Xinrui Zhao

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Education

- **Massachusetts Institute of Technology** — Cambridge, MA
  PhD in Mathematics; — *Sept 2020 -*
- **University of Science and Technology of China** — Hefei, China
  Bachelor of Mathematics; — *Sept 2016 - June 2020*

Experience

- **Rutgers University** — New Brunswick, NJ
  Exchange student — *Sept 2018 - Dec 2018*
- **UCLA** — Los Angeles, CA
  Research Assistant - Prof. Kefeng Liu — *May 2019 - August 2019*

Preprints

- **Margulis Lemma on RCD(K,N) spaces(arXiv:2308.15215)**:
  We extend the Margulis Lemma for manifolds with lower Ricci curvature bounds to the RCD(K,N) setting. As one of our main tools, we obtain improved regularity estimates for Regular Langrangian flows on these spaces.
- **Uniqueness of conical singularities for mean curvature flows(arXiv:2301.10883)**:
  In this paper, we prove the uniqueness of asymptotically conical tangent flows in all codimensions. This is based on an early work of Chodosh-Schulze, who proved the uniqueness in the hypersurface case.
- **Unique Continuation Problem on RCD Spaces. I (arXiv:2212.14237)**:
  In this note we establish the weak unique continuation theorem for caloric functions on compact RCD(K,2) spaces and show that there exists an RCD(K,4) space on which there exist non-trivial eigenfunctions of the Laplacian and non-stationary solutions of the heat equation which vanish up to infinite order at one point. We also establish frequency estimates for eigenfunctions and caloric functions on the metric horn. In particular, this gives a strong unique continuation type result on the metric horn for harmonic functions with a high rate of decay at the horn tip, where it is known that the standard strong unique continuation property fails.

Publications

- Qin Deng, Xinrui Zhao, Failure of strong unique continuation for harmonic functions on RCD spaces, J. Reine Angew. Math.795(2023), 221-241.
- Bing Wang, Xinrui Zhao, Canonical Diffeomorphisms of Manifolds Near Spheres, The Journal of Geometric Analysis volume 33, Article number: 304 (2023)

Teaching

- Fall 2023: 18.03 Differential Equations, Teaching Assistant
- Spring 2023: 18.03 Differential Equations, Teaching Assistant
- Fall 2022: 18.965 Geometry of Manifolds I, Teaching Assistantt