Project Summary: Developing American Research Leadership in Algebraic Geometry and its Boundaries

This RTG project continues a successful research training program in algebraic geometry and its boundary areas at the University of Michigan. Target trainees are recent PhDs and advanced graduate students, though there is also an REU component. The project is run by five senior faculty members (William Fulton, Robert Lazarsfeld, Mircea Mustata, Yongbin Ruan and Karen Smith) in consultation with an additional 16 senior faculty at Michigan in related areas.

Intellectual Merit. Algebraic geometry is a central and highly active branch of mathematics today, with increasingly important connections to other branches of mathematics and science. These other areas include commutative algebra, number theory, combinatorics, representation theory, and complex analysis, as well as string theory and other aspects of theoretical physics and computer science. The explosive growth of algebraic geometry at the end of the twentieth century has made this a very exciting time to begin research in the field, but it has also made it difficult for young researchers to get started. This project will increase the flow of broadly trained researchers in algebraic geometry and its boundary areas. Given the size and visibility of the research groups involved in this project, Michigan's Algebraic Geometry RTG program has had and will continue to have a substantial impact at the national level in building a thriving community of young researchers in and around algebraic geometry.

Broader Impact. The project develops the research potential of its trainees, as well as their capability to nurture the next generation. Activities include

- a rich array of seminar and workshop activities allowing broad exposure to a wide variety of basic and research level topics of importance in algebraic geometry (broadly construed);
- the opportunity for post-doctoral trainees to propose, design and organize workshops under the mentorship of a senior faculty member;
- an annual school and other activities open to researchers from outside Michigan, including activities such as a computer-algebra training workshop which will also be of value to many of our undergraduate students as well.
- opportunities for post-doctoral researchers to design and lead REU projects under the mentorship of a senior faculty member;
- numerous opportunities for advanced graduate students and post-docs to develop their technical and expository lecturing skills;
- numerous opportunities for post-docs and advanced graduate students to receive mentoring on all aspects of a research career in mathematics.
- funds for trainee travel to domestic and international conferences in order to establish connections, get exposure to research trends not represented at Michigan, and gain visibility as they lecture on their work.

The vast majority of funds will be used to support a critical mass of strong students and post-docs at Michigan. As our experience has shown, by bringing together so many enthusiastic young minds in a fertile and friendly mathematical environment such as Michigan's algebraic geometry group, these training activities represent only the smallest beginning of the great opportunities for collaboration, maturation, and support our trainees will create for themselves with our guidance.