Workshop on singular canonical Kähler metrics on compact and noncompact manifolds

Friday (September 05)

9:30-10:30 **Charlie Cifarelli: Explicit Calabi-Yau metrics via Hamiltonian 2-forms**

Abstract: The theory of Hamiltonian 2-forms was introduced by Apostolov-Calderbank-Gauduchon-Tønneson-Friedman as a tool for studying several natural equations arising in Kähler geometry. They discovered that the framework could be used as an Ansatz for important classes of special Kähler metrics, and this perspective was subsequently used to great effect in several scenarios, notably the situation of extremal metrics on projective bundles. I will present on work, partially joint with Apostolov, which extends this technique to the non-compact setting to produce many new examples of complete Calabi-Yau metrics. As a consequence of the Ansatz, one ends up with explicit formulas determining the metric. The same method can be employed to produce Kähler-Ricci solitons, which we may discuss briefly if time permits, but we will focus on the Calabi-Yau case.

11:00-12:00 **Antonio Trusiani: Smooth Monge-Ampère solutions in big cohomology classes**

Abstract: Yau's Theorem on the existence of smooth solutions to complex Monge-Ampère equations in the Kähler setting resolved Calabi's conjecture and opened up numerous directions of research. Among these, the study of complex Monge-Ampère equations in big cohomology classes has been particularly active, leading to several important geometric applications. In this talk, I will show that solutions to complex Monge-Ampère equations in big cohomology classes are smooth on the so-called ample locus. I will conclude by discussing some applications, including an analogue of Calabi's conjecture in the big setting and regularity results for certain canonical metrics.

14:00-15:00 **Ruadhai Dervan: Metric wall-crossing**

Abstract: Moduli spaces in algebraic geometry depend on a choice of stability condition, as they parametrise (poly)stable objects (such as varieties, log pairs, bundles...). Wall-crossing describes how these moduli spaces vary with the choice of stability condition. In Kähler geometry, these moduli spaces admit natural Weil-Petersson metrics, which also depend on the stability condition. I will discuss results in favour of the following conjectures, which provide a metrised (Kähler) upgrade of wall-crossing: (i) across walls, the moduli spaces endowed with their Weil-Petersson metrics undergo metric flips; (ii) towards a wall, the moduli spaces converge in the Gromov-Hausdorff sense to the metrised moduli space on the base of the flip.