STATEMENT OF TEACHING PHILOSOPHY

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As a student, I was lucky enough to have several exceptional mathematics teachers, from high school through graduate school, who taught lively and inspirational courses. Without these mentors, I would almost certainly not be a mathematician today. In my own teaching, I try to convey the same passion and clarity to my students.

Mathematics has a reputation for being dull and difficult, but of course it needn’t be so. Sometimes this is a question of giving students perspective on the course. I remember my precalculus teacher explaining how many concepts were designed to build up to the “wonderful” subject of calculus, and my consequent eager anticipation to learn calculus. I try to emphasize to students a broad picture of where we are headed, why we should care about particular concepts, and why the subject is useful. For instance, I have found that the subject of linear algebra becomes much livelier when I discuss concrete applications, such as Google’s PageRank algorithm or the dynamics of population changes. Beyond motivation and applications, I think that it is our responsibility as mathematics educators to animate the subject. We find math enjoyable, and the more we can communicate our enthusiasm, the better our students will respond.

Learning mathematics has an effect which in my mind supersedes even the usefulness of the many individual notions one encounters along the way. By taking math courses, students learn how to think analytically and rigorously. Even if they forget the definition of a limit or the sine addition formula, even if they major in literature or some other field only tangentially related to mathematics, students should understand from a math class how to construct cogent and logical arguments. Often introductory math classes in college do not teach the basics of how to write a proof; I feel that any class would benefit from a basic primer on if-then statements, converses, contrapositives, proofs by contradiction, and so forth. Deductive reasoning should form the basis for any form of intellectual inquiry and to me comprises mathematics’ most crucial and elegant legacy.

From my experiences as a student and teacher at Harvard, MIT, and Stanford, I have seen some concrete teaching techniques which I like to incorporate into my own instruction. One is extremely close attention to organization. This includes providing a detailed syllabus so that students can see what’s coming and get a head start if they desire; being punctual in assigning and returning homework; making review sheets available before exams; and streamlining the course so that lectures, discussion sections, and textbooks build upon each other in a consistent fashion. Another technique is the liberal use of props, visual aids, online resources, and the like. Many students perceive an hourlong math class as too long for the necessary concentration. Breaking the lecture into pieces, with the help of physical demonstrations, definitely helps the students in my experience.
Mathematics does not stop in the classroom, and it is extremely important to encourage students who want to learn beyond the curriculum. I have seen too many bright students whose interest in mathematics has waned because they have not seen any mathematics outside of class material. I try to suggest additional problems and avenues for exploration for interested students, and make myself as available as possible outside of class for this purpose. This works at all levels, and also completely separately from classes; I have led sessions of the Stanford Math Circle, for high school students in the San Francisco Bay Area, and have also directed extracurricular problem-solving seminars (for the Putnam competition) for undergraduates at both Harvard and Stanford. In these types of environments, students can be exposed to active areas of mathematics which they would not ordinarily see in a standard course sequence. I would be eager to help with similar programs in the future.

Teaching Experience

(Teaching at Stanford was voluntary due to the nature of my postdoctoral fellowship.)

Math 51, Stanford University, fall 2004: Linear Algebra and Differential Calculus of Several Variables (two lecture classes). Overall evaluation rating: 4.4/5.0.

Math 385, Stanford University, spring 2003: graduate topics course in knot theory and three-manifold topology. Overall evaluation rating: 4.9/5.0.

Math 361, Stanford University, fall 2002: supervised reading course in symplectic geometry for five graduate students.

18.022, MIT, fall 1999: taught recitation for advanced multivariable calculus under Prof. Hartley Rogers. Overall evaluation rating: 6.6/7.0.

Student Comments: Stanford (Math 51)

“Excellent, always put students first and catered to their needs while staying on task.”

“He showed enthusiasm and a willingness to answer students’ questions thoroughly.”

“Would go out of his way and time to make sure students understood material.”

“Excellent, great review sheets, extra topics (Google) were great.”

“Enthusiastic, goes through lots of good examples, gives good review handouts.”

“Genuinely cared about our progress.”

“Great attitude, very clear.”

Student Comments: MIT (18.022)

“Lenny is the most intelligent and concise teacher that I’ve had here at MIT. . . . I believe that Lenny really tried his utmost to get the material across to us in the most organized fashion, and the entire class knows that Lenny is a legend because of how effective his recitation section is.”

“The only reason I stayed in this course is because of him.”