Teaching Statement

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My passion for teaching stems from my belief that security and privacy are inseparable parts of modern computing. So besides publishing novel research results and open-sourcing latest techniques, teaching is an equally (if not more) important way to promote and deepen people’s understanding about security and privacy, and to reduce vulnerabilities in software. I believe my solid background in this area has prepared me well to share my knowledge and insights.

Teaching

As an international student, I have precious experiences in top U.S. and Chinese universities. These experiences and the great instructors I have had were fortunate to have shaped my teaching philosophy. In particular, I believe great teaching consists of three main elements: motivating topics, passionate instructor, and effective feedback.

Adaptive Curriculum. Although computer science was originated and is still strongly bound to mathematics, as a discipline of applied science, it is also practical. My experience as a student has taught me that, the best way to motivate students is to use real-world examples to help them understand how the concepts and knowledge they learned at school could be utilized to solve concrete problems. I believe this not only could help students better understand the subjects, but would also encourage them to actively explore related problems. Moreover, it also makes the techniques they learned at school more likely to be used in their future careers. Because computer science is a fast evolving area, to achieve this goal, one must make lectures, projects and homework aligned with the latest development of technologies.

Passionate Teaching. We are in an era that everyone is surrounded by information. Therefore, to attract students to the class, as a teacher, I must be extremely passionate about the subjects I teach; otherwise students can be easily distracted by other information. Being passionate is not solely about attracting students, it also encourages the instructor to create more interactive and inspiring classroom, thus makes the learning more effective and pleasurable.

Refinement. Just like writing papers, teaching is another form of communication; so it requires the teacher to constantly polishing the way information is presented. To achieve this goal, I believe a teacher must create effective feedback channels to adapt the course to better suite students. And such channels do not need to be limited to regular Q&A and discussion in class, they could also be “side-channels” like common problems in the homework and projects.

Courses

I am happy to teach any class on computer security and privacy to undergraduate and graduate students. But I am particularly interested in the following courses.

Introduction to Security and Privacy. During my research on software vulnerabilities, I have observed that too often than not, security and privacy issues are introduced because developers are not aware of potential problems, especially common pitfalls. At the same time, only a few companies have adopted security and privacy practices like Microsoft Security Development Lifecycle (SDL). Therefore, I believe it is important to have one undergraduate level class for all computer science major students to help them avoid such problems in their future careers. In this class, besides the basic principles in computer security, I also want use real-world cases to teach students about (i) common security and privacy problems in software systems; (ii) best practice to avoid creating new problems and patch old problems; and (iii) development tools that can help detect such problems.

Information Security Lab. For students who want to pursue a career in information security, I believe the best way is to hand on real challenges. For this reason, I want to have one graduate (senior undergraduate) level class on information security lab. This class will be organized similar to capture-the-flag (CTF) competitions. In each lab (every week), students will be asked to solve a set of problems. For each problem, students have to submit two things, a flag and a write-up. A Flag is retrieved by successfully exploiting a vulnerable binary, successfully patching a binary against attacks, or successfully retrieve information from a piece of malware. And in the write-up, students should summarize what they have learned.

Special Topics on Software and System Security. This class is for graduate (mostly Ph.D.) students who are interested in security and privacy related research. Similar to other advanced graduate class, this class will focus on paper discussion. The purpose of this class is to help students get on track with research, by making them familiar with the recent advances in security and privacy research, especially work of great importance.

Mentoring

Mentoring students is another important and awarding aspect of an academic career. I have the fortunate to mentor several outstanding students at Georgia Tech: Kangjie Lu, Cong Zheng, Meng Xu, Ming-Wei Shih, Monjur Alam, Insu Yun, Yang Ji, and Ren Ding; and at Peking University: Kevin Zhijie Chen, Yu Ding, Jinhui Zhong, Shixiong Zhu, and Huilin Zhang. As a mentor,
I helped the students on several important aspects of security research, including choosing research directions, understanding background knowledge, high-level designs, low-level implementation details, as well as polishing paper writing.

I believe my mentoring experience has taught me important lessons on how to be a good advisor. Specifically, I found it is extremely important to encourage students to choose research directions that they are passionate about. Not only would this make them more motivated to solve the problem, it also helps prepare them as independent researchers. As a faculty member, my main obligation is to help them understand the criteria of good research, especially of good security research. But at the same time, I also believe that for junior students who just start their research career, it would be very helpful to work closely with their advisors on some low-level technical details and paper writing.