

# Research Statement

Patrick X. Rault

My research interests are twofold: number theory and mathematics education. My research in number theory focuses on the set of rational points on a variety. This is a worldwide hot-topic with inspiring problems like the recently solved Fermat's Last Theorem and the unsolved million dollar BSD Conjecture. As a mathematician, I hope to make a contribution to this intriguing subject. As a teacher I strive to engage and inspire my students. Everything I do in teaching mathematics is an appropriate subject for research.

With easy to state problems that lead naturally into advanced techniques, number theory is the perfect vehicle for helping undergraduates encounter higher level mathematics. I have proven bounds for the height-counting-function of a curve which improve in several ways on an important theorem of Browning and Heath-Brown. I have many ideas for independent future research, including generalizing my aforementioned result to solve an open problem of Heath-Brown. I especially look forward to mentoring students in research and independent studies.

As a graduate student I have studied research on mathematics and science education. I have recently designed and implemented a controlled study of teaching methods in the classroom setting. Both college education research, which relates directly to my own teaching, and K12 research, which relates to my students in teacher preparation programs, is of interest to me. I look forward to furthering my research skills via study of the literature and collaboration with an established researcher.