

Simon Donaldson: **Stability of algebraic varieties and Kahler geometry**

We will begin by reviewing background in Geometric Invariant Theory, the Kempf-Ness metrical criterion for stability and the Kobayashi-Hitchin correspondence for vector bundles. Then we will explain the notion of K-stability for varieties and the formal picture relating this to Kahler geometry. These ideas will be illustrated by the case of toric manifolds. We will then outline the proof (with Chen and Sun) of Yau's conjecture for Kahler-Einstein metrics on Fano manifolds and particularly the interaction between algebraic geometry and Riemannian convergence theory. As time allows, we will describe more recent work (with Sun) on the algebro-geometric meaning of Riemannian "tangent cones" and mention other developments (by a number of different groups) concerning moduli spaces of Fano manifolds.