

RUOBING ZHANG

CURRICULUM VITAE

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Princeton University
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Research Areas

Differential geometry, geometric analysis, metric Riemannian geometry, complex geometry, and conformal geometry

Education

- **Princeton University**, Ph.D. in Mathematics, May 2016
 - ▷ **Thesis:** Regularity, quantitative geometry and curvature bounds
 - ▷ **Advisors:** Alice Chang and Paul Yang
- **Yantai University (China)**, B.S. in Mathematics, July 2011

Appointments

- Assistant Professor of Mathematics, Princeton University 09/2020 – ~
- James H. Simons Instructor, Stony Brook University 09/2016 – 08/2020

Visiting Positions

- Distinguished Visiting Professor, Chinese Academy of Sciences Summer 2023
- Visiting Research Scholar, ShanghaiTech University Spring 2019
- Visiting Scholar, Academia Sinica (Taipei) January 2019
- RTG Visiting Research Scholar, Princeton University Fall 2018
- Visiting Scholar, Academia Sinica (Taipei) January 2018

Awards/Grants

- 2023 International Congress of Chinese Mathematicians Best Paper Award
Article: *Nilpotent structures and collapsing Ricci-flat metrics on K3 surfaces* [[Journal](#)]
- NSF Grant [DMS-2304818](#) (August 1, 2023 – July 31, 2026):
Metric geometry and analysis on Einstein manifolds.
- NSF Grant [DMS-1906265](#) (June 1, 2019 – May 31, 2023):
Geometric analysis of Einstein manifolds and their generalizations.

Publications

Published/Accepted

1. *Torelli-type theorems for gravitational instantons with quadratic volume growth* (with G. Chen and J. Viaclovsky), to appear in **Duke Mathematical Journal** (2023) [[arXiv](#)]

2. *Hodge theory on ALG* manifolds* (with G. Chen and J. Viaclovsky), to appear in **Journal für die reine und angewandte Mathematik** (2023) [[arXiv](#)]
3. Collapsing geometry of hyperkähler 4-manifolds and applications (with S. Sun), to appear in **Acta Mathematica** (2022) [[arXiv](#)]
4. *Nilpotent structures and collapsing Ricci-flat metrics on K3 surfaces* (with H.-J. Hein, S. Sun and J. Viaclovsky), **Journal of the American Mathematical Society**, 35 (2022), no.1, 123-209 [[Journal](#)] [[arXiv](#)]
5. *A Liouville theorem on asymptotically Calabi spaces* (with S. Sun), **Calculus of Variations and Partial Differential Equations** 60 (2021), no.3, 1-43 [[Journal](#)] [[arXiv](#)]
6. *Collapsing Ricci-flat metrics on elliptic K3 surfaces* (with G. Chen and J. Viaclovsky), **Communications in Analysis and Geometry**, 28 (2020), no.8, 2019-2133 [[Journal](#)] [[arXiv](#)]
7. *Regularity and rigidity for nonlocal curvatures in conformal geometry* (with W. Chen), **Journal of Mathematical Studies**, 53 (2020), no.4, 436-470 [[Journal](#)]
8. *A note on the collapsing geometry of hyperkähler four manifolds* (with Shouhei Honda and Song Sun), **Science China Mathematics**, 62 (2019), no.11, 2195-2210 [[Journal](#)] [[Preprint](#)]
9. *Nonlocal curvature and topology of locally conformally flat manifolds*, **Advances in Mathematics**, 335 (2018), 130-169. [[Journal](#)] [[arXiv](#)]
10. *A direct method of moving spheres on fractional order equations* (with W. Chen and Y. Li), **Journal of Functional Analysis**, 272 (2017), no. 10, 4131-4157 [[Journal](#)] [[arXiv](#)]
11. *Topology and ϵ -regularity theorems on collapsed manifolds with Ricci curvature bounds* (with A. Naber), **Geometry and Topology**, 20 (2016), no.5, 2575-2664 [[Journal](#)] [[arXiv](#)]

Preprints

1. *Singular set of degenerate and singular elliptic equations on Poincaré-Einstein manifolds* (with X. Jiang and Y. Sire), submitted, 2023 [[arXiv](#)]
2. *Asymptotically Calabi metrics and weak Fano manifolds* (with H.-J. Hein, S. Sun, and J. Viaclovsky), submitted, 2023 [[arXiv](#)]
3. *Complex structure degenerations and collapsing of Calabi-Yau metrics* (with S. Sun), submitted, 2020 [[arXiv](#)]

