Bimal Viswanath Teaching Statement

I enjoy mentoring and working with students and it is one of the primary reasons for choosing an academic career. As a faculty member, I hope to make students excited about learning computer science, and encourage them to further (positively) impact people's lives with their contributions.

Teaching experience: During my Ph.D. at MPI-SWS, I taught a course on security and privacy aspects of social computing systems. This was an opportunity to experience the process behind preparing and delivering lectures, and also to explore new ways to teach certain skills. My basic duties involved giving lectures, preparing a reading list, and designing a course project. I realized that students did not have much experience reading and critiquing research papers. So, I developed a scheme where a paper reviewing portal (using HotCRP conference management software) was set up, so that students could play the role of a paper reviewer and learn to write constructive reviews identifying key strengths and weaknesses of a paper. The portal was active with paper discussions and the students benefited from reading and rating each other's reviews. To help students apply their knowledge, I chose a project with practical significance, focusing on an emerging problem in social media. The project focused on understanding how rumors spread in microblogs. It was satisfying to see students (most with no prior background on the topic), conducting large-scale web measurements and finding patterns of rumor propagation in the real world.

I also served as a teaching assistant for multiple courses at MPI-SWS and IIT Madras. These included introductory courses (at the freshman level) on computational engineering (where basic programming and computing concepts were taught), and advanced graduate level courses on networking, and operating systems. My duties involved grading, supervising programming lab sessions, and reviewing code and system designs for courses with advanced systems projects.

Teaching approaches: As a teacher, I plan to cover the fundamental building blocks of a topic in the simplest manner possible. While doing so, I would aim to keep a balance between theory and practice; students should feel excited about applying a theoretical concept in practice, as well as realize challenges with solving a real-world problem. For example, when teaching unsupervised learning or data clustering, I would prepare an assignment based on a large real-world dataset (e.g., user behavior). This would help students appreciate some practical issues: the importance of sanitizing data, developing code that scales to large datasets, as well as face the daunting task of interpreting and evaluating the data clusters. Finally, given the fast pace at which topics in data science, security and systems are advancing, I plan to adapt and keep my teaching curriculum up-to-date.

Mentoring: I am fortunate to mentor multiple talented students during my time as a graduate student, researcher in an industry lab, and as a postdoctoral scholar. Mentoring experience at each stage was unique, helping me hone my mentoring skills, as well as learn valuable research lessons along the way. Overall, I mentored 4 research interns, 5 PhD students and 1 masters student, and our work led to top tier publications at CCS, Usenix Security, WWW, CoNEXT, EuroSys, including a Distinguished Paper Award at SOUPS'14. While mentoring, I stress the importance of paying attention to details (e.g., when designing a system or writing a paper), and provide hands-on support when necessary (e.g., with junior PhD students), while also giving enough research freedom so they can develop skills towards becoming an independent researcher. Whenever possible, I encourage students to build end-user tools to demonstrate their research. This helps to further motivate them as they can proudly showcase their work to the community. With an intern at MPI-SWS, we built a web service to detect reputation manipulation on Twitter, and at Nokia Bell Labs, an intern developed and open-sourced a data analytics tool to simplify management of complex microservice applications.

Courses I can teach: As a professor, I am qualified to teach courses on security and privacy, networking, and data mining and machine learning (with an emphasis on application to real world problems). At the freshman and sophomore level, I can offer introductory courses in computer programming, and basic data structures and algorithms. Given my expertise on inter-disciplinary topics, I would also be interested in offering the following two courses: *social computing* and *data science for cyber-security*. Both topics span multiple areas of computer science, including systems, security, data mining, and machine learning. These courses would help students understand how real social computing platforms are built and the challenges with providing security in cyberspace by relying on advances in multiple areas of computer science.