Teaching Statement

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I have always taken pleasure in teaching, mentoring, and helping young students cultivate their critical thinking based learning capabilities. I believe that thinking independently and critically is the key for a successful technical/academic career. My teaching mantra is to treat each student as a unique individual.

In the classroom, I believe that delivering the material in a thought-provoking way sets a great example for learning critical thinking. I will focus on presenting the course materials to students systematically and logically. I am a fan of problem-driven, top-down learning approach, as I believe that it enables students to better understand the contents and logical relations therein. I will first present the students with a high-level problem, and then introduce them the associated technical concepts. To clarify the key concepts, I will introduce the background, history, and basic techniques. Next I will explain how to apply those essential concepts to solve more complex problems. Where applicable, I will compare different approaches to illustrate the pros and cons of each. More importantly, I will design course assignments and projects that guide students in working through problems by applying the fundamental concepts and methods taught in the class, and which help them develop critical thinking skills. My ambition is to inspire confidence in my students so that they can identify and analyze any new problem and find effective solutions on their own.

I began honing my tutoring skills early in my undergraduate years. I have taught mathematics, physics, and chemistry to middle school and high school students. I found that explaining fundamental concepts and methods by working through typical examples and comparing similar methods were instrumental in helping students to understand the course materials fully and clearly. Consequently, my students grades improved. These satisfying tutoring experiences made me realize how rewarding and pleasing teaching can be.

As a PhD student at Virginia Tech, I was a teaching assistant for three courses: parallel computing, operating systems, and computer organization. I prepared and gave class lectures on selected topics and led project sessions, graded exams, and assignments, and worked with the instructors to design projects and course assignments. I also took charge of advising students with their course projects, from the design phase all the way to the final implementation. For one of the most challenging core CS courses, I guided students through the thinking process and design that was necessary for the actual implementation. Students found that these rigorous discussions allowed them to finish their projects without significant redesign iterations. These experiences not only deepened their understanding of the design principles for operating systems, but also boosted their confidence in accomplishing difficult kernel programming projects and even programming projects in other courses. Students who have developed strong logical reasoning and programming capabilities tend to rank higher in classes. Thus, I am a strong believer in critical thinking based learning and research.

During my graduate career, I have mentored and worked closely with several junior graduate students in my lab. Some students helped me on projects that I led. I also guided and supported students in their own research. Critical thinking again played an important role in these collaborations. Because of the lively and energetic discussions we had regarding my projects, e.g., the SMIO project, we decided to adopt a top-down hierarchical approach to help improve the efficiency of the virtual machine management. The results of this vigorous discussion and collaboration include a published paper, several technical reports, and a masters thesis. Through these experiences, I learned that students progress at different speeds depending on their capabilities, their strengths and their background. I will leverage this experience to guide my future students based on their individuality and balance the two extreme of hands-on and hands-off mentoring. I will encourage students to develop critical thinking, propose their own ideas, execute projects and eventually become independent researchers.

In our lab, I have found that the reading group keeps students up to date with current research and gives them opportunities to polish their presentation skills. In addition, research meetings, during which everyone presents and discusses ideas in short time slots every week, help to form good research and collaboration environments, especially for brainstorming and vigorous technical conversation. I would like to continue this practice in my research group.

Based on my research background and teaching experience, I intend to teach both undergraduate and graduate courses on operating systems, distributed systems, cloud computing, and parallel computation, and run seminars on cloud computing and large-scale data-intensive computing. However, given my experience, I am also confident that I can comfortably teach other basic CS courses.

In summary, I am passionate about working with students and cultivating their independent research and learning spirit. I am looking forward to this great opportunity in my academic career for teaching and mentoring students.