

Teaching Statement

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I am deeply committed to fostering a dynamic and inclusive learning environment. My journey toward becoming a tenure-track faculty member is fueled by a passion for teaching and research mentorship, all of which are integral to my philosophy of education.

Although I haven't held an official position as a teaching assistant, I was actively involved in research mentorship and teaching junior students. My experience as a **research supervisor** in the Multidisciplinary Design Program, which is an undergraduate research project at University of Michigan, has been a cornerstone of my academic career. During two semesters, I led a team of four undergraduate students in exploring cutting-edge cybersecurity research problems on cloud platforms and manufacturing systems. This role not only honed my leadership skills but also deepened my understanding of the nuances involved in guiding a diverse team. Additionally, I was a **research mentor** of two undergraduate students and two master's students throughout my Ph.D. tenure, which was a particularly rewarding experience. I provided them with opportunities to contribute to ongoing projects and supported their exploration of personal research interests. My experience leading discussions in an autonomous vehicle research reading group further solidified my commitment to collaborative learning and research dissemination.

In the following two sections, I will elaborate on my philosophy of teaching and research mentorship.

1 Teaching Philosophy

High-level pictures and inspiring questions go first. In my teaching approach, I emphasize starting with a high-level overview followed by inspiring questions to pique student interest and lay a foundational understanding of the subject. During my tenure as a research supervisor in the Multidisciplinary Design Program at the University of Michigan, I applied this philosophy while guiding undergraduates to learn fundamentals about cybersecurity concepts. Though students are often assigned a specific title of research directions, I choose to step back and first educate them on the overall security risks in the targeted systems. After understanding the background, my students and I together brainstormed how the potential attackers could leverage the security risks. I found that my students were more engaged in the discussion after getting familiar with the high-level picture.

Using concrete and interactive examples in teaching. My teaching philosophy strongly emphasizes the use of concrete examples to elucidate complex concepts, making them more accessible and relatable to students. This approach has consistently proven to be effective in enhancing students' understanding and retention of material. A standout instance of this approach was when I taught the SSL/TLS protocol to undergraduate students. Recognizing the abstract nature of network security concepts, I sought to provide a tangible learning experience. To achieve this, I set up a small, functional website and walked the students through the process of securing it with SSL/TLS certificates. Using this concrete example significantly improved student engagement. They were more involved in the learning process and showed keen interest in the practical aspects of the technology. This method also links the abstract concepts to their real-world living experiences, enhancing their comprehension of the material.

Supporting students in life challenges. A critical aspect of my teaching philosophy is to support students through their life challenges. Recognizing that personal issues can significantly impact academic performance, I prioritize creating a supportive and understanding environment where students feel comfortable discussing their struggles. I practice this philosophy through my teaching experiences, being a good listener of the students' difficulties and offering help.

Teaching plan. In my future role as a tenure-track assistant professor, I am prepared to offer a diverse range of courses. My teaching portfolio includes introductory undergraduate courses like programming, data structures, software engineering, and computer security, designed to establish a solid foundation in these key

areas. For graduate students, I plan to teach more specialized courses such as program analysis and software security, delving into complex concepts and advanced methodologies. Additionally, I am enthusiastic about leading research-oriented courses that integrate emerging topics at the intersection of academia and industry, like autonomous driving, thus providing students with insights into cutting-edge developments and real-world applications in the field.

2 Research Mentorship

Cultivating a research mindset. A fundamental part of my research mentorship approach is to cultivate a research mindset among students, emphasizing the importance of understanding the broader context and significance of their work before delving into the specifics. To implement this philosophy, I immerse students in the larger context of the research question, such as “what the research problem is” and “why the problem is important” at the beginning of research projects. This process entails a deep dive into the rationale underlying the research question and grasping its impact within the field. Such exploration aids students not only in grasping the project’s objectives but also in refining their research taste. I firmly believe that nurturing such a research mindset is a pivotal aspect of my role as a research mentor.

Matching student background and interest with the research. In my approach to research mentorship, a key focus is on tailoring research projects to align with the individual backgrounds and needs of each student. This personalized strategy ensures that students are both challenged and engaged, fostering a productive and enriching research environment. My strategy involves initially conducting one-on-one meetings with students to understand their academic backgrounds, skill sets, and research interests. For beginners in a research domain, I provide a comprehensive set of learning materials and exercises to facilitate a foundational understanding. Regular follow-ups are conducted to assess their learning progress and address any challenges. For students with a strong background and self-motivation, I engage in collaborative brainstorming to identify and develop research topics that align with their interests and expertise. This approach ensures a tailored and effective mentorship experience, catering to the diverse needs and strengths of each student.

Encouraging students to learn from research failures. Emphasizing the educational value of setbacks and failures is a crucial aspect of my approach to research mentorship. I believe that navigating through failures is not only integral to the research process but also vital for the personal and professional growth of students. Throughout my experience in research mentorship, I have observed that some students experience anxiety over mistakes or failures in their research endeavors, often hesitating to share these experiences. In such scenarios, my approach involves normalizing the occurrence of failures in research. I create an environment where students feel comfortable discussing their setbacks without fear of judgment. For instance, by sharing examples from my own research experiences, where persistence led to breakthroughs after initial failures, I inspire students to adopt a similar attitude. After that, I provide constructive feedback and guidance to help students diagnose the problem and discuss potential strategies for future attempts. The objective is to transform these setbacks into learning opportunities that contribute to a deeper understanding of the research process.

Future mentorship. In addition to my current research mentorship practices, I plan to further enhance the support I offer to students in their academic and professional endeavors. This involves providing tailored advice on career options, assisting in the development of professional skills, and helping students build a network in the academic and industry communities.