

Jonathan J. Zhu

INFORMATION	University of Washington 4110 E Stevens Way NE Seattle, WA, USA	Phone: +1 (908) 487 8999 E-mail: jonozhu@uw.edu Web: < math.washington.edu/~jonozhu >	Citizenship: Dual citizen Australia, USA
INTERESTS	Differential Geometry, Geometric Analysis; Minimal surfaces, Mean curvature flow.		
APPOINTMENTS	Assistant Professor Department of Mathematics, University of Washington		2022 -
	Postdoctoral Research Fellow Department of Mathematics, Princeton University National Science Foundation Postdoctoral Research Fellowship		2018 - 2022
	Research Fellow Mathematical Sciences Institute, Australian National University		2020 - 2021
	Visiting Scholar School of Mathematics, Institute for Advanced Study		2018 - 2019
EDUCATION	Harvard University , Cambridge, MA, USA Ph.D in Mathematics Advisor 1: Prof. William P. Minicozzi II (MIT) Advisor 2: Prof. Shing-Tung Yau (Harvard)		2013 - 2018
	Massachusetts Institute of Technology , Cambridge, MA, USA SB in Mathematics, Physics		2009 - 2013
PUBLICATIONS AND PREPRINTS	<ol style="list-style-type: none">24. <i>Half-space intersection properties for minimal hypersurfaces</i> (with K. Naff), preprint, arXiv:2401.09669.23. <i>Uniqueness of blowups for forced mean curvature flow</i> (with S. Hirsch), Intl. Math. Res. Not. IMRN (2025). https://doi.org/10.1093/imrn/rnaf023 arXiv:2310.08005.22. <i>Sharp distance comparison for curve shortening flow on the round sphere</i> (with P. Bryan and M. Langford), preprint, arXiv:2310.02649.21. <i>A distance comparison principle for curve shortening flow with free boundary</i> (with M. Langford), preprint, arXiv:2302.14258.20. <i>Moving monotonicity formulae for minimal submanifolds in constant curvature</i> (with K. Naff), preprint, arXiv:2210.03263.19. <i>The prescribed point area estimate for minimal submanifolds in constant curvature</i> (with K. Naff), preprint, arXiv:2206.08302.18. <i>Widths of balls and free boundary minimal submanifolds</i>, Adv. Nonlinear Stud. 23 (2023). doi:10.1515/ans-2022-0044, arXiv:2203.10031.17. <i>Min-max theory for capillary surfaces</i> (with C. Li and X. Zhou), J. Reine Angew. Math. 2025, no. 181, 215-262. https://doi.org/10.1515/crelle-2024-0075 arXiv:2111.09924.16. <i>Rigidity of spherical product Ricci solitons</i> (with A. Sun), preprint, arXiv:2108.02326.15. <i>On certain quantifications of Gromov's non-squeezing theorem</i> (with K. Sackel, A. Song and U. Varolgunes), Geom. Topol. 28 (2024), no. 3, 1113-1152. doi:10.2140/gt.2024.28.1113 arXiv:2105.00586.14. <i>Lojasiewicz inequalities for mean convex self-shrinkers</i>, Int. Math. Res. Not. IMRN 2023, no. 2, 1236-1254. doi:10.1093/imrn/rnab287, arXiv:2101.09025.		

