TEACHING STATEMENT

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The most powerful feat a teacher can accomplish in the classroom is to inspire students. At every stage of my academic career, I have been inspired by my teachers. I call myself a mathematician these days, but I wanted to be a writer until I took a calculus class in high school from a wonderful and devoted teacher. Throughout my undergraduate and graduate career, certain professors, with a perfect blend of enthusiasm and expertise, cultivated within me an interest in various mathematical disciplines, an interest so great that I have chosen to make mathematics my profession.

What each of my great teachers has in common is *presence*, an ability to transform mathematics into something clearly important and worth studying by delivering material with unique confidence and enthusiasm. One of the key questions that my generation of teachers must answer is the following: What does a student gain from being in a room with a real, live teacher that they can't get from watching videos online? One answer is surely personal interaction in non-lecture classroom activities. Another is that no video can substitute for being in a room with an engaging, dynamic teacher. I lead my classes in such a way that my passion for the subject and my desire to share what I find beautiful within mathematics are plain to see.

For example, I keep my students involved in lectures by asking broad questions that I hope will provoke a range of answers, e.g. "How do we define the length of a curve $y = f(x)$, $a \leq x \leq b$?" When I asked this question to my own Calculus II class in the fall semester of 2015, students responded with a variety of creative answers; for example, "measure the curve with string, and then stretch out the string." This is not how we define arc length, of course, but within the student's response is the crucial fact on which the actual definition hinges: We already know how to find the length of a straight line! By asking follow-up questions that guide the students toward a rigorous answer, they discover for themselves that one approximates the length of a curve by straight line segments, that this approximation improves as the number of segments increases, and that, in the end, the definition of arc length is given by a certain integral. This process of discovery enlivens a topic that may have no relevance to them: Why would they care to know how to find the length of a curve? By seeing that the answer is not so obvious, yet can be formed entirely from ideas they've learned previously, they come to know not only the formula for arc length, but also one aspect of how mathematics and quantitative reasoning is done. Lessons similar to the latter represent the true value of an undergraduate mathematics course.

Based on my own experience, this business about "presence" and "enthusiasm" isn't just talk. As an analytic number theorist, I deal with infinite series as a matter of course, and I mentioned this to my Calculus II class when we began discussing sequences and series. A mathematics major in the class – a freshman who chose his major "just because [he] was always good at it" – e-mailed me after class to ask about mathematics research, and I was happy to tell him about my own research and how math research is done in general. In addition, two freshmen who entered my class with an undeclared major have declared a mathematics major, and both have contacted me about opportunities for getting involved with research as an undergraduate. Interactions like these are why I love

teaching, and it is incredibly satisfying to see that my efforts to make math appealing to students seem to be working.

During my time at the University of Georgia, I have had the opportunity to teach a wide array of undergraduate classes, from Pre-Calculus through Calculus II, and even a course designed for pre-service elementary school teachers. Owing to this experience, I've come to learn some of the differences in how these courses should be approached from an instructor's point of view. Trying to convey information in Pre-Calculus at the same depth as one would in Calculus II will lead to confusion for many students. This is not to say that one should "lie" to students in lower-level courses; the cardinal rule of teaching mathematics is that what one says and writes as an instructor must be correct (and that, when mistakes are inevitably made, they are corrected as soon as possible). For example, when the concept of limit is first introduced in a calculus course, I like to stress an intuitive, "graphical" understanding, as opposed to more complicated epsilon-delta definitions one might see in Calculus II. Simply put, I have experience teaching mathematics to audiences of varying mathematical maturity.

On the other hand, teaching such a variety of courses has allowed me to discover some of what remains the same among all of them. For instance, students want to feel that they are important to their teacher. I have fulfilled this desire by frequently asking for feedback on formal surveys and encouraging students to talk to me in private if they have an issue with the course. This establishes a sense of trust and leads to a comfortable classroom environment conducive to learning.

What is the best way to measure that learning? It is traditional to ask our students to demonstrate what they've learned on high-stakes exams; this is what I have done in each course I have taught so far (though I am interested in experimenting with other methods). If the first such exam in a given term is the teacher's first attempt at assessment, the results may indicate a problem that has lingered since the first day of class, a problem that may be tough to fix late in the semester. This is why I believe in frequent, low-to-no stakes assessment of students' knowledge. In every class I've ever taught, I've given weekly quizzes that do not contribute much towards a student's grade, but allow them (and me) to recognize parts of the material they may not know as well as they should. More recently, I've started taking attendance via daily writing prompts: Each day, students are asked to write a few sentences about a concept we have covered in class. This writing is never graded, but nonetheless, students are made to think critically about what they've learned.

The idea of daily writing prompts is just one small part of what I've learned through my participation in the Future Faculty Program, an organization at the University of Georgia to which winners of the Outstanding Teaching Assistant award may apply. The Outstanding Teaching Assistant award is given to graduate student teachers who have demonstrated superior teaching abilities in the classroom. A department may nominate up to ten percent of its graduate student teachers, and I am proud to say that I received this award in the spring semester of 2014 prior to successfully applying for the Future Faculty Program. In our biweekly meetings, members of the Future Faculty Program discuss challenges they've faced in the classroom and learn new methods of instruction and assessment. I'm excited to apply what I'm learning in the Future Faculty Program not only to my next course, but all future courses I teach.

However, nothing replace a teacher's enthusiasm for a subject, which I believe is the single most important factor in getting a student to take an interest in mathematics. If a student dislikes math and goes to class only to find that their teacher also (apparently) dislikes math, how can the student ever be motivated to learn the subject themselves? It is the sad truth that many college students view mathematics as nothing more than an

obstacle en route to a degree. While I may not be able to get most of these students to like math as much as I do, I can certainly help them understand it; the preceding examples of my success as a teacher attest to that. Moreover, I recognize that as a teacher, I am seen by my students as an example of a person who studies mathematics for a living. Therefore, when my students see my enthusiasm, when they see that I appear to be genuinely happy doing and teaching math, they will see that math can be enjoyable and fulfilling, rather than a painful chore. I hope that, in this way, I can not only help all of my students learn, but also serve to inspire some to pursue mathematics on their own.