

CURRICULUM VITAE

Xin Zhou

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Research Interest: Geometric Analysis; Calculus of Variations; General Relativity

Employment:

Cornell University,	Associate Professor,	from 7/20
University of California Santa Barbara,	Associate Professor,	from 7/20
University of California Santa Barbara,	Assistant Professor,	7/16-6/20
Massachusetts Institute of Technology,	CLE Moore Instructor,	9/13-6/16

Visiting positions:

Institute for Advanced Study,	Member,	9/18-6/19
Mathematical Sciences Research Institute,	Postdoc Fellow,	8/13-12/13

Education:

Stanford University,	Ph.D. in mathematics,	June 2013
Peking University,	M.S. in mathematics,	June 2008
Tsinghua University,	B.S. in physics and mathematics,	June 2006

Grants and awards:

- NSF Career Award, DMS-1945178, 2020-2024
- Alfred P. Sloan Research Fellow, 2019-2021
- NSF Grant DMS-1811293, 2018-2021
- UC Regent's Junior Faculty Award, 2018
- NSF Grant DMS-1704393, DMS-1406337, 2014-2017

Preprints:

1. Generic scarring for minimal hypersurfaces along stable hypersurfaces (with A. Song), preprint, arXiv:2006.03038.
2. Min-max theory for free boundary minimal hypersurfaces II – General Morse index bounds and applications (with Q. Guang, M. Li, and Z. Wang), submitted, arXiv:1907.12064.
3. On the Multiplicity One Conjecture in min-max theory, submitted, arXiv:1901.01173.
4. Compactness and generic finiteness for free boundary minimal hypersurfaces (I) (with Q. Guang and Z. Wang), submitted, arXiv:1803.01509.
5. Free boundary minimal hypersurfaces with least area (with Q. Guang and Z. Wang), submitted, arXiv:1801.07036.

Publications:

1. Min-max theory for networks of constant geodesic curvature (with J. Zhu), *Adv. Math.* 361 (2020), 106941, 16 pp.
2. Existence of hypersurfaces with prescribed mean curvature I - Generic min-max (with J. Zhu), *Cambridge Journal of Mathematics*, Volume 8, Number 2, 311-362, 2020.
3. Min-max minimal disks with free boundary in Riemannian manifolds, (with L. Lin and A. Sun), *Geometry & Topology* 24 (2020) 471-532.
4. Min-max theory for constant mean curvature hypersurfaces, (with J. Zhu), *Invent. math.* (2019) 218:441–490.
5. Min-max theory for free boundary minimal hypersurfaces I: regularity, (with M. Li), accepted by *J. of Differential Geom.*, arXiv:1611.02612.
6. A maximum principle for free boundary minimal varieties of arbitrary codimension, (with M. Li), accepted by *Comm. Anal. Geom.*, arXiv:1708.05001.
7. Curvature estimates for stable minimal hypersurfaces with free boundary, (with Q. Guang and M. Li), *J. reine angew. Math.* 759 (2020), 245-264.
8. Sweeping out 3-manifold of positive Ricci curvature by short 1-cycles via estimates of min-max surfaces, (with Y. Liokumovich), *Int. Math. Res. Not. IMRN* 2018, no. 4, 1129-1152.
9. Entropy of closed surfaces and min-max theory, (with D. Ketover), *J. Differential Geom.* 110 (2018), no. 1, 31-71.
10. Existence of minimal surfaces of arbitrary large Morse index, (with H. Li), *Calc. Var. Partial Differential Equations* 55 (2016), no. 3, Art. 64, 12 pp.
11. Min-max hypersurface in manifold of positive Ricci curvature, *J. Differential Geom.* 105 (2017), no. 2, 291-343.
12. On the free boundary min-max geodesics, *Int. Math. Res. Not. IMRN* 2016, no. 5, 1447-1466.
13. Min-max minimal hypersurface in (M^{n+1}, g) with $Ric_g > 0$ and $2 \leq n \leq 6$, *J. Differential Geom.* 100 (2015), no. 1, 129-160.
14. Mass angular momentum inequality for axisymmetric vacuum data with small trace, *Comm. Anal. Geom.* 22 (2014), no. 3, 519-571.
15. Convexity of reduced energy and mass angular momentum inequalities, (with R. Schoen), *Ann. Henri Poincaré* 14 (2013), no. 7, 1747-1773.
16. On the existence of min-max minimal surfaces of genus $g \geq 2$, *Commun. Contemp. Math.* 19 (2017), no. 4, 1750041, 36 pp.
17. On the existence of min-max minimal torus, *J. Geom. Anal.* 20 (2010), no. 4, 1026-1055.

