

Algebraic Geometry Seminar

Calabi-Yau threefolds fibred by lattice polarized K3 surfaces

Alan Thompson (University of Waterloo)

Abstract: I will describe recent joint work with C. Doran, A. Harder and A. Novoseltsev, in which we study the moduli spaces of certain Calabi-Yau threefolds with small Hodge number $h^{2,1}$. Many such Calabi-Yau threefolds admit fibrations by K3 surfaces that are polarized by lattices of high rank. In the case where the polarizing lattice has rank 19, the theory of such fibrations closely parallels the theory of elliptic surfaces: in particular, the coarse moduli space of the K3 surface fibres is a modular curve, and there are analogues of the functional and homological invariants which determine much of the geometry of the threefold total space. Using this structure, it is possible to explicitly map out the moduli spaces of Calabi-Yau threefolds fibred by such K3 surfaces. There is also a beautiful interpretation of mirror symmetry for these Calabi-Yau threefolds, related to (weak) Landau-Ginzburg models of Fano threefolds, which I will describe if time allows.

Wednesday, September 9 at 4:00 PM in SEO 427