Special Lectures and Colloquia

1. *2023 International Congress of Chinese Mathematicians: Best Paper Award Lecture*, Shanghai Institute for Mathematics and Interdisciplinary Sciences, 01/2024
2. *Young Mathematician Lecture Series*, National University of Singapore, 10/2023
3. *Department Colloquium*, University of Kansas, 09/2023
4. *School Colloquium*, Shanghai Jiaotong University, 07/2023
5. *Department Colloquium*, Zhejiang University, 06/2023
6. *Distinguished Lecture*, Arbeitsgruppen Differentialgeometrie (Augsburg-Fribourg-Karlsruhe-Stuttgart), 05/2023
7. *SCMS Lecture*, Shanghai Center Math. Sci., Fudan University, 01/2023
8. *Westlake Forum*, Westlake University, Hangzhou, China, 11/2022
9. *Colloquium*, Chinese Academy of Sciences, 08/2022

Conference Talks

1. *Moduli spaces and singularities*, Centre de Recherches Mathématiques, Montréal, 05/2024
2. *2023 Conference on Differential Geometry and Geometric Analysis*, National Tsinghua University (Hsinchu), 12/2023
3. *2023 Simons Math Summer Workshop: The SYZ Conjecture and Collapsing Calabi-Yau manifolds*, Simons Center, 08/2023
4. *Annual Workshop on Geometric Analysis 2023*, Ürümqi China, 06/2023
5. *Symposium on Geometry in Honor of Eugenio Calabi's 100th Birthday*, Univeristy of Science and Technology of China, 06/2023
6. *36th Annual Geometry Festival*, Courant Institute of Mathematical Sciences, New York University, 04/2022
7. *2021 Simons Collaboration on Special Holonomy in Geometry, Analysis and Physics Annual Meeting*, Simons Foundation, New York, 09/2021
8. *Geometric PDE and Applications to Problems in Conformal and CR Geometry*, Banff International Research Station, 05/2021
9. *Riemannian Topology Research Conference* (Augsburg-Fribourg-Karlsruhe), 04/2021
10. *Conference on Geometric analysis and PDEs*, Shanghai Jiaotong University, 04/2020
11. *Geometric Invariance and Partial Differential Equations*, Academia Sinica and Tsinghua University, 01/2020
12. *Pacific Rim Complex-Symplectic Geometry Conference*, ShanghaiTech University, 07/2019
13. *Trends in Modern Geometry 2019*, Tsinghua University, 06/2019
14. *Conference for the 10th Enhanced Program for Graduate Study*, Peking University, 05/2019
15. *The Third Symposium in Geometry and Differential Equations*, University of Science and Technology of China, 05/2019
16. *Geometric Invariance and Partial Differential Equations*, Institute of Mathematics, Academia Sinica, 01/2019
17. *The Structure of Collapsed Special Holonomy Spaces*, Duke University, 04/2018
18. *Topology and Curvature Lower Bounds*, Mathematisches Forschungsinstitut Oberwolfach, 11/2017
19. *AMS Spring Eastern Sectional Meeting*, City University of New York, 05/2017
20. *AMS Fall Eastern Sectional Meeting*, Rutgers University, 11/2015
21. *Workshop on Riemannian Convergence Theory*, Stony Brook University, 11/2015
22. *AMS Fall Western Sectional Meeting*, California State University, 10/2015
23. *Workshop on Geometric Analysis*, Peking University, 06/2015
24. *Workshop on Ricci Curvature*, Northwestern University, 05/2015
25. *Graduate Students Geometry & Topology Conference*, Notre Dame University, 04/2013

Organizing Services

- *2023 Pacific Rim Complex-Symplectic Geometry Conference*, 07/2023
- *The 3rd Joint Princeton-SJTU Conference on Geometric Analysis & PDEs*, 06/2023
- *The 37th Annual Geometry Festival*, 04/2023
- **Princeton Annual Horizons Lecture and Seminar** *discussing societal impacts of the mathematics profession*, 04/2023
- *The 2nd Princeton-SJTU Joint Conference on Geometric Analysis & PDEs*, 06/2022
- *The 1st Princeton-SJTU-MPIM (Leipzig) Joint Conference on Geometric Analysis & PDEs* , 07/2021
- *Differential Geometry & Geometric Analysis Seminar (Princeton University)*, Fall 2020 - present
- *Geometry & Topology Seminar (Stony Brook)*, Fall 2019-Summer 2020
- *Princeton-IAS joint seminar on geometric measure theory*, Fall 2018
- *Geometric analysis learning Seminar (Stony Brook)*, Fall 2016-Spring 2018
- *Geometric analysis learning Seminar (Princeton University)*, 2015-2016

Departmental Services

- Mathematics Department Climate and Inclusion Committee 2023 – present
- Graduate Admission Committee 2020 and 2022
- Students Advising:
 - Graduate students: David Degen, Xin Qian
 - Undergraduate students: Sara Ansari, Nianli Peng