not committed to any particular area, so it's the right time to explore.
        - You'll work best when it's something you're interested in!
        - Six months doing a project you love will sound a lot better on an application than a year doing a project you don't.
        - Reading a lot of papers is helpful, and a really simple foot in the door is to cold email a professor asking for recommendations about what to read to get to know the field.

    - It’s okay to not know everything!
        - Don’t beat yourself up about not knowing things from the start - a big part of research is learning!
    - If you can scope the project and the PI’s expectations for you, that can help everything to run smoothly.
        - Remember that you’re only going to be there a finite amount of time and have other responsibilities. For example, if you’re in your last year, you might want to prioritize a project that is closer to being finished.
    - Remember that these research experiences are not a perfect representation of the PhD experience!
        - If you have a bad experience, that doesn’t mean you can’t do research or a PhD - use these chances to help you learn about what kinds of research and mentorship style will help you work best.
- **What makes research different from coursework?**
    - Research is messy!
        - Research questions can be very broad, so there may be a lot of avenues to proceed in and a lot of ways to answer them.
        - Things aren’t going to work out the first time around! Don’t be scared to try things. Make sure you’re learning from things that don’t go how you expect though!
        - You’ll spend a ton of time rethinking and revisiting initial assumptions or ideas. This also means you may have to scrap a lot of work or change direction often.
            - All these changes may feel like setbacks, but it’s more helpful to think of it like exploring different states/domains to make sure you have found the best way forward.
            - You’ll need some tenacity and flexibility to be successful!
            - These times can definitely feel demoralizing, but it’s definitely a normal part of the process.
            - If it's frustrating, it can often be good to talk to professors/friends/PhD students who have experienced this too!
        - If you have a new idea, you can try something small to see if it works! You have a lot of time to build and iterate, and starting with a small proof of concept will make sure you’re not chasing a dead end and give you clarity on how to fully pursue the idea.
    - Unlike courses, the feedback you’ll get from research and your advisor is a lot less structured.
        - Some advisors will not have time to give much fine-grained feedback, so you’ll need to figure out the best use of both of your time.
        - You’ll have to figure out what support you need and who can help you with that (you can often ask other people in the lab, for example, rather than the professor).
- **What do you appreciate in an undergrad researcher?**
    - Shows up, shows interest, asks good questions.

        - Sometimes researchers can get too stuck in the weeds, so having an outsider with interest can be really helpful.
    - Maintains notes about their own work, deliverables, action items
    - Communicates when they are stuck, and asks questions to try to understand.
    - People skills from other experiences (leadership in a club, working in industry, etc) on how to work in projects can apply well to research too!
        - For example:
            - Being detail-oriented and keeping clean organized notes
            - Communicating concisely and precisely with exactly what you need
    - Knows how much they can do/commit within a time frame, and follow through - better to be honest and reliable than to overpromise and underdeliver.
        - Unreliable help can often be more harmful to a project and its timetable than no help.
        - People understand that you have other priorities - it's okay to say if you're feeling overwhelmed for a time frame!

Helpful Readings:

Tips for Success as a New Researcher by Alex Tamkin

Ph.D. Students Must Break Away From Undergraduate Mentality | July 2013 | Communications of the ACM

Michael Bernstein's CS 197 Slides (Stanford's course on Computer Science Research)

The classic "You and Your Research" essay by Richard Hamming

Research as a Stochastic Decision Process - Jacob Steinhardt

A great list of other tips and resources by Neeldhara Misra and Shashank Srikant