

I love traveling and teaching is like being a tour guide to me - guiding learners around the nooks and crannies of the world of Computer Science as I have explored them throughout my career. It is also an instrument that enables us to distill and share the knowledge we accrue when conducting research. For these reasons I am passionate about teaching and I have been involved in teaching in some form or other for a long time. My teaching philosophy is to explain the underlying concepts to the students clearly, advance the learning process through encouraging students to ask questions, inspiring critical thinking and motivating a culture of collaborative learning. I also encourage students to tackle new problems and try to create opportunities for them to become involved in active research. As a research mentor I try to foster a sense of ownership among the students for the research component they are working on. I also promote the collaborative nature of research by encouraging them to help each other and discuss ideas in groups.

Teaching Experiences. My early experiences in teaching began with home tutoring school-going children during my undergraduate days. This helped me learn the process of explaining complex concepts in simple words. Later, during my Masters' studies at Jadavpur University in India I helped conducting two lab courses with approximately 50 students each class. I arranged tutorial sessions, helped students with their assignments and graded homeworks for Systems Programming Lab and Distributed Computing Lab as a graduate teaching assistant. I strived to be available to students for their queries. I held regular office hours and responded promptly to student queries through emails during these appointments. These early experiences at teaching helped me later during my employment with TCS Research in India in training and mentoring new employees in learning new programming languages and tools to solve challenging problems.

More recently during my doctoral studies at the University of Illinois Urbana-Champaign, I came across numerous opportunities to teach - I worked as a teaching assistant for both undergraduate and graduate level courses for two semesters and delivered invited guest lectures. I spent the Fall 2019 semester as a teaching assistant for Computer Security I. This course teaches the security mindset and introduces the principles and practices of computer security as applied to software, host systems, and networks. This course gave me the opportunity to lead discussion sessions, host office hours, design examination questionnaires and assignments, and grade students' work. During the discussion sessions, as part of the course material I discussed the recent research and discoveries in the field of system security including my own research in that field. This led to thoughtful exchange of ideas among the students and kindled research questions among them. Some of these students later became involved as undergraduate security researchers at the university.

I spent the Spring 2020 semester as a teaching assistant for the Advanced Computer Security course, which is a graduate level research-based course. In this course students read about recent and seminal works in the field while also completing an original research project. During this course, I had the opportunity to help students to critically study existing research papers and to explain the merits and pitfalls of published works succinctly. I evaluated student performance on reviewing research papers and observed a steady improvement in their critical thinking abilities during the course of the class. The Covid pandemic started midway this course suspending the in-person classes and I quickly adapted to remote learning methods to continue assisting in teaching the course. I also delivered multiple lectures in this class to talk about the recent advancements in the security of serverless platforms. Three students in the class got interested in this topic and did their research projects for the class on serverless security. I mentored one of these students Arnav Sankaran in streamlining their research efforts and publishing the findings in a competitive security research conference (ACSAC'20). Arnav went on to working as a core developer in Hudson River Trading.

I have also enjoyed several opportunities of delivering guest lectures at the university. I delivered

an invited talk on “Defending against Emerging Threats in Serverless Computing” at a seminar as part of the prestigious Illinois Cyber Security Scholar Program offered by the Information Trust Institute¹ at UIUC. I have also taken part in a panel discussing “Why did you decide to go to Graduate School and what did you wish you knew when applying” as part of the Road Map to Graduate School course offered to UIUC engineering undergraduates. I utilized these lectures to interact with undergraduate students and inspire them into the world of security research. I was also invited to talk on the topic of “Writing in Engineering and Physical Sciences” as part of the Doctoral Research Support Program at the university. Writing is an integral part of the journey of a graduate student and I was able to help doctoral students in early stages of their PhD with techniques and tips of effective academic writing.

Research Mentoring. Along with the described teaching efforts above, I have also mentored undergraduate and graduate students in conducting security research. I mentored two undergraduate students Siddharth Agarwal and Alec Liv-Feyman as part of the Promoting Undergraduate Research in Engineering program² at University of Illinois Urbana-Champaign. I helped them with preliminary ideas on how research is conducted in the domain of security. Instead of a one-way communication of just telling them what to do, I spend time with students in formulating a research problem together and in discussing several solutions and the pros and cons for each of those to figure out the best path forward. They worked on building a website to conduct an online user study to evaluate privacy and security risks in smart homes. In the process they learnt about research surveys, website building and data visualization. While working with them I found out that they needed the most support learning to communicate their research effectively, and I helped them in developing and practicing research presentation skills. At the end of the research program, they successfully presented their research challenges and preliminary results at a poster presentation at the university. Currently Siddharth is pursuing a graduate degree in Computer Engineering at University of Illinois and Alec is working as an analyst in Chicago. I mentored Prabuddha Kumar, a graduate student from Stony Brook University in a research collaboration and helped them in understanding the serverless platform security research space and guided them in learning research paper writing techniques. We co-authored a paper on serverless platform security that was published in TheWebConf (formerly known as WWW) 2020. Prabuddha is currently working as an engineer at Amazon.

Future Interests. I have enjoyed these experiences immensely and plan to continue teaching and mentoring students as a faculty member in future. I am especially interested in teaching undergraduate and graduate computer security courses, and I am also comfortable teaching in related fields such as operating systems, distributed systems, and cloud computing. I also plan to develop specialized courses tailored around my active research, such as cloud computing security, IoT security, and the security and privacy concerns of marginalized groups. There is a great interest in these topics among the academic and industry researchers, and as part of the course projects, students will have the opportunity to work with real-world tools, platforms and datasets on solving open problems.

I plan to utilize campus resources toward continuous improvement of my teaching capabilities, such as taking part in computing education training programs and workshops. I aim to continue improving as a teacher as I interact with more students, help them learn, and in process learn from them.

¹<https://iti.illinois.edu/education/illinois-cyber-security-scholars-program-icssp>

²PURE program, <https://pure.engr.illinois.edu/>