Statement of Teaching Philosophy

Physics is commonly considered among many college students as one of the most difficult courses they can take, as certain concepts and theorems are too abstract to grasp simply by reading textbooks and working on homework problems. Working in both academic and industrial environments has given me many opportunities to teach classes, lead discussion sessions and mentor students. Through my teaching and mentoring experience, I have found the most effective way to teach is to stimulate students' interest/critical thinking, connect the theory and the practical application, and create a collaborative environment to broaden students' horizons.

While working as a research assistant at the University of Illinois at Urbana-Champaign, I was asked to give a series of experimental demonstrations about transmission electron microscope (TEM) for the undergraduate and graduate students who were taking the TEM class. The first demonstration was about TEM alignment. Based on the syllabus I was given, I started with alignment of gun and then condenser lens and so on. However, I realized they were feeling quite bored and confused, as no one asked any questions. From a quick conversation with them, I learned most of them had no hands-on experience before. The main challenge for me at that moment became how to stimulate students' interest. I suddenly recalled how I became excited about TEM for the first time, which was right after I saw those amazing high-resolution TEM (HRTEM) images in a journal. Instead of going through the rest of the alignment, I quickly had it aligned at my own pace and showed a HRTEM image of the sample with clear lattice fringes on the screen. I then successfully drew the students' attention. I also realized this was a good timing to refresh what they had learned in class, so I asked some relevant questions, such as "what type of contrast is HRTEM?" and "are we looking at atoms now?". The students were actively participating in the discussion. In this way, the students connected the theoretical portion and experimental portion of TEM imaging. Then I intentionally messed up the alignment and asked students to bring the HRTEM image back. The students were then eager to know what they should do, as they all wanted to see lattice fringes again and how the images changed when they adjusted the knobs. From this experience, I learnt that sparking students' interest as well as linking the practical application to theory is crucial for teaching.

After moving to Intel Corporation as a senior research & development engineer, I mentored several student interns and new employees. The mentees had very different backgrounds, varying from hardware to firmware to software. When discussing with individual of them, I realized many of them were focusing too much on their own field and sometimes got stuck, but the expertise and experience from other groups could be very helpful. I remembered how I benefited from broad collaboration with various research groups, so I scheduled group discussions instead of meeting each individual of them to create a collaborative environment. From the group discussions, the mentees had a chance to understand what others were doing and how they could work collaboratively. From the group activities, a couple of hardware issues were successfully addressed with firmware updates. The collaborative spirit plays a significant role in stimulating student's critical thinking and active learning.

I believe as a physicist and as a teacher that it is my responsibility to create a rich environment to motivate students to learn materials science with great self-interest as well as to support students to study/work together with a collaborative spirit. I would sincerely welcome all undergraduate and graduate students to my laboratory to test the knowledge they have gained in the classroom and implement brilliant new ideas they have, as it is deeply rooted in my teaching philosophy that practice is the most efficient way to learn.