STATEMENT OF TEACHING INTERESTS

The role of an effective instructor is two-fold: to deliver information and to empower students to use their knowledge and understanding in the future. To be an effective instructor, I set two goals for myself: first, I aim to disseminate the material in manner that facilitates comprehension and thoughtfulness; second, I strive to prepare students for their next endeavor, whether that be future courses, graduate school, or a professional career.

As an instructor, it is imperative to foster critical thinking, problem solving, reasoning, and innovation. For undergraduate education, I guide the students in building a foundation of scientific literacy and understanding. From my own experiences as an undergraduate student, too often we were asked to memorize large amounts of material or solve overly difficult and unrealistic problems, rather than understanding mechanisms and the reasoning needed to acquire a solution. This applied to both the biology and engineering courses that I studied. To query their understanding and pinpoint any problem areas, I think it is important to quiz the students frequently throughout the course.

Graduate education is about building on their foundation to achieve deeper levels of understanding. Because graduate students may come from different educational backgrounds, it is important to provide an initial introduction and quiz to ensure that everyone is appropriately prepared. Graduate students should be able to expand on the topics presented in class and become familiar enough with the subject matter such that they can instruct each other, which is an exercise I like to do with smaller classes.

I approach each lecture with the thought “How can I make this information as interesting and engaging as possible?” I believe that a great instructor can make any topic interesting and accessible. My experience teaching students from grades 1-12 and at the undergraduate and graduate levels have taught me how to read the audience, and to use that to engage them in the material. For example, I use multiple approaches and forms of media, including videos (with closed captioning), which provide verbal and visual stimulation. I have found videos to be extremely effective in disseminating concepts while working with students in grades 1-12, but I have found it to be successful with undergraduate and graduate students as well. Some of my favorite videos to show include the early studies of spinalized cats walking on a treadmill (evidence for a spinal central pattern generator). The most memorable talks from courses and conferences have videos. Additionally, difficult concepts need to be reiterated in several different ways and interleaved with related topics for them to be fully understood. Interleaving content is a teaching strategy that I recently learned through the Future Faculty Program at Carnegie Mellon University, which is a program designed to instruct early career researchers on pedagogy through a series of workshops.

Interaction with students can also greatly facilitate understanding and interest. Education literature recommends active learning to engage students with the material, instead of passive listening. When I was a graduate student studying Artificial Intelligence and Machine Learning, my instructor was extremely engaging and had us play games to introduce concepts. I found this

method so effective that I taught many of these concepts in a similar way to a girl's science camp (ages 9-11). Although it is difficult to implement some of these methods in large classes, it is still possible to be engaging. One such method of active learning that I like to utilize is Think-Pair-Share. In smaller classes, each group can share their answer with the class; and in larger classes, the pairs can share and discuss their answer with other pairs. This is a strategy that I learned through the Future Faculty Program, and recently implemented it in a guest lecture successfully. Labs present a unique opportunity to engage students in hands-on activities and provide a more tailored learning experience. Labs also connect the course material to "real-world" applications, such as collecting and analyzing electromyographic data for controlling a cursor on a screen. Moreover, labs enable students to develop important investigational and troubleshooting skills, particularly when trying to collect high quality data and working with instrumentation and computer code, for example. I assess learning during labs through lab reports, as well as through interaction with myself or the teaching assistants during the lab time.

Preparing students for their next endeavor must include building communication skills, independence, teamwork, leadership, and confidence. This requires courses to be designed to specifically target building these "soft-skills". Meeting these goals requires effort and passion from the instructor, as well as a commitment to inclusion, diversity, and equity. Students come from a wide variety of backgrounds – socioeconomic status, education, race, gender, etc. It is not only important to recognize this but to actively ensure that everyone feels comfortable and confident in the classroom environment and has the resources they need to be as successful as possible. One way to do this is to ensure that everyone has the chance to contribute to discussions and have their ideas acknowledged and supported. I accomplish this by asking students to pause with their answers, then call from different students who wish to share their answers or ideas.

I am confident that I can apply my teaching philosophies to create inclusive and effective learning environments for both undergraduate and graduate courses. I am truly passionate about teaching, and I believe that it shows when I am giving a lecture. I remember guest lecturing for the Anatomy and Physiology course for engineers; I left thinking "This is what I was meant to do". I guest lectured for an undergraduate Kinesiology course on human motor control, where I gave a lecture on spinal cord circuitry and reflexes. I solicited formal feedback from the students and received very useful and supportive comments including "I felt the lecture was great. She was an engaging speaker and obviously is very knowledgeable in the area." and "The research done in the area made the presentation really interesting!" I feel the same thrill when I am mentoring students in the lab. I have taught several undergraduate and graduate students how to do various surgical procedures in animal models. One undergraduate student was able to perform all the procedures independently after 4 cat experiments and continued to utilize those skills during his graduate studies. Another student went on to use his newfound surgical skills as a dentistry student. I am truly passionate about teaching and mentoring, and am always working to grow and improve as an instructor so that my students can get the most out of their education as possible.

STATEMENT OF TEACHING AREAS

Since I have both an engineering and neuroscience background, I feel comfortable teaching in both areas as well as combining these concepts in interdisciplinary courses. I would feel comfortable teaching **physiology for engineers, electrophysiology and bioelectricity of tissues, systems neuroscience, neural engineering,** and **control systems** at the undergraduate level. I am particularly interested in teaching advanced courses covering **neural interfaces** and **rehabilitation engineering**. The descriptions for the following courses are original and would greatly supplement current programs in Biomedical Engineering and related disciplines.

Neural Interfaces: This course is intended for senior undergraduate and graduate students. It covers devices used to record from and stimulate the nervous system throughout the body. Students will be provided with relevant journal articles and will be expected to discuss them during class. Examples of topics covered include recording and stimulation basics, biocompatibility, cochlear implants, retinal implants, brain-computer interfaces, vagus nerve stimulation, peripheral functional electrical stimulation, spinal cord stimulation, bladder control, and augmentation.

Rehabilitation Engineering: This course is intended for senior undergraduate and graduate students. Examples of topics covered include a review of pathologies, assistive devices (wheelchairs, prostheses, orthoses), traditional rehabilitation strategies, functional electrical stimulation, new or up-and-coming rehabilitation interventions, and combinatorial treatments. This course includes a writing and oral presentation component where students are tasked with designing a new combinatorial treatment for a pathology of choice, supported by evidence from literature but one that has not been tested yet.