Anh Luong

Teaching Statement

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The ability to help others grab onto insightful "lightbulb" movements is one of the most rewarding aspects of teaching. Unfortunately, we are approaching a difficult time in the world of teaching where the standard lecture style is no longer in vogue and massively online courses are rapidly gaining momentum. This poses challenges for the next generation of educators to try and adapt to these new pressures while still being able to drive home fundamentals. In the area of embedded systems and signal processing, we fortunate enough to be able to teach concepts through examples and laboratory exercises. My classroom would emphasize active learning to create opportunities where students can exercise fundamentals in practice. As engineering continues to diversify, it will become increasingly important to bring embedded system laboratory exercises and the excitement of the maker movement into core-concept classes. What is often not obvious to our new batch of incoming students is that there is nothing more practical than a good theory.

I was given an opportunity in Spring 2013 to help redefine the Embedded System Design course at University of Utah. The idea behind the course is to provide students with a close to real-world experience in creating an embedded system by practicing their theoretical understanding of circuits, communications, and software. I helped refine the course material, develop practical exercises, and mentor final projects. During the course, the students showed me that they absorb the material and the knowledge much better by implementing their own systems. The following year, we decided to flip the classroom with many examples of success. The students could simply access information from the previous year through lecture recordings, and only attended the class for group discussions on the material and detailed walk-throughs of examples. Due to this heavy spin on the practical aspects of the course, I have seen many successful, ambitious, and refined course projects that students will be able to highlight during job interviews to demonstrate their understanding of the field. However, for some students the course is more of a foundation for future projects, as the course fosters basic skills that they can leverage to pursue their creative ideas during the more advanced capstone course. As a mentor, I thrive on the successes of challenging projects inspired not only by the students but also by industrial research groups. This opportunity beneficially allows a real-world experience for the students and industrial engagement with prospective employees.

At CMU I have been working on building out a hackerspace to foster a DIY culture. My vision goes beyond just providing access to 3D printers, soldering stations, laser cutters, and tools for prototypes. As a mentor, I would like to actively help my students take their ideas beyond the conceptual stage which means close collaboration with researchers. During my time at the University of Utah, I was able to turn our limited laboratory space into a mini-makerspace that students could utilize and leverage to work on their coursework and research projects. At Carnegie Mellon University, I was able to see the extended results of these fully equipped spaces and explore how to facilitate graduate and

undergraduate interactions. Students can use these spaces to build technologies sought after by new startups or open new directions for research questions.

I have taught a number of summer courses that interact with K-12 students. I have noticed that younger students tend to shy away from core classes like math and science due to the stigma against inapplicable knowledge for real-world applications. Through outreach programs as part of a makerspace, I would like to show young students how geometry can be applied to designing an object. By allowing them to manufacture a prototype, they could do a hands-on experiment using their knowledge and learn the importance of strong basics. Through these experience, I would like to inspire our future generations to pursue engineering as their life-long career.

With my electrical and computer engineering background, I am interested in teaching a variety of undergraduate and graduate courses. As a teacher, I could take on many different courses if given enough preparation time; however, these are the courses that I am capable of teaching on Day 1:

Digital System Design$*$	Digital VLSI Design	Embedded Systems Design$*\dagger$
Wireless Communication	Radio Frequency Sensing	Senior Capstone$*$
Intro to C/C++	Computer Systems	Advanced Embedded Software
Courses taught at $*$University of Utah, $\dagger$Carnegie Mellon University		

I am also interested in creating a multi-disciplinary course using my extensive background in collaborative projects. I believe in the importance of being able to share and apply knowledge with/from other fields. An example of this is Applied Wireless Robotics, where students learn about the fundamentals of wireless communications as they will apply when building future autonomous robots.