Mentoring Statement

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I greatly enjoy the rewards of mentoring and teaching students. For me, the rewards consist of two significant parts: (1) the pride and fulfillment when my mentored students grow into independent researchers and my teaching helps students carry out their studies smoothly, and (2) the interesting future research directions inspired or confirmed during mentoring and teaching. Driven by these rewards, I have mentored four undergraduates and five junior PhD students in their research, and taught as a teaching assistant and as a small-group "supervisor".

Mentoring Experience

Mentoring: During the summers of 2022 and 2023, I mentored four undergraduate students for research internships at Harvard: three came from non-US schools, with two being in the US for the first time. To help the students get familiar with systems research (and life in the US), I held weekly meetings with each student, talking about not only research but also various cultural acclimation challenges that I had experienced during my own PhD. Among the four undergraduates, one (Zezhou Wang) published an NSDI'23 paper with me and went to University of Washington (UW) as a system PhD; two of them (Xingyu Xiang and Matt Kiley) co-authored an NSDI'24 submission with me, and are about to apply for system PhDs as well as the rest one. Such mentoring brings me enormous pride, e.g., seeing Zezhou gets into the UW PhD program. It inspires my future research—working with Zezhou on eBPF sparks two follow-up projects: one has become the NSDI'24 submission, and another is showing promising results. I also consistently (monthly) shared my research and internship experiences with five junior PhD students over the past two years. All of them are non-native English speakers and are non-white.

Occasionally, I received email inquiries from PhDs who are in other research areas or from underrepresented minorities; I often scheduled one-to-one meetings to learn about their difficulties or puzzles. For example, Jessica Quaye, originally from the Republic of Ghana in West Africa, was interested in system research though she is in an architecture research group. I had long meetings with her both in person and online, and introduced her to my co-advisor Minlan Yu to identify potential opportunities for collaboration and advising.

Besides one-to-one mentoring, I also participate in one-to-many panels to share my research experience with junior system PhDs. For example, I was a panelist for the "Getting started with systems research" panel [1] organized by Students@Systems in 2022. The video recording for the panel is freely accessible online to help systems PhD students regardless of their university or physical location.

Teaching: I make an explicit effort to help students with little prior exposure to computer science, and I try to promote inclusiveness during teaching. When I was the small-group "supervisor" for the Algorithm Design and Analysis course at Peking University, I realized that some students lacked high school experience with programming contests; these students often found it hard to catch up with peers who did have this experience. To help them, I wrote step-by-step, thorough explanations for the algorithms discussed in class, and I handed out these explanations after class. When TA'ing a course at Harvard University, I answered all questions that appeared in the Ed forum, no matter whether the questions were anonymous or not, to keep everyone's learning progress on track.

Talking: Academic networking (e.g., talking to peer researchers at conferences) is crucial to the success of a PhD student. However, junior graduate students are often afraid of professional networking, e.g., due to fears about having little experience or being from less prodigious schools. However, I vividly remember how, at a conference, James Mickens (one of my co-advisers) stood in front of the door of a breakout room and publicly said "I am James, a Professor at Harvard, and you are welcome to talk to me!" This event inspired me to proactively interact with junior students during conferences, to talk about mutual research interests and identify potential collaboration opportunities. I also like to encourage poster presenters for their research, especially when there are no people who are currently engaging with their posters.

I also talk to undergraduates and high school students regarding computer science research. For example, in October 2022, I gave a research talk at a Harvard AM/CS/EE PhD recruitment event (accessible to all US universities) which targeted students "that hold membership in an underrepresented and/or historically minoritized group in STEM." In 2022, I also gave talks at the Harvard SEAS Undergraduate Research Open House and the SEAS Research Showcase, targeting Harvard freshman and sophomore undergraduates. These talks were well-received, with several undergraduates

in the audience later contacting my research lab to learn more about participation opportunities; I still mentor one of these undergraduates. Going back to the time when I was an undergraduate, I had the privilege to talk to juniors in my alma mater high school on why a computer science major is a good college major. Some of these students still contact me for advice.

Mentoring Philosophy

My mentoring philosophy has been on three parts:

- *Building students' confidence.* It is well-known that confidence is crucial for students, but how to build their confidence is challenging. One way I find helpful is respecting students' thoughts by giving them enough freedom to try their thoughts while keeping an eye on the big agendas and goals. Another way is connecting them to experts upon entering a new field, avoiding the steep learning curves overwhelming or destroying their confidence. The experts, who could be the mentors themselves, would point out the proper materials or steps for quick ramp-ups.
- *Encouraging students to form their own opinions and tastes.* I encourage and anticipate students to form their own opinions about systems, develop their own tastes on promising research problems, and stick with them. I do not worry too much about if students' opinions/tastes are wrong, as once they go deep into specific directions they believe, they will learn extensive experiences and insights to refine their previous opinions/tastes.
- *Collaborating widely.* Wide collaboration across industry and academia is especially beneficial for practical system research, and mentors should play the important role in connecting students with proper researchers in the wild. For example, my fault-tolerant far memory project Carbink was collaborated with Google via my co-advisor's connections, and then inspired by Google's desire for high availability. However, collaborating with industry usually requires teasing out real research challenges, while not being misled by massive engineering details; advisors should leverage their experience to help students (especially junior PhDs) navigate efficiently in this space. For another example, my eBPF-for-Paxos project Electrode would not be possible without the collaboration with Sowmya Dharanipragada who is a distributed system PhD at Cornell. Going forward, I would like to expand collaborations to theory, machine learning, architecture, programming languages, etc.

References

[1] Student@Systems. A panel on "Getting started with systems research". https://students-at-systems.org/pages/events/getting-started-with-systems-research.html.