13. *Lojasiewicz inequalities, uniqueness and rigidity for cylindrical self-shrinkers*, preprint, [arXiv:2011.01633](https://arxiv.org/abs/2011.01633).
12. *Rigidity and Lojasiewicz inequalities for Clifford self-shrinkers* (with A. Sun), preprint, [arXiv:2011.01636](https://arxiv.org/abs/2011.01636).
11. *Mean convex mean curvature flow with free boundary* (with N. Edelen, R. Haslhofer and M. Ivaki), *Comm. Pure Appl. Math.* **75** (2021), no. 4, 767-817. [doi:10.1002/cpa.22009](https://doi.org/10.1002/cpa.22009), [arXiv:1911.01186](https://arxiv.org/abs/1911.01186).
10. *Reilly's type inequality for the Laplacian associated to a density related with shrinkers for MCF* (with M. Carmen Domingo-Juan and V. Miquel), *J. Differential Equations.* **272** (2021), 958-978. [doi:10.1016/j.jde.2020.10.004](https://doi.org/10.1016/j.jde.2020.10.004), [arXiv:1503.01332](https://arxiv.org/abs/1503.01332).
9. *Min-max theory for networks of constant geodesic curvature* (with X. Zhou), *Adv. Math.* **361** (2020), art.106941. [doi:10.1016/j.aim.2019.106941](https://doi.org/10.1016/j.aim.2019.106941), [arXiv:1811.04070](https://arxiv.org/abs/1811.04070)
8. *Existence of hypersurfaces with prescribed mean curvature I - Generic min-max* (with X. Zhou), *Camb. J. Math.* **8** (2020), no. 2, 331-362. [doi:10.4310/CJM.2020.v8.n2.a2](https://doi.org/10.4310/CJM.2020.v8.n2.a2), [arXiv:1808.03527](https://arxiv.org/abs/1808.03527)
7. *Min-max theory for constant mean curvature hypersurfaces* (with X. Zhou), *Invent. Math.* **218** (2019), no. 2, 441-490. [doi:10.1007/s00222-019-00886-1](https://doi.org/10.1007/s00222-019-00886-1), [arXiv:1707.08012](https://arxiv.org/abs/1707.08012)
6. *Moving-centre monotonicity formulae for minimal submanifolds and related equations*, *J. Funct. Anal.*, **274** (2018), no. 5, 1530-1552. [doi:10.1016/j.jfa.2017.07.008](https://doi.org/10.1016/j.jfa.2017.07.008), [arXiv:1704.08195](https://arxiv.org/abs/1704.08195)
5. *First stability eigenvalue of singular minimal hypersurfaces in spheres*, *Calc. Var. Partial Differential Equations*, **57** (2018), no. 5, art. 130. [doi:10.1007/s00526-018-1417-8](https://doi.org/10.1007/s00526-018-1417-8), [arXiv:1610.04816](https://arxiv.org/abs/1610.04816)
4. *On the entropy of closed hypersurfaces and singular self-shrinkers*, *J. Differential Geom.* **114** (2020), no. 3, 551-593. [doi:10.4310/jdg/1583377215](https://doi.org/10.4310/jdg/1583377215), [arXiv:1607.07760](https://arxiv.org/abs/1607.07760)
3. *On the rigidity of mean convex self-shrinkers* (with Q. Guang), *Int. Math. Res. Not. IMRN* **2018**, no. 20, 6406-6425. [doi:10.1093/imrn/rnx078](https://doi.org/10.1093/imrn/rnx078), [arXiv:1603.09435](https://arxiv.org/abs/1603.09435)
2. *Rigidity and Curvature Estimates for Graphical Self-shrinkers* (with Q. Guang), *Calc. Var. Partial Differential Equations*, **56** (2017), no. 6, art. 176. [doi:10.1007/s00526-017-1277-7](https://doi.org/10.1007/s00526-017-1277-7), [arXiv:1510.06061](https://arxiv.org/abs/1510.06061)
1. *Minimal Hypersurfaces with Small First Eigenvalue in Manifolds of Positive Ricci Curvature*, *J. Topol. Anal.* **9** (2017), no. 3, 505-532. [doi:10.1142/S1793525317500200](https://doi.org/10.1142/S1793525317500200), [arXiv:1512.00105](https://arxiv.org/abs/1512.00105)

OTHER ARTICLES

Min-max theory for constant mean curvature hypersurfaces (with X. Zhou), research report, *Partial Differential Equations, Oberwolfach*, 35 (2017).
An inverse phase stability approach to rational materials synthesis (with W. Sun, W. Huang, D. Kramer and G. Ceder), in preparation.

