Teaching Statement

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I plan to use teaching to achieve three purposes: (1) draw the interest of students and provide them with sufficient fundamental knowledge for their future career; (2) interact with students to improve their coding capabilities, communication skills, and presentation skills through projects and presentations; and (3) inspire and involve graduate students with original research ideas through paper reading and discussions. My experience includes teaching undergraduate courses on microprocessor design, mentoring students to develop a test bed that simulates a cyber-physical system, and presenting demos that deliver complicated research ideas.

1 Teaching Philosophy

I have different teaching philosophies for undergraduate-level and graduate-level courses. For undergraduate-level courses, I plan to emphasize on two aspects. The first aspect is to help students clearly understand fundamental knowledge. At the University of Illinois at Urbana-Champaign, an oral Ph.D. qualification exam challenges each student with a wide range of fundamental knowledge. Based on this experience, I strongly believe that the capability to understand and explain fundamental knowledge can help students to simplify a complicated research idea and deliver it in an understandable manner. Specifically, to achieve this goal, I plan to use traditional blackboard presentations if necessary, which can engage students more actively to review lectures. The second aspect I would like to emphasize is to involve students in projects or machine problems, which allow them to apply the knowledge from the lectures. Instead of merely remembering abstract concepts, students can become more capable of using the knowledge to design, implement, and optimize a concrete idea. More importantly, students can learn how to collaborate and communicate with each other through projects.

For graduate-level courses, I plan to follow current research trends and extend the research carried out by students themselves. I have developed collaborations and produced a few publications through graduate-level courses, which can benefit both the instructor and the students. Also, I will grade the graduate-level course in terms of originality and effort in projects or a research idea, instead of concrete results. I believe this teaching style can encourage students to try original ideas, even if they may appear impractical at the current stage.

2 Teaching Experience

During my studies at the University of Illinois at Chicago, I was involved in teaching ECE 367 Microprocessor Based Design with lecturer Robert Becker. In this course, I gave lectures on laboratory sessions, guided students to perform experiments, and also answered questions related to course projects. This was a very challenging experience because I taught and graded coding, which can be very different for each student. But I enjoyed this process. I interacted with students to learn and analyze their designs, before I dug deep into their codes. This approach could usually help me to identify possible mistakes and, thus, shortened debugging time. Furthermore, by interacting with students, I was surprised to see many original designs. This experience helped me to realize the precious resources in our students.

One special lecture experience was in a seminar course at the University of Illinois at Urbana-Champaign. This course was set up by Prof. William Sanders and Prof. Peter Sauer to support research work in the Trustworthy Cyber Infrastructure for the Power Grid (TCIPG). In this course, participants with computer engineering backgrounds gave lectures related to power engineering, and vice versa. This teaching experience is very beneficial for interdisciplinary research. I am a researcher with more background in computer systems and network security. This background helped me to understand the challenge of learning concepts related to power system analysis. Consequently, I tried to use an analogy to explain concepts in power systems during my lectures. For example, to explain the concept of reactive power, I used the analogy of work-recreation balance for a person. Similar to the role that “recreation” plays in a person’s life, reactive power does not directly introduce concrete outputs, but provides critical support to generate and maintain real power.
3 Demo Experience

During my studies at UIUC, I have attended all industrial workshops of TCIPG, in which I usually present a demo and a poster of my research project. In the November 2012 workshop, I was selected as one of five students among four universities to give demos to TCIPG vendors (the recording of the demo can be found here¹). I believe that a research demo is an effective and challenging way to deliver a research idea; it requires highlighting the essence of a complicated research idea and delivering it in an understandable manner. I felt excited and delighted when my demo drew interest from senior researchers. More importantly, presenting demos has helped me to obtain experience encapsulating knowledge into a vivid appearance, which can be used to attract students in lectures. Together with my demo, the associated posters were always among the most popular (measured by the number of glued labels). In the October 2014 workshop, I was selected as one of four students to present their research projects (the recording of the presentation can be found here²).

4 Teaching Interests

I am interested in teaching courses in the area of network security, secure/reliable computer systems, operating systems, and computer networks at all levels. Furthermore, I hope to develop an advanced course that can specifically focus on interdisciplinary research related to cyber-physical systems, such as smart grids. This research can include different areas (e.g., computer system design, network security, power system analysis, control system analysis, etc.). Although students can take courses in these areas separately, there is a lack of courses that describe how different research areas are merged together in this unique area. Consequently, I am interested in developing this course by collaborating with professors from other related areas, to help students who are interested in similar topics.

¹ https://www.youtube.com/watch?v=unb7b8myNvA
² https://www.youtube.be/J9OMzhbgNjA