Mathematics Department Colloquium

Organizer(s): Kenneth Ribet

Thursday, 4:10–5:00pm, 60 Evans

Jan. 22   **Karen Smith**, University of Michigan
               Thresholds of Singularities

Consider a polynomial function f on complex N-space. We say that f is *singular* at a point if its gradient vanishes there, or equivalently, if the algebraic variety defined by f (that is, the zero set of f) is not smooth at the point. But how can we measure how singular f is? I will present three different ways of trying to make such a measurement. The most classical involves using integration to measure how fast the reciprocal approaches infinity at the singular points. Or using algebraic geometry, we can measure the singularities in terms of the complicatedness of a "resolution of singularities." Finally, we can also "reduce mod p" and study the behavior of f under the Frobenius (or pth power) map. Amazingly, all these different ways of measuring singularities turn out to be more or less equivalent, and I hope to hint at why.