Teaching Statement

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One way to contribute to mathematics is to engage in active research oneself. Another way is to teach mathematics in such a way that others can appreciate the beauty of this wonderful subject. Helping out my friends and fellow students during my undergraduate days made me realize that I had the potential to teach mathematics. A good way to learn is the process of inquiry and my teaching reflects this principle. The basic approach I follow in teaching is what I use in my research: to constantly ask questions.

In my time as a Research Assistant Professor at the University of Nebraska-Lincoln (UNL) and as a Graduate Teaching Assistant at the University of Kansas (KU), I have taught students with varying backgrounds including mathematics graduate students, undergraduate students from the school of engineering, from the business school and the college of liberal arts and sciences. I have taught courses with varied levels of responsibility. These include coordinated courses (first semester business calculus at KU, second semester engineering calculus), discussion sections (third semester engineering calculus), courses in which I have had complete responsibility including an advanced topics course in commutative algebra for graduate students, Math in the City: an interdisciplinary course involving a hands-on learning experience using mathematical modeling for undergraduates at the senior and junior level, vector calculus and differential equations and reading courses in advanced topics for graduate students at UNL. Teaching these different styles of courses and students with diverse backgrounds has given me a great opportunity to sharpen my teaching skills.

The constant in all these courses has been the lively atmosphere in my class. There is plenty of interaction between me and my students, I encourage them to share their questions, doubts and ideas on the material being covered. I introduce topics by asking questions and pointing the students in the right direction instead of giving them the answers. This helps them discover the course material rather than covering it myself. A good example is when introducing products of vectors, I ask my students whether they think it should be a scalar or a vector. Most students are pleasantly surprised to find out that they are right no matter which option they choose. In order to stimulate an atmosphere promoting learning by discussion, I also encourage students to work in groups by giving them group projects and quizzes. All these techniques found a perfect fit in Math in the City, in which students work on real-life projects in groups, requiring more of a mentoring role on my part rather than the traditional teaching role. A clear blackboard style, a proper mix of writing and talking, a good sense of humour and pop quizzes help me keep the students I teach interested and thinking all the time.

In teaching calculus, I employ various techniques while trying to get the point across. My favourite is the use of a 'slinky' to illustrate the parametrized curve $(\cos(t),\sin(t),kt)$; higher values of the constant k correspond to stretching the slinky more. I try to achieve the right blend of rigour with techniques like proofs by example or by pictures to help students understand the material. I also push students to think beyond the course by giving them appropriate extra credit problems (e.g., try to construct a function $f(x)$ with three horizontal asymptotes, in a introductory calculus course; a function $f(x,y)$ with $f_{xy} \neq f_{yx}$ in a higher level calculus course) to work on and to be turned in at the end of the semester. The aim of such problems is not the answer itself but the whole process of arriving at the answer, at the end of which the students would have thought more about the course than by just solving the regularly assigned exercises. In the same vein, the graduate students in the advanced topics course were required to write an essay on the main object of study for their final exam. The essays provided evidence that this technique is successful; each student researched and wrote an essay that reflected how they used the main object of study in their own work.

Another important aspect of my teaching is constant feedback. The mathematics departments at KU and at UNL collect an evaluation at the end of the semester which helps me improve. I also conduct a mid-semester feedback in each class, in which the students turn in anonymous surveys about the class. These forms and the daily inputs from students during class and office hours help me keep track of how the class is progressing and change my methods if necessary.

Teaching is an art. As with any art, one has to constantly practice and improve. Valuable input from the faculty, my peers and the student feedback have helped me constantly evolve as a teacher. My scores in the evaluation conducted by the mathematics departments have always been above average. I was a finalist for the "*Florence Black Teaching Award*" for GTAs in the mathematics department at KU four years in a row. This honour and the comments I receive from my students keep me motivated to teach, and more importantly, constantly strive to get better at helping my students understand the subject.

Teaching Evalutions: Department of Mathematics, University of Nebraska-Lincoln
Item from the Mathematics Department survey summarized:

What is your overall impression of the quality of instruction in this course?

Semester	Course	No. of surveys	Score (max. 4.0)
Spring 2011	Advanced Topics in Commutative Algebra	5	4.0
Fall 2010	Business Calculus - I	95	2.84
Spring 2010	Differential Equations	25	3.04
Fall 2009	Vector Calculus	17	3.00
Fall 2009	Business Calculus - I	56	2.95
Average		198	2.94

Teaching Evalutions: Department of Mathematics, University of Kansas
Item from the Mathematics Department survey summarized:

Overall, he is an effective teacher.

Semester	Course	Score (max. 5.0)
Spring 2008	Vector Calculus	4.53
Spring 2007	Business Calculus - II	4.59
Fall 2006	Engineering Calculus - II	4.81
Fall 2005	Engineering Calculus - II	4.75
Spring 2005	Business Calculus - II	4.48
Fall 2004	Engineering Calculus - II	4.75
Spring 2004	Vector Calculus and Linear Algebra	4.46
Fall 2003	Business Calculus - I	4.14
Spring 2003	Business Calculus - I	4.14
Fall 2002	Business Calculus - I	4.00
Average		4.47

Complete evaluations available upon request.