TEACHING STATEMENT

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TEACHING EXPERIENCE

As a graduate student at UC Berkeley I was a TA for 10 semesters during which I TA'd for a wide variety of courses including all levels of calculus, linear algebra, differential equations, discrete mathematics, statistics, and many more.

After receiving a PhD from Berkeley I held a VIGRE postdoc at UCLA. The point of the VIGRE program is to integrate established researchers (my mentor) with postdocs and postdocs (me) with grad students and grad students with undergraduates. I ran several participatory graduate seminars on advanced topics where the students actively ran the class. My roll in these seminars was to provide the initial direction or topic and then to help the students understand the material they were reading, discussing, and presenting in class. Topics of these seminars included, forcing, descriptive set theory, determinacy, and basic inner model theory. In addition to the participatory seminars I taught undergraduate and graduate courses including discrete mathematics, calculus, analysis, differential equations, linear algebra, and a course on Gödel's constructable universe and covering.

From UCLA I took a visiting position at the University of North Texas (UNT) in order to work with Steve Jackson whose area of research is close to my own. At UNT I have taught discrete math, business calculus, and college algebra as well as a graduate course on models of determinacy.

In addition to the above I have on two different occasion taught at Laney, in the Peralta Community College system in the Berkeley-Oakland area . In Spring of 2000 I taught a night course in statistics and worked in the mathlab and in Summer of 2003 I taught a pre-algebra course.

TEACHING PHILOSOPHY

For foundational introductory mathematics courses like pre-algebra, college algebra, pre-calculus, and to some degree the first semester of calculus, I like to mix lecture with time spent with the students working on problems in groups and then presenting solutions on the board. This is a little difficult to manage with the large classes that I have had, the main problem is making efficient use of class time and getting through all of the material that must be covered. For these introductory courses lecturing involves more working of examples than actual lecturing as such. I believe for courses at the level of pre-algebra, algebra, geometry, etc. it is critical to keep the students actively involved in class. I think the students gain little from a pure lecture format and gain greatly from group work and presentation of solutions. In particular the students gain from trying to explain concepts to their peers and gain from the immediate feedback they get when presenting solutions on the board. It is also useful for students to see the variety of mistakes that other students make.

For more advanced college level mathematics I tend to use fairly standard teaching methods. I lecture and expect students to take notes and pay attention to examples given in class (which often reappear in slightly altered forms on quizzes and exams). I also expect students to read their texts for reinforcement of concepts and I often try to get them to read ahead by assigning reading as homework so that they might already have some questions ready for lecture. If there is time I will still try to incorporate group work and presentations. Often it is difficult to cover the required material for advanced courses carefully and in the allotted time thus there is not much time left for group work or presentation of problems to the class.

As a final note, I am always learning more about teaching from the actual experience and from colleagues. I am not rigid in my beliefs and I am willing to try out new techniques. As mentioned above much of my experience with undergraduate classes has been in the setting of large classes where it is virtually impossible to get to know all of the students individually. I would welcome the opportunity to teach smaller more personal classes.

STUDENT ASSESSMENT

For courses up through calculus, I usually assign a hefty dose of simple repetitive homework in order to build fundamental understanding and confidence with the mathematics involved. I believe that there is no better way for a

student to get comfortable with the techniques involved and avoid mistakes than practice. Take, for example, solving systems of equations or inequalities or techniques of differentiation and integration. For courses that are slightly more advanced I like to choose some easy exercises to build confidence, but also choose more challenging exercises to really get the students thinking. For these more advanced courses I think too simple of examples and exercises can actually obscure what is going on, as a simple example, from a Business Calculus course I have taught several times, suppose one looks primarily at optimization or graphing problems which are quadratic, the existence of algebraic methods which suffice to solve the problem obscures the reason we are teaching differentiation in the first place. When grading homework, I usually split the grade into a grade for completeness or, more generally, for effort, and then I choose a few problems to grade carefully. In addition I usually augment the homework grade with an occasional quiz. I attempt to make sure that turning in homework and taking quizzes can only help the students final grade. In addition to homework and quizzes I give exams and often arrange things so that if exams show improvement, then the later exams will count more than the earlier exams, but real improvement must be shown, I do not just drop exams or curve the class grades. A grade should be earned and I think it is a bad idea to keep moving students through math courses without them developing the necessary skills.

TECHNOLOGY

For courses where appropriate I like the students to use computers, for example, for visualization in multidimensional calculus, direction fields in differential equations, and "non trivial" numerical calculations in statistics. As far as the use of technology goes, I like to use computers over calculators where appropriate and when feasible. I like to stick to free software when possible; there is plenty out there for most applications required by college level mathematics. I have not actually ran a course where computers are used as a significant part of the course, but I am quite familiar and comfortable with computers and would have no problem incorporating them into the classroom, where they are beneficial.