

RESEARCH INTERESTS

Homogenization theory, gradient flows, free boundary problems, geometric measure theory

EDUCATION

University of Utah

Salt Lake City, U.S.

PhD of Mathematics

2021–2026

- Dissertation: “Homogenization in complex conductive networks and interface motions”
- Advisor: William M. Feldman
- Graduated April 30, 2026

Southern University of Science and Technology

Shenzhen, China

Master of Mathematics

2019–2021

- Thesis: “Topics on reaction-diffusion equations with large diffusion rate within thin components”
- Advisor: Linlin Su and Xuefeng Wang

Southern University of Science and Technology

Shenzhen, China

Bachelor of Mathematics and Applied Mathematics

2015–2019

- Thesis: “Review of the model about fast diffusion on a road in a large field using effective boundary conditions”
- Advisor: Xuefeng Wang

SCHOLARSHIPS AND AWARDS

- Outstanding Thesis Award, Department of Mathematics, University of Utah 2026

PREPRINTS

1. **An indefinite Coulomb interaction from the Steklov spectrum of perforated manifolds**, arXiv preprint arXiv: 2607.25211 (2026). Joint with Raghavendra Venkatraman
2. **On the continuum limit of t-SNE for data visualization**, arXiv preprint arXiv: 2604.12041 (2026). Joint with Jeff Calder, Ryan Murray and Adam Pickarski

PUBLICATIONS

1. **On the attainability of the singular Wiener bound**, arXiv preprint arXiv: 2508.08208 (2025). Accepted by *SIAM Journal on Mathematical Analysis*, submitted in September 2025
2. **Homogenization of a vertical oscillating Neumann condition**, joint with William M Feldman, *Archive for Rational Mechanics and Analysis*, 250, 29 (2026). <https://doi.org/10.1007/s00205-026-02188-2>
3. **Regularity theory of a gradient degenerate Neumann problem**, joint with William M Feldman, *Journal de Mathématiques Pures et Appliquées*, Volume 209, May 2026, 103863, <https://doi.org/10.1016/j.matpur.2026.103863>
4. **Is mean curvature flow a gradient flow?** arXiv: 2212.03701 (2022). *Proceedings of American Mathematical Society*, DOI: <https://doi.org/10.1090/proc/16572>
5. **Homogenization of enhancing thin layers**, *Journal of Differential Equations*, Volume 282, 2021, Pages 330-369, ISSN 0022-0396, <https://doi.org/10.1016/j.jde.2021.02.024>.

INVITED TALKS AND SEMINARS

- **Talk in DMS Applied and Computational Mathematics Seminar, Auburn University**
at Auburn, Alabama, Feb 27, 2026
My Talk: Regularity of a gradient degenerate Neumann problem and homogenization
Website: https://www.auburn.edu/cosam/events/2026/02/dms_applied_and_computational_mathematics_seminar2.htm
- **Talk in Analysis Seminar in WashU**
at St. Louis, MO, November 3, 2025
My Talk: Attainability of the singular Wiener bound and leaf venation patterns
Website: <https://math.wustl.edu/past-events/analysis-seminar-attainability-singular-wiener-bound-and-leaf-venation-patterns>
- **AMS Special Session on Geometric Variational Problems and Applications**
at St. Louis, MO, October 18-19, 2025
My Talk: Attainability of the singular Wiener bound and leaf vein patterns
Website: <https://meetings.ams.org/math/fall2025c/meetingapp.cgi/Paper/52138>
- **AMS Special Session on PDEs from Materials Science** at Hartford, Connecticut, April 5-6 2025
My Talk: Semilinear homogenization and rate-independent motion law in a parabolic Neumann problem
Website: <https://meetings.ams.org/math/spring2025e/meetingapp.cgi/Paper/47927>
- **Optimal Transport and Dynamics** at CMO, Oaxaca, August 11-16 2024
My Talk: Regularity theory of a gradient degenerate Neumann problem
Website: <https://www.birs.ca/events/2024/5-day-workshops/24w5198>
- **Large Deviation Principle and Optimal Transport** at University of Utah, 2022
Reference material: Optimal Transport for Applied Mathematicians

SHORT RESEARCH LEVEL COURSES

- **CNA RTG Summer School: Topics at the Interface of PDE and Probability**
at Carnegie Mellon University, Pittsburgh, June 15–19, 2026
Website: <https://www.math.cmu.edu/~gautam/c/2026-pde-prob-ss/>
- **Time-dependent Bernoulli-type free boundary problems**
at Caltech, Pasadena, California, February 2 to February 6, 2026
Website: <https://aimath.org/workshops/upcoming/bernoullievolution/>
- **PDE Summer School** at University of California, Irvine, June 23 - 27, 2025
Website: <https://ucpde2025.github.io/2025-PDE-Summer-School-Website/>
- **RMMC Summer School** at University of Wyoming, Laramie, June 17-20, 2025
Website: <https://math.asu.edu/rmmcss2025>
- **Frontiers in Applied Analysis** at Carnegie Mellon University, Pittsburgh, June 3-6, 2025
Website: <https://events.mcs.cmu.edu/frontiers2025/>
- **Analysis and PDE** at Montana State University, Bozeman, May 14 to May 17, 2025
Website: <https://sites.google.com/view/apde-mt>
- **Geometry of Measures and Free Boundaries** at UW Seattle, July 20-26 2024
Website: <https://sites.google.com/view/gmfbseattle2024/>
- **Summer School on PDEs and Randomness** at Max Planck Institute, Leipzig, 2023
Website: <https://www.mis.mpg.de/calendar/conferences/2023/randompde.html>
- **Summer Program in Partial Differential Equations** at UT Austin, 2022
Website: <https://analysispde.ma.utexas.edu/summer-program-in-partial-differential-equations-2022/>
- **PIMS-IFDS-NSF Summer School on Optimal Transport** at UW Seattle, 2022
Website: <https://kantorovich.org/event/2022-optimal-transport-summer-school/>

- **17-th Summer School on PDEs** at Jilin University, 2019
- Short Courses: fractional Laplacians, General Relativity, Special Lagrangian Equations

TEACHING EXPERIENCE

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| • Math 2281 Enhanced Introduction to Differential Equations at University of Utah
<i>Primary Instructor</i> | Spring 2026 |
| • Math 1050–006 College Algebra at University of Utah
<i>Primary Instructor</i> | Spring 2025 |
| • Math 1050–005 College Algebra at University of Utah
<i>Primary Instructor</i> | Spring 2024 |
| • Math 2250–014 & 015 Differential Equations and Linear Algebra at University of Utah
<i>Lab Teacher</i> | Fall 2022 |
| • Math 3140–005 & 006 Engineer Vector Calculus and PDE at University of Utah
<i>Lab Teacher</i> | Spring 2022 |
| • Math 1210–040 Calculus I at University of Utah
<i>Lab Teacher</i> | Fall 2021 |
| • Real Analysis at Southern University of Science and Technology
<i>Teaching Assistant</i> | Fall 2019 |