

## 1. Teaching Philosophy

My schooling has played a strong role in shaping my teaching style and philosophy. I attended a small, progressive high school followed a small liberal arts college and I strive to emulate those teachers in my classroom. I strongly believe that the most important and valuable thing that can be taught in mathematics is not equations or figures, but how to reason through a problem. The true value of my education, I realize, was in shaping my ability to look at problems from multiple perspectives. This skill has served me very well in applied mathematics because each discipline tends to have a slightly different manner of looking at and discussing similar ideas. Being able to think logically and creatively has allowed me to quickly adapt to new areas. It is this type of thought process that I aim to impart in my students, for it the part of mathematics that students can take from the classroom and apply to any endeavor.

Studying mathematics can be an immensely enjoyable experience for students because it can illuminate the full spectrum of scientific topics. It is often said that mathematics forms the foundation on which most of science is built. While I agree with the idea, I prefer to think of mathematics as language; the fundamental language throughout the scientific world. In light of this, I see the teaching of mathematics presenting the same challenges as teaching a second language. While repetition is necessary, it is also crucial to give context to the material and develop the students' ability to think logically. It is for this reason that I believe in emphasizing reading and writing in math courses. At an introductory level, this entails a focus on word problems, basic proofs, and both real and simple idealized applications. To revisit my language analogy, while students must learn to conjugate verbs, the conjugations are worthless if they cannot be used to properly convey sentiments in a sentence. Similarly, while a calculus student must learn a number of integration rules, those rules do no good if the student is unable to construct the proper integral to describe a problem.

In upper level courses I will stress the importance of mathematical proofs, as well as reading and writing mathematical papers. The construction of an elegant mathematical proof requires the same logical organization as a well written essay and it is this skill that I aim to cultivate in my students. The other thing I stress in my classes is the wide range of applications for mathematics. I have had the opportunity to work in a number of different areas of research—from astronomy, to quantum mechanics, to atmospheric and oceanic modeling—and I like to draw from this experience to impress upon my students many different ways that mathematics is used in the world. I really enjoy discussing applications with students, especially applications which many would never have imagined as mathematical problems. In the introductory courses that I taught, I found that bringing in the idea of applications, even at a very basic level, substantially increased my students' interest in the material.

It is because I strive to develop and hone a mathematical thought process that I believe in de-emphasizing the use of calculators in introductory courses. In upper level classes, however, I would like to integrate some basic computer use in many classes. Because I have a strong interest in mathematical models, I believe that they can be a fantastic tool for visualizing many mathematical problems. I would use them as examples in lectures in all levels of classes; from helping multivariate calculus students visualize volume integrals to demonstrating the behavior of chaotic dynamical systems. Since computer

use is an increasingly integral part of most sciences, I believe that making basic programming part of some upper level courses helps develop an important skill that extends beyond mathematics. In addition, it provides students with an effective, more hands-on demonstration.

## **2. Teaching Experience**

Teaching - University of Maryland, College Park

In all of the courses I have taught, I have received very positive feedback. In course evaluations I received superior rankings in every category and my overall instructor rating from the students—3.86 out of 4—was greater than one standard deviation better than the department mean. I always take the time to explain the material fully and answer all questions and that is reflected in my reviews. Wrote one student: “Matt is an excellent [sic] teacher. His way of explaining course work and breaking the problems down makes understanding and learning easy. I never feel uncomfortable asking a question. If a student doesn't get something the first time he will explain and work out the problem several different ways until they do.” I am typically energetic in the classroom so that I can convey my passion for the material and for teaching to my students. According to another student, “Matt makes a wonderful instructor and should probably think about doing it professionally. He's animated and knowledgeable - a rare combination in professors.”

### **College Algebra with Applications – 2004, 2005**

I was the primary instructor for two sections of approximately thirty students each. College Algebra is an introductory course that is a prerequisite for non-major calculus. The syllabus covers basic exponential and logarithmic manipulation, exponential modeling, solving systems of equations, and basic linear programming. Classes were fifty minutes sessions three days a week. While the textbook was assigned, I wrote all of my own lectures as well as all of my own quizzes and was responsible for grading homework, quizzes, and exams.

### **College Algebra with Applications and Trigonometry – 2005**

This is a similar course to College Algebra with Applications, but instead of linear programming it covers trigonometry. I was the primary instructor for the class and wrote all of my own lectures and quizzes for the thrice weekly class. In addition, I graded homework, quizzes, and exams.

### **Calculus I – 2006**

I ran a weekly recitation session for students in calc I. The sessions were an hour and fifteen minutes and usually about two-thirds of the class was me lecturing and the other third was answering questions, going over difficult problems from class or homework, or giving quizzes. I wrote my own lectures and quizzes and graded homework, quizzes, and exams.

Tutoring – University of Maryland, College Park

### **Math Tutoring Center – 2004, 2005, 2006**

The math tutoring center is available for all undergraduate students taking math classes as a place to get questions answered. I spent time in the tutoring center once a week to answer questions ranging from pre-calc and calc to linear algebra and help explain and solve challenging homework questions.