Survey articles and research reports:

1. Multiplicity One Conjecture in min-max theory, *Partial Differential Equations, Oberwolfach Report 2019*, to appear.
2. Free boundary minimal hypersurfaces with least area, (with Q. Guang and Z. Wang), *Surveys in Geometric Analysis 2018*, 45-50, Science Press Beijing, Beijing, 2019. ISBN: 9787030611123.

3. Recent progress on compactness of minimal surfaces with free boundary, (with Q. Guang), *Surveys in Geometric Analysis 2017*, 63-78, Science Press Beijing, Beijing, 2018. ISBN: 9787030573223.
4. Min-max theory for constant mean curvature (CMC) hypersurfaces, (with J. Zhu), *Partial Differential Equations, Oberwolfach Report*, 35, 2017.
5. On minimal surfaces with free boundary, (with M. Li), *special issues of ICCM Notices*, to appear.

Research Talks:

- BICMR online seminar on Geometric Analysis, 5/2020
- Colloquium, Cornell University, 11/2019
- Differential Geometry Seminar, Harvard University, 9/2019
- Partial Differential Equations, Oberwolfach conference, Germany, 7/2019
- RTG Workshop on Geometric Analysis, Princeton University, 6/2019
- 2019 Workshop on Geometric Analysis, China, 5/2017
- Colloquium, Peking University, China, 5/2019
- Diff. Geom, Math. Phys., PDE Seminar, University of British Columbia, Canada, 4/2019
- Variational Methods in Geometry Seminar, IAS, 3/2019
- Differential Geometry Seminar, Ohio State University, 2/2019
- Colloquium, University of Alabama at Birmingham, 2/2019
- Princeton and IAS joint Differential Geometry and Geometric Analysis Seminar, 2/2019
- Geometric Analysis Seminar, CUNY, 2/2019
- Differential Geometry Seminar, Harvard University, 2/2019
- Geometric Analysis Seminar, University of Chicago, 1/2019
- Differential Geometry Seminar, UC San Diego, 1/2019
- Differential Geometry Seminar, UC Irvine, 1/2019
- Geometric Analysis, AMS meeting, San Francisco, 10/2018
- Stanford Geometry Seminar, Stanford University, 10/2018
- Columbia Geometry & Analysis Seminar, Columbia University, 10/2018
- Nonlinear Analysis Seminar, Rutgers University, 10/2018
- Mass in General Relativity Workshop, Simons Center for Geometry and Physics, 3/2018
- PDE and Differential Geometry Seminar, University of Connecticut, 2/2018
- Geometry/Topology seminar, Boston College, 2/2018
- Geometric partial differential equations and their applications, AMS meeting, UC Riverside, 11/2017
- Member Seminar, CMSA, Harvard University, 10/2017
- ITS-CUNY symposium on Nonlinear Problems in Geometry, CUNY, 10/2017
- Nonlinear Analysis Seminar, Rutgers University, 9/2017
- Analysis and Partial Differential Equations Seminar, John Hopkins University, 9/2017
- Partial Differential Equations, Oberwolfach conference, Germany, 8/2017
- Mathematical Congress of the Americas, Montreal, Canada, 7/2017
- Geometric Analysis Seminar, University of Chicago, 6/2017

