William A. Stein Teaching Statement

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In the past ten years I have taught several freshman-level courses. I was an undergraduate at Northern Arizona University in Flagstaff, Arizona, and attended graduate school there for one year. During that year I was responsible for all aspects of teaching two courses on college algebra and two on elementary discrete mathematics. Next I transferred to Berkeley, where I taught a summer course on discrete mathematics, was an assistant for four calculus courses, and developed computer-based curriculum materials for a linear algebra course. Finally, at Harvard I've taught linear algebra twice and a freshman seminar on elliptic curves and am currently teaching one on Fermat's Last Theorem.

At Harvard I taught an undergraduate elementary number theory course twice, which was aimed at students interested in mathematics, but not necessarily majoring in mathematics. I have written a book based on this course that will be published by Springer-Verlag (see `http://modular.fas.harvard.edu/ent`). I type up lecture notes for many of the courses I teach because students greatly appreciate the enhanced clarity these notes bring.

When preparing a lecture I master the material, then write it up as clearly as I can, often typed or as a computer presentation, depending on the topic. After writing up a lecture, I spend substantial time thinking through how to present the material in front of an audience: What questions might I be asked? Will the notation make sense when spoken? How does a sentence sound when spoken? I like to make available notes before the lecture, so students can simultaneously learn from both my lecture and from a written account, which accommodates different learning styles. I also post virtual office hours to the course web site, which summarize email correspondence and discussions from office hours.

I have been very successful at involving undergraduate students in my research. For example, during summer 2004 I designed, obtained funding for, and ran an NSF-sponsored summer research program in which five undergraduates worked on research under my direction (see `http://modular.fas.harvard.edu/sage/`).

I find using technology in my teaching natural, because I have studied computers extensively and genuinely enjoy writing software. Being able to program allows me to develop the tools I need for a class. In my teaching, I make substantial use of software to demonstrate ideas and to help students play with mathematical objects and make conjectures. I also try to convey curiosity about how mathematical software works.

I've had the opportunity to give many talks to young people, including three at Math Circles in Boston, one at the Harvard/MIT Math contest, and a one week course at the Canada/USA MathCamp. I was also an invited speaker at the student-organized Brown Symposium for Undergraduates in the Mathematical Sciences (see `http://www.math.brown.edu/sums/`).