AWARDS

Alfred P. Sloan Research Fellowship	2023-2025
NSF Mathematical Sciences Postdoctoral Research Fellowship	2018-2022
ICCM Best Paper Award, Gold Medal	2020

INVITED TALKS

- International Workshop on Minimal Surfaces and Mean Curvature Flow, Peking University, 8-12 Jul 2024
- Geometry Seminar, Lehigh University, 13 Jun 2024
- Geometry and Topology Seminar, California Institute of Technology, 24 May 2024
- Valencia Geometrica
University of Valencia, 24-26 Apr 2024
- Geometric Analysis Seminar, University of Oregon, 31 Oct 2023
- Geometric Analysis Seminar, Rutgers University, 19 Sep 2023
- Non-Linear Critical Point Theory in Analysis and Geometry, BIRS UBC Okanagan, Aug 2023
- Geometric Analysis Seminar, University of California - San Diego, 4 May 2023
- Red-Raider Mini Symposium XIX, Texas Tech University, 21 Apr 2023
- Geometric Analysis Seminar, Massachusetts Institute of Technology, 19 Apr 2023
- Geometric Analysis and Topology Seminar, New York University, 14 April 2023
- Young Mathematicians in Noncommutative Geometry and Analysis, Texas A&M, 17 Aug 2022
- Mean Curvature Flow and Related Topics, Queen Mary University of London, 8 July 2022
- Workshop on Scalar Curvature, Minimal Surfaces, and Initial Data Sets,
Harvard CMSA, 5 May 2022
- Geometric Analysis Seminar, Massachusetts Institute of Technology, 4 May 2022
- Geometry Seminar, University of Minnesota, 14 Apr 2022
- Regularity Theory for Minimal Surfaces and Mean Curvature Flow, MSRI, 22 Mar 2022
- Differential Geometry Seminar, University of California - Riverside, 11 Mar 2022
- Geometry and Topology Seminar, North Carolina State University, 9 Mar 2022
- Differential Geometry and Geometric Analysis Seminar, Princeton University, 23 Feb 2022
- Geometry and Topology Seminar, California Institute of Technology, 11 Feb 2022
- Calculus of Variations in Probability and Geometry, IPAM, 10 Feb 2022
- Geometric Analysis Seminar, Columbia University, 10 Dec 2021
- Geometric Analysis section, AustMS Annual Meeting, University of Newcastle, 9 Dec 2020
- New Directions in Geometric Flows, Banff International Research Station, 9 Nov 2021
- Geometric Analysis Seminar, Rutgers University, 26 Oct 2021
- Analysis and Geometric Analysis Seminar, Cornell University, 4 Oct 2021
- Geometric Analysis Seminar, University of Notre Dame, 29 Apr 2021
- Geometry Seminar, University of Newcastle (Australia), 17 Mar 2021
- Geometric Analysis Seminar, University of California - San Diego, 3 Feb 2021
- ICCM Annual Meeting, UST China, 29 Dec 2020
- Geometric Analysis section, AustMS Annual Meeting, University of New England, 10 Dec 2020
- Pure Math Colloquium, University of Waterloo, 30 Nov 2020
- PDE and Analysis Seminar, Australian National University, 24 Nov 2020
- Geometric Analysis Seminar, City University of New York, 12 Nov 2020
- Geometric Analysis Seminar, University of Chicago, 20 Oct 2020
- Differential Geometry and Geometric Analysis Seminar, Princeton University, 10 Jun 2020
- PDE and Differential Geometry Seminar, University of Connecticut, 9 Mar 2020
- Differential Geometry Seminar, University of California - Berkeley, 27 Jan 2020
- Geometric Analysis Colloquium, Fields Institute, 13 Nov 2019
- Congress on Geometric Analysis, University of Cádiz, 29 Oct 2019
- Metro Area Differential Geometry Seminar, Johns Hopkins University, 12 Oct 2019
- 3rd Symposium in Geometry and Differential Equations, UST China, 21 May 2019
- Geometry and Topology Seminar, California Institute of Technology, 26 Apr 2019
- Geometric Analysis Seminar, Rutgers University, 12 Mar 2019
- Variational Methods in Geometry Seminar, Institute for Advanced Study, 9 Oct 2018
- Differential Geometry Seminar, University of Adelaide, 17 Aug 2018
- Geometric Analysis section, Joint Mathematics Meetings, San Diego, 13 Jan 2018
- Geometric Analysis section, AustMS Annual Meeting, Macquarie University, 13 Dec 2017
- Differential Geometry Seminar, University of Sydney, 11 Dec 2017
- Minimal Surface Seminar, University of Pennsylvania, 3 Oct 2017
- Differential Geometry and Geometric Analysis Seminar, Princeton University, 27 Sep 2017
- PDE Mini-School, University of North Carolina - Chapel Hill, 13 Apr 2017
- AMS Graduate Student Conference, Brown University, 7 Apr 2017
- Differential Geometry Seminar, University of California - Santa Barbara, 10 Feb 2017

