John McGee
Personal Statement

I developed a love for science in general and mathematics in particular early in life. Like many before, me I was inspired by the science fiction of Jules Verne and Gene Rodenberry and others, as well as the inspiring reality of the space program of the 1960's. Many of my science and mathematics instructors also had a profound impact on my academic course. In particular, I appreciate the thorough grounding in calculus provided by my high school math and physics instructor Elio del Cañal. Two of my college professors also served as excellent guides and mentors, Dr. James Matthews of WPI and Dr. Ezra Brown of Virginia Tech. My own route to academia has been a long an circuitousness one. After receiving a master's degree in electrical engineering, I spent 22 years in industry as a mathematical software developer. In 2003 I returned to the university for a degree in mathematics and preparation for the classroom. It is as a teacher of mathematics that I have finally found my place.

■ Teaching

My teaching philosophy is simple: treat each student with respect, while expecting from each one just a little more than they do of themselves. In practical terms this means challenging students with difficult and unusual problems, giving second chances and extra help to those willing to work for them, and maintaining a level of excitement and unpredictably in the classroom. I believe an important aspect of showing respect for students is by prompt grading of their work, along with feedback designed to correct erroneous conceptions.

In mathematics it is more important for students to understand concepts than to memorize formulas, more important to learn abstract thinking and the meaning of proof then to master use of a particular technology. I believe that under ideal conditions, students should not be allowed to use computational aids until they have demonstrated the ability to perform similar computations "by hand". Technology can play in important role however, and that is to help students visualize concepts and to ease computational burden when such computations are not the key aspect of the subject matter under study.

■ Research

It is very important to me to maintain an active research program. I believe it is neither reasonable nor practical to expect students to continuously expand their mathematical thinking if I do not demand the same from myself. Two areas of research that are currently the focus of my study are mathematical and statistical pedagogy and algebraic number theory. Since I am relatively new to the classroom I depend heavily on the example of the best teachers I have had the privilege to know, both in the field of mathematics and outside it. In my experience the keys to effectiveness of the best teachers are (1) a thorough and deep understanding of the subject matter (2) a genuine enthusiasm for the material (3) a sincere personal interest in each students' progress. In order to maintain my own program of "continuous improvement". I endeavor to observe carefully which teaching methods work well and those that definitely do not, and use these results to refine my own pedagogy.

The other area of research is the mathematics of algebraic number theory, centered around elliptic curves. I choose this area for several reasons. First, it is a rich source of mathematics that is accessible to undergraduates, and yet extends to the deepest depths of modern mathematics. As many others have observed, this particular area of mathematics leverages the power of almost every subject area including: classic number theory, abstract algebra, topology, real and complex analysis, as well as projective and Riemannian geometry. Thus study in this area keeps one exposed to ideas and advancements across a broad spectrum of mathematical thinking.

Service

My current service objectives include recruitment, advising and supervising undergraduate research. These activities allow me to contribute to the mathematics department as well as to have an impact on a personal level in the academic progress of students.