Teaching Statement

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Given enough time and determination, I believe that any student can succeed in any course in the mathematics curriculum. However, without clear guidance this is potentially a frustrating endeavor. My role as an instructor is to enable students to focus on key ideas and concepts, to provide the necessary guidance and motivation to learn them, and to point out connections with other areas of their studies. I am especially interested in incorporating elements that allow the students to apply the theory they are learning more broadly or to develop their creativity and problem solving skills.

My views and methods of teaching have evolved from observing my own teachers, observing and interacting with my own students, learning from the experts at the Sheridan Center at Brown University, serving as a teaching consultant for the Sheridan Center, and observing and discussing teaching with my peers. I previously undertook pedagogical training at the Sheridan Center for Teaching and Learning at Brown University to ground my teaching in well established methodologies. In this program, we discussed topics ranging from designing meaningful assessments in a course, to incorporating technology in the classroom. As my pedagogical expertise increased, I became a teaching consultant for the Sheridan Center. Upon request, I and another consultant would travel to a classroom to videotape and observe the teaching of a fellow Brown graduate or post-doctoral student. We would then hold a discussion of the lesson and provide a written evaluation of lecture. Not surprisingly, I saw many of the same errors repeatedly, such as talking to the blackboard instead of the students, or failing to provide enough wait time when asking questions. I believe that being able to observe the teaching of many different people in many different fields has had a great benefit to my own teaching. This benefit comes both from the reiteration of good teaching practices and from expanding my own classroom techniques.

At Amherst College, I have the opportunity to teach one calculus course and one upper level course each semester. In the calculus courses, I have refined the group projects I began to implement in my classes as a teaching fellow at Wheaton College. The projects I ask my calculus students to undertake stem from my belief that mathematics must be done, as opposed to strictly observed, for optimal learning. Consequently, class time is regularly devoted to students solving or presenting problems. The projects allow the students to apply their knowledge and creativity to a much larger problem than is possible to assign on a homework set. Additionally, the final written report gives the students the opportunity to develop their ability to clearly and concisely communicate mathematical ideas. I typically assign one applied project and one more theoretical project during the course of a semester. First semester calculus students have performed a detailed investigation of epsilon-delta definition of limits and optimization of a real world scenario, such as optimal speed for container trucks. In second semester calculus, the students have modeled an object as a surface of revolution and computed its

volume and used infinite series in the stacking of blocks. In multivariable calculus, students have modeled objects in Mathematica and investigated n-fold integration through the volume of n-spheres.

The 3-dimensional modeling in Mathematica, in particular, has been a student favorite. During my first week at Amherst College, I had the pleasure of meeting the new director of the Mead Art Museum, Elizabeth Barker. Ms. Barker's research focuses on how perception influences art appreciation. I shared with her a previous project, which I conducted as a teaching fellow at Wheaton College, in which students modeled everyday objects found around their dorm rooms, such as a hyperbolic water bottle. With great enthusiasm, we decided that the modeling project could be conducted with artwork from the museum. The end result is a joint project. With the help of me and the museum staff, the students examine and learn the history of the art work, choose a suitable object to model, and take physical measurements to produce equations and a Mathematica rendering. The project culminates with a mathematical model and rendering of the object, a detailed mathematical report, and a discussion and podcast at the museum. Now in its fourth semester at Amherst College, the project is always well received by the students and rarely fails to give them a new perspective on the college's art collection. See the museum website for more information: *http://www.amherst.edu/museums/mead/education/classproj*.

In upper level courses, I keep my students actively involved through concrete problems and opened ended investigation. For example, in an introductory number theory course, I brought the students' creativity to the forefront by exposing them to current open research problems. We used the number theory program Pari/gp to assist our investigation of number theoretic properties; every week I provided them free rein to work on an open problem. This problem was either an open conjecture or a related number theoretic question that they themselves found interesting. I hope to incorporate similar endeavors in other courses whenever possible.

One of the most challenging, and oftentimes most rewarding, aspects of teaching is working with students who are not performing to their potential. While it is always enjoyable when a top student comes to the office to discuss the finer points of mathematics, I find the particular challenge to identify and assist the student who is quietly struggling to stay afloat equally important. More often than not a short discussion concerning study habits, the peculiar process of learning mathematics, or the varied additional sources of help available to them at the institution results in noteworthy improvement. It is for these students that a little effort and encouragement often make a significant difference.

Because every student learns differently and curriculums continue to evolve, I know I will never feel complacent about teaching a course. What may be a great explanation, problem set, or question for one group of students may be a total failure for another. While basic principles, such as clear presentation of a topic, must always be mastered, the possible ways to explore and learn mathematics is bounded only by the imaginations of my students and me.