Teaching Statement

My interest in teaching dates back to my Master's degree, when I took an education course at McMaster University, entitled "Principles and Practice of University Teaching". This course taught me a variety of techniques, from understanding the theory of teaching to the ability to promote student involvement in lectures and ways to encourage deep learning. McMaster University offered only two such education courses, so I took the second, "Presenting Effective Lectures" as part of my Ph.D. One of the requirements was to present two guest lectures in undergraduate classes in our fields, using the techniques we had learned. I was fortunate enough to present lectures in courses run by an award-winning lecturer, Miroslav Lovric', who also provided me with excellent mentoring in the practice of teaching. During the final summer of my Ph.D., I taught first year Calculus/Calculus for Engineers and second year Linear Algebra, an opportunity not normally given to graduate students. This allowed me to put my skills into practice: I was responsible for designing the structure and material covered in both courses and supervising undergraduate markers and Tutorial Assistants.

During my postdoctoral fellowship at the University of Western Ontario, I taught second and third year Differential Equations for two years. Once again, I was the sole instructor and course designer for these courses. As well as supervising graduate student Tutorial Assistants and undergraduate markers, I designed labs for the computational section of the course. When teaching these courses, I would often spend hours of my own time working through problems with students. In addition to providing students with a great deal of assistance, this also allowed students to feel comfortable enough to suggest ways in which the courses could be changed to suit them, such as the inclusion of presentations and group work. I always welcome feedback and encouraged a great deal of dialogue with students about how their needs were being satisfied by the course material I had designed. I believe the changes that I made midway through the course not only made the course stronger and more tailored to the students, but also allowed the students to feel that they were part of a process, rather than being forced to endure someone else's design.

I have always encouraged class discussion, on the basis that if a student brave enough to speak out in class does not grasp the material, then other students who stay silent are probably also confused. My policy has always been that students' questions should be answered fully, with multiple answers from different viewpoints and continued examples and revising of the material until they understand. I have found this policy to be extremely successful in helping students master the material and also in making them feel that their questions, no matter how trivial or fundamental, are always given due weight.

One of the ways to get students to contribute is to reward and never punish them for answering in-class questions. A student who answers the question "Is this equilibrium stable or unstable?" can only be right or wrong. If right, they learn nothing; if wrong, they become shamed into silence and no student will want to offer an answer ever again. A question phrased without a single right-wrong answer, such as "What are some of the properties of this dynamical system?" is far superior. It allows a multitude of answers, so that many students can contribute. By writing down all the answers on the board, students are rewarded for their answers, discussion of the concept is stimulated and I can discuss the implications of the answers in the remainder of the lecture.

Furthermore, as an interdisciplinary mathematician, I feel I am expertly placed to motivate students in understanding why mathematics is interesting, useful and fun. I have frequently had students tell me they never thought mathematics could be interesting until they heard me speak about it. My passion for both the methods and the variety of applications, many of which are directly useful in the students' lives, has stood me in good stead. As a mathematical biologist, I can engage students in a way that has a direct personal connection to each of them. When discussing periodic orbits, a student can understand the concept of a pendulum swinging back and forth, but they have no intrinsic connection to it. However, getting them to sit silently and listen to their own heartbeat for a minute touches a nerve with students that allows them to see how mathematics can describe phenomena that they have a deep and fundamental connection with. I have discovered that framing material in these terms is an extremely effective way in which to engage student interest and passion.

I have also had success in mentoring students in mathematics. During my postdoc at the University of Western Ontario, I was fortunate to have the opportunity to supervise a summer research student. She had some interest in mathematical modeling, but had intended to pursue a career in actuarial science. I take great pride in having encouraged her mathematical abilities such that she has ultimately decide to pursue a career in mathematics and was recently accepted to Oxford University. In the following semester's courses, I discovered a student who was interested in mathematical biology, but who had no idea how to go about fulfilling her interests. I was running our department's math biology seminars at the time, so I invited her to join us on a weekly basis and encouraged her pursuit of mathematical modeling projects. Consequently, she has since changed her field to mathematical biology and is now undertaking an M.Sc. in HIV modeling at the University of British Columbia. At the ECTMB conference in 2005, I eagerly joined the mentoring program and was assigned a Master's student, advising and answering her questions about her academic future. Once again, I feel proud to have been instrumental in encouraging her to pursue a Ph.D. in mathematics, rather than the career in the corporate world she was seeking.

I recently taught freshmen pre-calculus and discovered that teaching what is too often regarded as a "service course" was immensely rewarding. Through gentle encouragement and consistent classroom discussion and feedback, I was able to guide these students from basic high-school concepts through to sophisticated problem-solving challenges. This summer, I conducted a workshop on mathematical modeling for biologists and I am currently teaching mathematical epidemiology to graduate students in pathobiology. I have found the application of mathematics to biological problems is a field that can excite and inspire students who have limited mathematical background and who often fear equations. Bringing such students "into the fold" has been extremely rewarding, both for myself and for them, giving them the ability to read a paper that involves differential equations and understand how a model is constructed and what underlying assumptions connect to which equations.

My aim is to provide an educational experience which is informative, enthusiastic, entertaining and relevant. The interdisciplinary nature of my work makes me especially suited to these tasks and I have a love of communication that puts students at ease. I find teaching to be extremely rewarding and it is my sincere aim that my students come away from my classroom with the same rewards.