

Speaker: Brett Parker

Title: Degenerations of holomorphic curves, tropical geometry, gluing theorems, and exploded manifolds

Abstract: Holomorphic curves play a central role in symplectic topology. They can be regarded as 2-dimensional analogues of geodesics within a symplectic manifold, or as trajectories traced out by interacting strings in string theory, and provide a rich geometric framework for understanding symplectic topology. In many situations, holomorphic curves can be studied using 1-dimensional piecewise-linear objects called tropical curves. In the first lecture, I will explain the geometry behind the appearance of tropical curves, and explain why it is useful to employ a category blending tropical geometry with usual differential or algebraic geometry. In the remaining lectures, I will introduce the category of exploded manifolds, and explain how using such a category provides a guiding framework for proving gluing formulae and understanding holomorphic curves under a wide class of degenerations including normal crossing degenerations. I will also link this to log geometry and logarithmic Gromov—Witten invariants.