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Teaching Statement

As an Engineer myself, it is my passion to adopt and develop innovating teaching techniques particularly catered to Engineering concepts. I believe it is my responsibility as a teacher to make sure that an efficient and effective transfer of knowledge takes place, and the students learn to apply and build on what they are exposed to.

The goals I set for my students are informed from my experience teaching both graduate and undergraduate classes and as a student myself. I expect my undergraduate students to 1) learn the fundamental techniques in Engineering, 2) be able to exploit the effectiveness of mathematics in solving problems, 3) identify the relevant techniques that may be applied given a specific problem, and 4) appreciate that Engineering involves creativity. I believe the primary difference between graduate and undergraduate classes is the range and depth of knowledge. Additionally, I want my graduate students to get a good grasp of fundamental principles of research. The first quarter of my graduate classes will focus on strengthening the fundamentals, and the remaining will be designed so that the students gain an expert level grasp at the subject. Class projects and group projects are to me a key part of a class, especially for graduate courses. While designing a project, I want my students to learn 1) how real-world data is gathered and what are the issues in pre-processing the data to make it useful, 2) to identify suitable techniques that may be applicable and judge their relative success before staring the project, 3) to estimate the time and effort it takes in implementing algorithms, and debugging the code to get it to a working condition, and 4) appreciate the importance of team work, advantages of brain-storming in constructing a plan to solve a given problem, and the various hurdles one has to go through to reach ones goal.

I have always been very passionate about teaching and I am grateful for the excellent facilities and opportunities at North Carolina State University (where I did my graduate studies), which helped me gain valuable experience and hone my teaching skills. As a graduate student, I was a teaching assistant for 2 years, during which I performed duties such as tutoring, supervising labs, teaching classes and grading. However, as my determination to pursue an academic career grew, I knew this experience would not be sufficient. I participated in several training workshops under the Fundamentals in Teaching (FIT) program here at NCSU. I had the opportunity to participate in the Mentored Teaching Assistantship (MTA) program (a competitive program sponsored by the graduate school), under the guidance of Dr. Hatice Ozturk for which I was nominated for the University outstanding Teaching Assistantship award. I also volunteered and taught several sessions of graduate classes, and as a result, came to appreciate the stark difference in learning

styles between graduate and undergraduate students, and the different teaching techniques to be employed. I am also working on developing skills in making short 10-15 min lecture videos, covering some important concept or technique, and videos summarizing important papers. I also realize that improving myself as a teacher is a never ending process, and experience is invaluable. I see myself volunteering in outreach programs in the future, where I can give back to the society, and to motivate the younger generation for better education.

I try to incorporate active learning into all my classes, something I found particularly useful in undergraduate classes. Many studies show that the attention span of students does not last more than 10-15 min, and it is important to pause the class and encourage guided discussion amongst students. I also found it very helpful to solicit feedback from time to time at the end of the class to get an idea of the difficulties students are facing, and if they have any problems with my teaching style. From my own experience, I learn more from my mistakes than if everything goes right in my first attempt. I used this to develop a technique which was very successful while I was participating in the MTA program. One of my jobs was to lecture students signal using simulations in MATLAB. I would start with a code which had some fundamental errors and would solicit suggestions from students to correct the mistakes. This method did wonders in helping students understand the basic concepts and appreciate the intricacies of programming.

My research is focused on areas including Graph Theory, Computational Topology, Discrete and Differential Geometry and Networks. However, through class work and experience during my PhD, I have gained substantial knowledge in various fields including Information Theory, Communications Systems, Random Processes, Estimation and Detection, Computer Networks, and Signal Processing, and am competent in teaching graduate and undergraduate classes on any of these subjects. Some very effective tools from Computational Topology are new to the Engineering community, thus, I would like to develop a course on these topics specifically designed for Engineers.

I have observed students with a wide variety of learning styles and different speeds at grasping different concepts, and I believe any good teacher should try to accommodate as many as possible. In fact, I was very happy to learn some of the students who I used to mentor as a TA went on to pursue graduate studies.

I started with a passion for teaching and joy in helping students motivate and understand new subjects and material. Over the course of time, I realized it also comes with several responsibilities, of coping with different learning styles, of dealing with various problems students might have, managing classrooms, and providing encouragement. After going through the experience myself, I am beginning to realize that though demanding, teaching can be more fulfilling that I thought before, and it will certainly play a big part in my academic career.