I have had the opportunity to teach several times during my academic career, and it has been formative in distilling my desire to become a professor. As an undergraduate at Penn, I worked as a calculus tutor, as a teaching assistant for *Integral Calculus* and *Multivariate Calculus* in the math department, and as a teaching assistant for the lab-based *Introduction to Electrical and Systems Engineering* and *Digital Audio Basics*. At Berkeley, I worked as a graduate student instructor (GSI) for the upper division *Introduction to Machine Learning* and graduate level *Statistical Machine Learning* and am currently working on curriculum development for a new *EECS Anti-Racism and Social Justice* course which will launch in the spring. I have also taught middle and high schoolers as an Electrical Engineering TA at Johns Hopkins Center for Talented Youth (CTY) summer camp.

Teaching philosophy

Fundamentals as building blocks. It is important that students have a strong grasp of the fundamental concepts underlying complex ideas. When I taught *Introduction to Machine Learning*, I often found that by explicitly pointing out the use of simple techniques, I was able to reinforce key ideas while clearing up confusion. As a student wrote in my teaching review, *"I really appreciated that she broke down problems into really simple parts and even went through the explanations of the simple parts."* Fluently connecting fundamentals to advanced ideas is important in classes like machine learning, which studies advanced concepts in statistics and optimization and relies on a background of linear algebra, calculus, and probability. These connections are similarly important in lower division classes to motivate deep understanding; by emphasizing how concepts in *Multivariate Calculus* are building blocks, I won a *Good Teaching Award*.

Open communication and feedback. Towards the goal of ensuring that students understand fundamental concepts, I aim to foster a classroom in which there are no stupid questions. As one of my students wrote, *"I felt that Sarah did not judge when I asked "stupid" questions, and made sure that I fully understood everything she was trying to explain."* Cultivating judgment-free dialog is an important skill that I first learned tutoring students in calculus. I have observed that insecurities and feelings of inadequacy are pronounced in mathematical settings, and in contrast students tend to be much more open to expressing their confusion and asking questions in lab settings; this insight motivates me to incorporate active learning techniques. It is also important to provide a variety of mechanisms for feedback, including periodic anonymous surveys.

Flexibility to learning styles. Students learn in different ways. I have observed this firsthand: from the challenge of handling the differing knowledge bases of CTY students aged twelve to seventeen to the contrast between labwork and exams. For this reason, I'm excited to develop curricula in support of different learning styles, from using visual aids in lecture to engaging with real-world examples in problem sets. Flexibility also means allowing students to demonstrate their achievements in different ways. I plan to structure my courses thoughtfully, so that students can choose to learn as best works for them, a strategy which I hope will mitigate bias against students with nontraditional backgrounds. I also view course structure as a way to set incentives and affect the collective experience: I've seen how mandatory quizzes lead to fuller and more productive participation in calculus recitations. For this reason, I plan to assign modest credit to activities that contribute to the collective learning experience, like creating a course wiki and participating in constructive discussion on platforms like Piazza.

Diversity and interdisciplinarity. I value how diversity in the classroom encourages us to think about problems from different perspectives. The importance of viewing problems through multiple lenses is increasingly clear, with the growing recognition of societal consequences of

modern technology and calls for a more robust and integrated treatment of ethics. As a GSI, I developed new course materials on fairness in machine learning, and grappled with the interdisciplinary question of clarifying technical formulations with respect to social contexts. Motivated by such challenges, I co-founded *Graduates for Engaged and Extended Scholarship in computing and Engineering* (GEESE), which aims to give graduate students a constructive place to reflect on issues of society and technology. We have been funded to study how emerging AI research on topics such as fairness, safety, and resiliency can be used to develop sociotechnical pedagogy. Cultivating an environment in which a diverse student body can flourish requires purposeful work. This semester I am working on curriculum development for a new *EECS Anti-Racism and Social Justice* course which aims provide students with historical and critical perspectives.

Courses

I am qualified to teach courses on foundational topics like probability, signal processing, optimization, feedback control, and dynamical systems at both the undergraduate and graduate level. I am also interested in teaching advanced topics like machine learning, optimal and robust control, and high dimensional statistics. I would also be happy to teach and contribute to curriculum development for introductory courses. Especially in undergraduate lower division courses, I would be eager to incorporate ethics modules and sociotechnical lenses.

If given the chance, my larger ambitions include establishing a project-based computing for social good course, based on partnerships with community organizations. I would like to design a graduate course on safe learning in feedback control, covering approaches based on dissipativity, receding horizon, and robust control. I would also like to design a research seminar for graduate students, to connect technical ideas emerging from research in AI Safety, Fairness in Machine Learning, and Human-in-the-Loop Cyber-Physical Systems with their sociotechnical motivations.

Mentoring and Outreach

I have been lucky to be supported by great mentors throughout my academic career, something I hope to pay forward. At Berkeley, I have worked closely on research projects with undergraduates and younger graduate students, many of whom are from underrepresented groups. I also participated in the Berkeley AI Research (BAIR) undergraduate mentoring program. These experiences will inform my approach to advising: I will to cultivate a culture of mentorship within my research group and open my lab to undergraduates, especially those from underrepresented backgrounds. I also hope to support department programs, since in my experience, even casual mentoring structures provided organizations like Women in Computer Science and Electrical Engineering (WICSE) are am important component of a supporting environment.

Through volunteer work, my mentorship experience extends beyond academia and into public schools in the East Bay and West Philadelphia. I have mentored middle schoolers on their science projects, taught math through weekly one-on-one tutoring, and introduced elementary schoolers to the joys of electricity and magnetism as part of outreach sessions. This fall, I am participating in a remote tutoring program for high school students that are navigating online learning. These experiences have highlighted to me the importance of lasting engagement to achieve goals of inclusion, equity, and justice. To continue this record of engagement as a professor, I hope to support student-led volunteer initiatives for K-12 outreach, and maintain relationships with community organizations doing important work.