

Teaching Statement

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During nine years of teaching mathematics at many levels, from precalculus and calculus courses to graduate courses, as instructor and as teaching assistant, I have been constantly learning and gaining experience as to what makes an effective practitioner of the craft, and improving and focusing my own skills. I bring this experience, together with a commitment to continue learning and adjusting, to my future career as a teacher of mathematics.

I am pleased to say that my success in teaching has been recognized with the Cornell University Department of Mathematics Teaching Award for 2012–2013.

The most important lesson for me has been the realization that the teaching of mathematics must be interactive and involve the student. In my first assignments as a teaching assistant, I naïvely reasoned that, since I understood calculus so well, I could convey this same satisfying understanding to my students simply by choosing the right words to explain it. Of course, I was forgetting that my own mastery hadn't arisen solely by listening to good lectures! It is certainly important to be able to explain concepts to students, both in lecture and on a more personalized "office hours" level, and I believe, based on student evaluations, that I do so well; but real understanding develops more gradually in the mind of the student, and as a teacher my true task is to facilitate this development in every way I can. Within the context of a lecture, this means not only asking questions of the class but also provoking discussion, guiding the students to work out certain points for themselves, and providing several different ways of viewing key concepts so that each student can find one that resonates.

In addition to my own lecturing, I have found it effective to have students present selected parts of the course material, or their solutions to relevant problems. Not only does this give the presenter valuable experience in expressing her mathematical ideas to an audience, but it adds variety to the class, and helps encourage the rest of the class to think critically about the material presented (since it comes from a less "authoritative" source). More recently, through my participation in the MAA's Project NExT professional development program, I have been learning about techniques such as inquiry-based learning and the Moore method (in which the course is driven by students discovering and sharing course material), which I feel would fit well with my philosophy of teaching and with which I hope to have an opportunity to experiment.

Outside the classroom, students need to learn mathematics by doing, and so solving problems is essential. I endeavor to assign homework that not only gives the students practice in applying ideas learned in class, but also helps give further insight into their uses, significance, context, and limitations. I emphasize the idea of students checking their own work, not from a solution manual, but based on their own careful rereading and checks for internal consistency, and I try as much as possible to ensure that students receive helpful feedback instead of just scores. For the future,

one of my interests is in augmenting traditional problem-solving by making technology, such as computer algebra systems, an integral part of courses, and I hope to have a chance to try it soon.

Another essential part of my teaching philosophy is that students must learn not only to “do” mathematics, but also to communicate and share it effectively. I often assign classroom presentations, as an opportunity for students to communicate mathematics with speech and chalk. In written assignments, I stress clarity, precision, and organization. I encourage students to collaborate and discuss their work with one another, either through in-class group activities or outside of class (though always with due attention paid that each student gains her own understanding and submits her own work).

I am always interested in encouraging students to explore applications of mathematics beyond the standard course material, and in a recent upper-division probability course I assigned a project with this goal. The course attracted students from a wide variety of majors, from economics to biology, and so I asked each student to find an article in the research literature of their area which related to the ideas in the course, and write an extended review. I was impressed by the results, which spanned a broader range of applications than I could have imagined including in the course itself. Additionally, the project gave students a chance to polish their scientific writing skills through a cycle of feedback and revisions. I look forward to including projects such as this in future courses.

As a teacher and a member of the mathematical community, I am strongly committed to encouraging and supporting diversity in my students and colleagues, to educating myself about removing barriers to inclusiveness, and to ensuring that success in mathematics is available to all. I believe mathematics has suffered as a discipline by failing to be inclusive of mathematicians and students of all races, ethnicities, genders, personalities, and socioeconomic and educational backgrounds, and this must be reversed. In my capacity as a teacher, I hope to help students overcome their internal stereotypes of who can be “good at math” and discover their own abilities. To this end, I believe in providing courses in which students develop and share their understanding of mathematics through constant interaction with their instructors and peers, in a safe, respectful, and collegial learning environment in which all students feel included. Outside the classroom, I look forward to the opportunity to advise and mentor students from all backgrounds, and to seek out ways to encourage those who are underrepresented in mathematics to pursue the subject.

While I have learned much about teaching mathematics thus far, and believe myself able to practice it effectively, I am under no illusions as to having perfected it. Indeed, I feel that perhaps the most important aspect of a good teacher is the willingness to continually grow: to seek out new ideas and innovations, to maintain and improve practices that work well, and to critically examine and alter those that do not. In this regard, I have found my experiences as a 2009–2010 Project NExT Fellow particularly rewarding; through this professional development program, I have had the opportunity to learn from experienced practitioners about many new and exciting teaching techniques, a few of which I have mentioned above, and to build a network of colleagues who are similarly interested and who I have no doubt will be an invaluable resource as I continue to branch out as a teacher. I am committed to the ongoing exchange of ideas with the academic community throughout my career, so as to continue to grow and excel as a teacher, and thereby to benefit my institution, my field, and most importantly, my students.