

MATH 80750

Gioacchino Antonelli

Description

The course will be an introduction to comparison geometry, with an emphasis on the interaction between curvature bounds, analysis, and the global structure of Riemannian manifolds. I plan to cover classical analytic and geometric comparison results, including Cheng-Yau gradient estimates, the Lichnerowicz eigenvalue estimate, Hessian and Laplacian comparison, Bishop-Gromov volume comparison, and related applications. We will then discuss structural results for manifolds with nonnegative Ricci curvature, including splitting theorems and aspects of the Cheeger-Colding theory of limits of manifolds with Ricci curvature bounded below. Time permitting, I will also cover Toponogov's theorem, basic notions from Alexandrov geometry, the Soul Theorem, and some more recent research-level questions, depending on the interests of the students.