Hypersurfaces which are far from being rational

Abstract:
Rational varieties are some of the simplest examples of varieties, e.g. most of their points can be parametrized by affine space. It is natural to ask (1) How can we determine when a variety is rational? and (2) If a variety is not rational, can we measure how far it is from being rational? A famous particular case of this problem is when the variety is a smooth hypersurface in projective space. This problem has attracted a great deal of attention both classically and recently. The interesting case is when the degree of the hypersurface is at most the dimension of the projective space (the “Fano” range), these hypersurfaces share many of the properties of projective space. In this talk, we present recent work with Nathan Chen which says that smooth Fano hypersurfaces of large dimension can have arbitrarily large degrees of irrationality, i.e. they can be arbitrarily far from being rational.