- Geometric Analysis Seminar, University of Chicago, 8 Nov 2016
- Geometry and Topology Seminar, University of Wisconsin - Madison, 4 Nov 2016
- Differential Geometry Seminar, Harvard University, 25 Oct 2016
- Analysis and PDE Seminar, Johns Hopkins University, 17 Oct 2016
- PDE and Analysis Seminar, Australian National University, 16 Aug 2016

TEACHING
EXPERIENCE

University of Washington

- Lecturer, Math420 History of Mathematics **Spring 2024**
- Lecturer, Math224 (F, G) Advanced Multivariable Calculus **Autumn 2023**
- Lecturer, Math224 (E, G) Advanced Multivariable Calculus **Winter 2023**
- Lecturer, Math126 (E) Calculus with Analytic Geometry III **Autumn 2022**

Princeton University

- Lecturer, MAT175 Multivariable Calculus for Economics and Life Sciences **Spring 2022**
- Lecturer, MAT203 Advanced Vector Calculus **Fall 2021**
- Course coordinator and lecturer, MAT201 Multivariable Calculus **Spring 2020**
- Lecturer, MAT201 Multivariable Calculus **Fall 2019**

Harvard University

- Instructor, Math21a Multivariable Calculus **Spring 2018, Spring 2016, Spring 2015**
- Instructor, Math1b Integral Calculus **Fall 2016**

Massachusetts Institute of Technology

- Grader, 18.102 Functional Analysis **Spring 2012, Spring 2011**

REFEREE SERVICE

- *Advanced Nonlinear Studies*
- *Advances in Mathematics*
- *Calculus of Variations and Partial Differential Equations*
- *Cambridge Journal of Mathematics*
- *Communications in Contemporary Mathematics*
- *Duke Mathematical Journal*
- *Geometric and Functional Analysis*
- *Geometry and Topology*
- *International Mathematics Research Notices*
- *Inventiones Mathematicae*
- *Journal für reine und angewandte Mathematik (Crelle's Journal)*
- *Journal of Differential Geometry*
- *Journal of Functional Analysis*
- *Journal of Geometric Analysis*
- *Mathematische Annalen*
- *Notices of the American Mathematical Society*
- *Pacific Journal of Mathematics*
- *Proceedings of the American Mathematical Society*
- *Pure and Applied Mathematics Quarterly*

CONFERENCES
AND SEMINARS
ORGANISED

- University of Washington DG/PDE Seminar, 2022 -
- SMRI-MATRIX Symposium:
'Singularities in Geometric Flows: An Ancient Perspective', Jan 2022
- Princeton University Differential Geometry and Geometric Analysis Seminar, 2019 - 2020
- MIT geometric analysis student seminar, 2016 - 2018

ADDITIONAL
INFORMATION

Languages: English (native), Mandarin Chinese (basic).