

**Speaker:** Yanki Lekili  
Massachusetts Institute of Technology

**Title:** Broken Lefschetz fibrations on 4-manifolds

**Abstract:**

Motivated by the programmes initiated by Taubes and Perutz, we study the geometry of near-symplectic 4-manifolds, i.e., manifolds equipped with a closed 2-form which is symplectic outside a union of embedded 1-dimensional submanifolds, and broken Lefschetz fibrations on them. A broken fibration is a map from smooth 4-manifolds to  $S^2$  with two types of singularities : isolated Lefschetz-type singularities and indefinite fold singularities along circles. We present a set of four moves which allow us to pass from any given broken fibration to any other which is deformation equivalent to it. The arguments rely on the introduction of a more general class of maps, which we call wrinkled fibrations and which allow us to rely on classical singularity theory. As an application, we prove existence of broken Lefschetz fibrations on any smooth 4-manifold disproving a conjecture of Gay and Kirby.