

TEACHING STATEMENT

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“.370, 25, and 1.000.” That, my name, e-mail address, and some information regarding the day’s lecture is usually what I write on the board the first day of calculus class. I would then face the class and ask, “do any of you know what these numbers mean?” After seeing some shaking heads and raised eyebrows, I explain, “these are my sister’s batting average, stolen bases, and fielding percentage for the University of Nebraska Huskers’ 2006 softball season.”

After the explanation, most students will still shake their heads or have their eyebrows raised, but a few will crack a smile. Usually, this introduction will prompt students to ask me, “what position did she play?” (center field), or make comments such as “she must be pretty good” (she is). I begin my lectures like this every day, with a bit of trivia regarding sports or current events that puts the students’ eyes on me and gets them to speak up. It lets them know that I want their attention and participation. And I usually get it.

Being in front of a classroom has been a part of my life since the fall quarter of my junior year. I have taught undergraduate students, graduate students, and I have worked with middle school teachers in a program designed to help improve their skills as math teachers. During the 2004–2005 academic year, I was honored with the Outstanding Teaching Assistant of the Year Award from the Mathematics Department at the University of California, Riverside (UCR). And in 2001, I received the Outstanding Lab Leader Award from the UCR Learning Center. My evaluations consistently rank very highly among other teaching assistants in the department and across the University. Following is a summary of my teaching history.

As a teaching assistant (TA):

- Ordinary and Partial Differential Equations (upper division)
- Intro to Topology (upper division)
- Intro to College Mathematics
- Intro to Ordinary Differential Equations
- Calculus for Business
- First-Year Calculus

As the primary instructor:

- Complex Analysis Qualifying Exam Prep (graduate level)
- Real Analysis Qualifying Exam Prep (graduate level)
- Intro to Ordinary Differential Equations
- First-Year Calculus
- Basic Algebra

All of the above courses were taught at UCR. Most of the courses in which I was the TA had multiple quarters and I have taught them multiple times. Indeed, I have been a TA in at least three classes every quarter of my graduate career. Additionally, I was a Lab Leader for the Basic Algebra course in my junior and senior years as an undergraduate, with responsibilities equivalent to those of a TA. I have also been, and continue to be, a TA Mentor (a new program in the UCR Mathematics Department for incoming TAs). Lastly, I was a research assistant for the Middle School Academy

Mathematics Achievement Partnerships (MAPs) during the summers of 2000 and 2001. I would like to continue working in such a program throughout my career as a professor of mathematics. Please refer to my curriculum vitae (CV) for more details regarding my teaching experience.

However, my CV will not tell you that I want a career in academia which will allow me to teach at the university level, make decisions that affect curriculum, continue research in fractal geometry and have the opportunity to improve mathematics education at large. This choice of career offers me a unique opportunity that I believe I am particularly well-suited to meet—challenging people to learn the subject I love.

I believe students learn the most when the material is presented in a visually stimulating way. For instance, I gave a lecture on finding the sums of geometric series this summer. In order to help the students visualize a geometric series, I used a golf ball and a baseball as an example. I asked the students to identify the ball that would bounce the greatest total distance if they were to bounce indefinitely. I noted that the golf ball is harder (I did not assume that my students knew the difference in the physical properties of each ball) and would bounce higher than the baseball. For ease of computation, I assigned the exaggerated values of 90% and 10%, respectively, as each ball's coefficient of restitution. When prompted, the students identified the golf ball as the correct answer. This simple demonstration helped the students understand geometric series and eased them into computing their sums. While confessing in office hours afterward that I felt silly bouncing the balls on the table in class, several students insisted that the example helped them understand geometric series. Their comments negated whatever silliness I felt. It was a simple idea that really paid off. On the final exam, the students were asked to compute the length of the complement of the Cantor set (whose lengths constitute a geometric series) and many of them answered the question correctly.

I also believe that the thoughtful and creative use of technology can be a helpful instructional tool. I encourage students to take advantage of technology inside and outside of the classroom when it promotes understanding of the material. An example would be plotting the direction field of a first order ordinary differential equation (ODE). This simple but tedious process takes away from an important property of the direction field; it provides a simple and repeatable way of generating approximate solutions to just about any ODE. In class and in office hours, my students are strongly advised to use the software that comes with their textbook and to use the helpful Rice University website, "<http://math.rice.edu/~dfield/dfield.html>". These resources are easy to manipulate and allow the students to be creative with ODEs and their solutions. Additionally, the fact that ODEs are used to model physics is strongly reinforced.

One thing I have learned from my students is, as the instructor, my attitude affects theirs. I had a class that began at 7:10 AM and did not like going to school that early. I told my students as much and repeated this sentiment a few times throughout the quarter. One of them responded by saying, in an evaluation, that I should not teach morning classes. Now, I maintain that I taught the class as thoroughly and thoughtfully as I always do, except that my initial bad attitude got this class and I off on the wrong foot. Since then, I have been mindful of how influential my disposition and approach can be when I am in front of my students.

Leading the Qualifying Exam Preparatory courses has turned out to be the easiest job so far. Although the material was difficult to prepare, teaching it was easier than

expected. About half of the time, I lectured and encouraged the students to ask questions and discuss solutions. The other half of the time, the students presented their own solutions and explained their reasoning to their classmates, earning a more thorough understanding of the subject matter. This reinforced the idea, for me, that student participation enhances their ability to learn.

Conversely, being a TA Mentor and a research assistant for MAPs proved to be the most challenging. As a TA Mentor, it was my job to observe and constructively critique new TAs as they taught their first few classes. I was to grade them using a checklist that included criterion like “speaks/writes clearly,” “well-prepared,” and “invokes participation,” but the list left off some intangible, yet important, qualities. For instance, the performance of one of the TAs fully satisfied the checklist, but he was remarkably boring. So I advised him to not be afraid to be himself and let his personality show while in front of the class. Students respond well when their instructors display personality, as they eventually did with this TA.

Other challenges came with my responsibilities in MAPs which included asking the middle school teachers about their experiences with the program. I was surprised to find resentment in their responses. They felt that they did not need help with their approach to teaching mathematics. The MAPs coordinators responded by being understanding and respectful of their opinions while still showing the participants that there are ways to improve and new techniques to consider. The middle school teachers’ initial resentment transformed into active learning as the coordinators challenged them with a variety of group projects and asked them to give presentations. More than any other teaching experience, this showed me how critical it is to be completely respectful to all students, notwithstanding their various backgrounds and perspectives, while challenging them at the same time.

I look forward to the opportunity to affect mathematics education at all levels by participating in or establishing a program for math teachers such as MAPs. Occasionally, instructors at UCR complain about the students’ lack of an understanding of mathematics at even an elementary level. Instead of merely complaining, I intend to act.

In summary, I believe I am an excellent teacher. I believe I have the right personality and temperament, and perhaps most importantly, I understand that always striving to improve is critical. Accomplishing this requires diligence and an open mind, characteristics I proudly believe I have. One way I hope to improve is by participating in the MAA’s Project NExT. I feel that students respond well to challenge, evidenced by the following quote from a student who took the time to e-mail me after missing the deadline for teaching evaluations, “You are by far the best and most helpful math instructor I’ve had yet at UCR. I liked how you did difficult problems in lecture and assigned difficult problems for homework. It was challenging but I feel like I learned more.”

Shaping the minds of my students is the most gratifying aspect of my career goals. Teaching is part of me, and part of what I want to do with my life.

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