TEACHING STATEMENT

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Over the last eight years as an assistant professor at Stanford and as a graduate student at Brown, my teaching assignments have covered a broad range of mathematical levels and student demographics. I have been the head instructor of a year-long multi-variable calculus sequence for over 400 first-year math and engineering students, taught several graduate courses in number theory, and have also designed and led a semester course in pre-calculus for non-math concentrators ranging in age from 18 to 50. During these courses, I have adopted many different pedagogical approaches ranging from computer laboratory sessions to small group work, from extended, serial homework problems to assigned readings from novels incorporating mathematical ideas, with varying degrees of success. Certainly the varied needs and learning styles of these different student groups require individualized approaches whenever possible, and I try to tailor my courses to best fit these needs. However, regardless of the approach I take in a given class, I find there is simply no substitute for a genuine enthusiasm for the subject, a passion for communicating these ideas to students, and a willingness to give generously of one's time to acheive these ends.

In the classroom, I try to show students that I want them to succeed in the course. By demonstrating a strong commitment to their learning, in part through extra office hours, supplementary hand-outs, and thoughtful responses to questions and emails, I find that students are willing to do more for the course and work harder to learn the material. I also try to give them a sense of my experience of the mathematics on their terms: why is this idea interesting or amazing? Whenever possible, we try to discover the answers together, rather than just state the results. For example, I was recently teaching a multi-variable calculus course and we were discussing change of variables in double and triple integrals. By studying the problem in a simple case, we reduced this process to questions about areas of triangles. Using this situation as a test case, the students were able to guess the correct statement of the much more general result and they were really excited about it. In those moments where the students glimpse a mathematical truth, they experience the same inimitable rush of discovery that keeps me doing math.

For me, the best teachers have been those who could both communicate their insights at the level of the students' understanding and foster new creative ways of thinking from the students themselves; I have tried to copy their examples. Mathematics and math classes often suffer from the perception that the math we learn is a collection of facts which students are forced to accept and memorize. This is a tragedy because the beauty of mathematics lies in the clever ways in which ideas are created in logical ways to solve problems. Each such idea tells a wonderfully linked story which, once learned, is not easily forgotten. To emphasize this point, I try to construct each of my lectures completely from scratch before each class. This forces me to reexamine old ideas, incorporate fresh connections to the material, and present these ideas as self-contained stories within the context of the larger course. By doing this, I hope that each class clearly reflects the ways in which I make these connections in my own mathematical life.

Lastly, I believe that good teaching comes from both teaching and thinking about teaching. Over the past several years, I have helped lead Stanford's graduate teacher training seminar which meets once a week for one quarter. As a graduate student at Brown, I spent time over the summer at Boston College, developing case studies used to train future graduate TAs. I continue to use the case study materials in graduate training here at Stanford.

(Statistics from past course evaluations can be found at `math.stanford.edu/~brubaker`.)