Teaching Statement
Varun Chandrasekaran

The ability to mentor the leaders of the next generation is one of the reasons I wish to pursue a career in academia. I believe that teaching is an essential service: not only does it help in dissemination of knowledge, it also helps me gain a deeper understanding of a particular topic area by learning how to best communicate its fundamentals to a broad audience of wide technical expertise. Through my research, I have learned better by understanding when certain concepts/techniques do not apply to the situation. The ability to also view problems from an adversarial mindset (i.e., devise mechanisms to break/evade functionality) has also helped me think more critically. I hope to teach the same to my students.

Pedagogy. In my personal experience, interactive lectures where I have been able to discuss details with the lecturer have helped me learn more efficiently. It has also created a more collegial environment, one where teacher-student interactions are organic, respectful and friendly. I strongly believe that interactive lectures, either through round-table or board-guided discussions are best suited for teaching. Such a teaching style keeps the whole class engaged. I also want students to build effective work relationships; while individual learning is important, collaborations are unavoidable in many situations in life and the work place.

Prior experience. While I was an MSc student at the Courant Institute of Mathematical Sciences, I had the opportunity to serve as the teaching assistant for two undergraduate courses (Computer System Organization taught by Jinyang Li and Technology and Economic Development co-taught by Yaw Nwarko and Lakshminarayanan Subramanian), and one graduate course (Networks and Mobile Systems taught by Lakshminarayanan Subramanian). My responsibilities included formalizing and grading assignments, and conducting review sessions.

At UW-Madison, I have delivered several guest lectures in various networking courses (taught by Suman Banerjee). At the undergraduate level, I have observed that students find it convenient when the course is structured along the outline prescribed in textbooks. At the graduate level, I have facilitated critiquing research papers. In particular, the focus of the discussion was to understand if the students had alternative design decisions, and seeing they have a deeper understanding of the motivation behind design choices. I believe such discussion promotes critical thinking, and teaches students to question the status quo.

I have also been invited to present my research at different academic institutions (University of Pennsylvania, Northeastern University, and Stanford University), and industrial research labs (Microsoft Research at Cambridge, and Telefonica Research). This experiences have taught me the right level of abstraction at which concepts need to be presented to diverse audiences.

Courses I would like to teach. At an undergraduate level, I would like to teach an introductory course in computer security. While my research is primarily centered at the intersection of machine learning (ML) and security & privacy, I have extensively studied other areas of computer security. I believe that such undergraduate courses are fundamental, as they allow students to get a sense of the wide variety of topics available in a particular field. The focus of my class will be two-fold: providing practical skills that will enable students to be competent in industry jobs, while also providing an introduction to research.

At a graduate level, I would like to teach a topics course on trustworthy ML. This field is rapidly evolving, with over 2100 papers published in the last 7 years. The field also contains topics of societal importance, such as algorithmic fairness, and transparency in decision making—essential components of any production-level ML system. Additionally, several of my mentors, peers, and collaborators are active researchers in this space; they will also be invited to provide guest lectures on specific topics related to their research. Through paper reading, I will train students to develop critical thinking skills, the ability to effectively communicate (both in speech and writing) their ideas, and design reproducible evaluation frameworks for them.

Eventually, I would like to teach a massive online open course (MOOC) on topics related to trustworthy ML. My background in the problem space and connections with industrial research (and industry
requirements) coupled with its growing importance in both academia and industry equip me to teach this to a wider audience.

Other courses I would like to teach. At Wisconsin, a strong emphasis is placed on developing systems skills. This has translated to our style of research, and the courses that are offered. I want to train undergraduate students to possess systems building skills; this will help them in the future should they wish to pursue graduate school, or seek jobs in large tech corporations. To this end, I would be interested in teaching a course on fundamentals of programming (in C/C++/python), with an emphasis on topics needed to support ML or security (e.g., cryptography) applications.

I have also extensively reviewed for networking conferences during my time at NYU and UW-Madison. For this process, I have constantly studied topics of networking and stayed aware of advances in the field (despite it not being my primary research area). This enables me to teach an introductory computer networking course at an undergraduate level, or a more advanced seminar related to advances in networking, with a particular emphasis on mobile networking.

Course plans. I wish to structure courses such that the student is periodically evaluated. At the undergraduate level, I will provide weekly/bi-weekly lab assignments that facilitate strong programming experience, a valuable skill. At the graduate level, for the former, I will encourage individual (or pair) projects where students will have to provide weekly progress updates, beginning with idea conceptualization all the way up to a final presentation and report with results.

Mentoring experience. Throughout graduate school, I have been fortunate to work with numerous talented students. I worked with Brian Tang (now a PhD student at the University of Michigan) on topics related to user privacy [2]. I also had the opportunity to work with Lakshya Jain from UC Berkeley (now an engineer at Trifecta) on problems related to synthetic data generation using adversarial ML [3]. During my time as a visiting scholar at the University of Toronto and through my subsequent collaborations, I had the opportunity to work with many students (Lucas Bourtoule, Christopher A. Choquette-Choo, Natalie Dullerud, Hengrui Jia, Anvith Thudi, Adelin Travers, Mohammad Yaghini, Baiwu Zhang) resulting in publications related to ML governance [1,4,5].

My mentoring philosophy is to be available: either in terms of providing relevant resources (i.e., papers, code etc.) to solve problems in the long term, or for more nuanced details (such as presentation of ideas, or code debugging). I have tried to encourage my mentees to read papers relevant to their project, and critique published works to find avenues for improvement. I have also actively provided advice early on towards improving written communication, and encouraged them to seek opportunities to present their research to a diverse audience. From my senior mentors, I have learnt that breadth (often developed through reading outside one’s comfort zone) is essential in developing a scientific mindset, and I also encourage this among my mentees.

References