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Research fields: Differential Geometry

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Present research:

I am now studying metric measure spaces with Ricci curvature bounded below, so-called RCD spaces whose original definition is written in terms of Optimal Transportation Theory. We have a couple of equivalent definitions of RCD spaces, for instance, coming from the theory of Dirichlet forms. Typical examples of RCD spaces can be found in weighted Riemannian manifolds with possibly boundary and in their measured Gromov-Hausdorff limit spaces. One of my interests is to understand RCD spaces geometrically via analytical tools including Geometric Measure Theory and PDEs.

In the last 20 years, it, say the RCD theory, is quickly developed with deep relationships between other topics including Probability Theory, Algebraic Geometry and Complex Geometry. In particular, the RCD theory now recovers/improves most studies of Ricci limits paces, which are defined as measured Gromov-Hausdorff limit spaces of unweighted Riemannian manifolds with Ricci curvature bounded below (thus, they are also typical examples of RCD spaces), where the theory of Ricci limit spaces was significantly developed around the end of 90's.

Finally, I would like to inform a couple of the topics I have studied previously:

-Degenerations of K3 surfaces and Fano manifolds;

-Spectral behavior of nonlinear PDEs and elliptic operators including Hodge Laplacian;

-Heat kernel and its applications;

-Second Order Analysis on metric measure spaces;

-Regularity and Rigidity on RCD spaces;

-Harmonic map and submanifold theory;

-Topological Stability Theorem;

-Functional Analysis with respect to the measured Gromov-Hausdorff convergence.

Notice for the students: I hope you enjoy mathematics with enthusiasm.