

Kai Xu

Department of Mathematics, Duke University

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Education

Ph. D in Mathematics, Duke University, Aug 2020 – Present

Advisor: Hubert Bray

B.S. in Mathematics, Peking University, Sep 2016 – Jul 2020

Thesis: “Domination relations in four-dimensional geometries”

Supervisor: Yi Liu

Publications and preprints

1. *Inverse mean curvature flow with outer obstacle*, 2024, [arxiv:2405.15181](https://arxiv.org/abs/2405.15181).
 2. Joint with G. Antonelli, *New spectral Bishop-Gromov and Bonnet-Myers theorems and applications to isoperimetry*, 2024, [arxiv:2405.08918](https://arxiv.org/abs/2405.08918).
 3. Joint with D. Kazaras, A. Song, *Scalar curvature and volume entropy of hyperbolic 3-manifolds*, 2023, [arxiv:2312.00138](https://arxiv.org/abs/2312.00138).
 4. Joint with D. Kazaras, *Drawstrings and flexibility in the Geroch conjecture*, 2023, [arxiv:2309.03756](https://arxiv.org/abs/2309.03756).
 5. *A topological gap theorem for the π_2 -systole of positive scalar curvature 3-manifolds*, 2023, [arxiv:2307.01922](https://arxiv.org/abs/2307.01922).
 6. *Isoperimetry and the properness of weak inverse mean curvature flow*, 2023, [arxiv:2307.00725](https://arxiv.org/abs/2307.00725).
 7. *Dimension constraints in some problems involving intermediate curvature*, 2023, [arxiv:2301.02730](https://arxiv.org/abs/2301.02730).
 8. *On closed surfaces with nonnegative curvature in the spectral sense*, 2022, [arxiv:2211.11715](https://arxiv.org/abs/2211.11715).
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Invited talks

1. Apr 2024: Geometric analysis seminar, Peking University / BICMR.
2. Apr 2024: Geometry seminar, Michigan State University.
3. Mar 2024: Geometric analysis and topology seminar, New York University / Courant Institute.
4. Mar 2024: Geometry seminar, Chinese University of Hong Kong.
5. Feb 2024: BIRS workshop: “Recent advances in comparison geometry”, IASM, Hangzhou, China.
6. Nov 2023: Geometry and topology seminar, Duke University.
7. Oct 2023: Geometric analysis seminar, University of Chicago.

8. Oct 2023: Geometry seminar, Westlake University.
 9. Oct 2023: Geometry seminar, Stanford University.
 10. Jul 2023: CUHK-CUNY Compactness and scalar curvature workshop.
 11. Oct 2022: Geometry seminar, North Carolina State University.
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Teaching

Spring 2024: Math 218D
Fall 2023: Math 111L
Spring 2023: Math 111L
Fall 2022: Math 553, 555, grading
Spring 2022: Math 621, 411, grading
Fall 2021: Math 111L

Scholarships

Oct 2019: Yizheng Alumnus Scholarship
Jun 2019: Scholarship in the Elite Education Program of Pure Mathematics

Last update: 2024.6.4