From my childhood, I have had a passion for learning and problem solving—in mathematics, sciences, and in real-life. To this day, I derive the same pleasure in solving a problem as I used to perhaps years ago. Immediately after my Masters, I worked at two very different early-stage startups, where I enjoyed applying my problem-solving skills to a wide variety of problems. While it was rewarding, I felt something incomplete about the whole experience. Upon further introspection, I realized that it was the critical aspects of learning and sharing my knowledge that were missing in the entire experience. This led me to apply to graduate schools for a PhD degree. In my opinion, the process of sharing knowledge is as rewarding as the process of acquiring knowledge. I believe a faculty job, with a mix of teaching and research, offers an optimal blend.

During my graduate studies, I have been the teaching assistant for two courses on Computer Networks—a graduate level course taught by Prof. Nick McKeown at Stanford, and an undergraduate course taught by Prof. George Varghese at UCSD. While both these courses tried to expose fundamental concepts of Networks, they were quite different and perhaps complementary. The graduate course at Stanford focused more on higher-layers of the networking stack (IP, TCP, etc.) and was programming intensive, while the undergraduate course focused on the lower-layers (physical, data link and IP). In both these courses, I was responsible for leading discussion sections, teaching material already covered in the course or sometimes new material that aided in better understanding of the concepts.

I enjoyed thoroughly the experience in both cases; explaining concepts using multiple dimensions often required creativity. For example, in the UCSD course, the first lecture gave a quick top-down overview of the layers and then the lectures proceeded bottom up from the physical layer to TCP. Before the midterm, we had reached the IP Layer and I realized in the discussion section that students understood individual concepts but not the big picture. To remedy this, I did a second top-down pass from IP down to the physical layer with a complete picture of where each protocol (e.g., RIP, OSPF, BGP) was used. Student feedback indicated that this was extremely helpful. While many network textbooks advocate either a top down or bottom up approach, I have found that such periodic hybrid combinations are beneficial to students.

There are many other observations I have made during my graduate studies that I plan to incorporate in my teaching style. From personal experience, I feel that lectures that involve only Powerpoint slides flashing by can make them monotonous. On the other hand, slides do help to organize the material. I plan to incorporate a judicious combination of organized material (e.g., slides) coupled with effective use of the black board. For example, I intend to explain major portion of the lecture using slides but I would also use the black board to walk through examples.

Another strategy is to make the lecture interactive by obtaining periodic feed-back about a concept, either by asking students to answer a question or by asking them to summarize a concept. For example, I find it helpful to ask the class at the end of a specific concept (e.g., memory fragmentation) to describe it in a few lines as if they were explaining it to their grandfather. This forces them to produce concise, jargon-free summaries and also forces a checkpoint for the rest of the class that may have missed the idea.

As a TA, I have also observed that many students found it difficult to understand specific jargon (e.g., swapping, thrashing), with the result that they could not easily understand what I was explaining. I think this is especially true for systems courses where such jargon forms an important shorthand for key ideas that are often reused. To resolve this issue, I would reiterate the specific terms, help them internalize their meanings, and emphasize that these words represent shorthand for important ideas.

In the future, I would be most interested in teaching courses on computer systems such as operating systems and networks, where I believe my expertise lies. Besides the general core courses, I can also introduce interesting specific courses on operational backbone networks, router architectures, and Internet algorithmics. I hope my specific experience will help provide a unique perspective for these “topics” courses. For example, my two internships and two year collaboration with AT&T have given me some insights into the operational procedures of real ISPs which I think students will enjoy. Similarly, my experience with router design (packet buffers at Stanford, TCP offload engines and packet classification architectures at industry, and algorithmics at UCSD) can help provide students with a balanced perspective on concepts and real industrial implementations.

In summary, in both the special topics and core classes, I hope to leverage my experience and interests. This fits with my educational philosophy that a course is not just an encounter with knowledge in a particular area but also with a way of thinking and a perspective. While every particular professor’s perspective is both enriching and yet limited in some way, by collecting various perspectives a student can ultimately have a rich and rewarding educational experience.