- 2017 Workshop on Geometric Analysis, Beijing, China, 5/2017
- Geometric Analysis Seminar, MIT, 4/2017
- Perspectives of Mathematics, Tsinghua University, Beijing, China, 4/2017
- Differential Geometry & Geometric Analysis Seminar, Princeton University, 4/2017
- Diff. Geom, Math. Phys., PDE Seminar, University of British Columbia, Canada, 4/2017
- Geometry and Analysis Seminar, UC Santa Cruz, 12/2016
- Joint UCI-UCR-UCSD Southern California Differential Geometry Seminar, Irvine, 11/2016
- Geometric Analysis and General Relativity workshop in BIRS, Banff, 7/2016
- Differential Geometry & Geometric Analysis Seminar, Princeton, 5/2016
- Geometry Seminar, Michigan State University, 4/2016
- Lafayette-Lehigh Geometry & Topology Seminar, 3/2016
- Colloquium, University of Colorado Boulder, 1/2016
- Colloquium, University of Connecticut, 1/2016
- Colloquium, UC Santa Barbara, 12/2015
- Colloquium, Rice University, 12/2015
- Differential Geometry Seminar, UC Irvine, 11/2015
- Differential Geometry Seminar, Harvard University, 11/2015
- PDE and Differential Geometry Seminar, University of Connecticut, 9/2015
- Differential Geometry & Geometric Analysis Seminar, Princeton University, 4/2015
- Vth Workshop on Differential Geometry, Maceió, Brazil, 3/2015
- Differential Geometry Seminar, Harvard University, 12/2014
- Geometric Analysis Seminar, MIT, 9/2014
- Geometric Analysis Conference, Lisbon, Portugal, 7/2014
- Brown Geometric Analysis Seminar, Brown University, 3/2014
- Berkeley Differential Geometry Seminar, UC Berkeley, 12/2013
- Columbia Geometry & Analysis Seminar, 11/2013
- UCSB Geometry Seminar, UC Santa Barbara, 10/2013
- MSRI Postdoc Seminar, Berkeley, 9/2013
- Bay Area Differential Geometry Seminar, Stanford University, 5/2013
- Stanford Geometry Seminar, Stanford University, 10/2012
- MSRI Mathematical General Relativity Workshop, Berkeley, 7/2012
- 2012 Geometric Analysis Workshop, China, 6/2012
- Columbia General Relativity Seminar, Columbia University, 12/2011

Services at UCSB:

- Mathematics Graduate Committee member, 2017-2018, 2019-2020.
- Postdoctoral scholar mentor: Qiang Guang, 2016-2019.
- PhD thesis defense committee: Joey Chahine, 2019.
- MA degree committee chair: Masoud Geevechi, 2016-2018.

- Organizer for *UCSB Differential Geometry Seminar*, 2016-2018, 2019-now.
- Co-organizer for *UCSB Geometry and Analysis on Manifolds Conference*, 2017, 2018.

Other Professional Activities:

- Referee for *Advances in Mathematics*, *Amer. Journal of Math.*, *Calculus of Variations and Partial Differential Equations*, *Cambridge Journal of Mathematics*, *Communication in Analysis and Geometry*, *Duke Math Journal*, *Journal of American Math Society*, *Journal of Differential Geometry*, *Mathematische Annalen*, *Proceedings of American Math Society*, etc.
- Co-organizer for *Special session on Geometric Partial Differential Equations and Variational Methods* at the AMS Sectional Meeting in Riverside, 2019.
- Co-organizer for *Variational Methods in Geometry Seminar*, IAS, 2018.
- Co-organizer for *Special session on Geometric Analysis* at the Joint AMS Mathematics Meetings in San Diego, 2018.
- PhD Thesis defense committees: Qiang Guang (MIT, 2016), Jui-En Chang (MIT, 2016).