BORONG ZHANG

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EDUCATION

University of Wisconsin–Madison **Madison, WI**
Ph.D. Candidate in Mathematics, Advisor: Prof. Qin Li & Leonardo Andrés Zepeda Núñez 09/2020 – Present
- **Honors:** Mathematics Department Ascending Scholar Fellowship

University of California, Berkeley **Berkeley, CA**
Bachelor of Arts in Applied Mathematics & Computer Science 08/2016 – 06/2020
- **GPA:** 3.8 / 4.0; **GREM:** 900/ 94%
- **Honors:** High Honors in Applied Mathematics; Distinction in General Scholarship; Dean's Honors Lists
- **Graduate Coursework**: *Topology and Analysis, Numerical Solution of Differential Equations*

PUBLICATIONS

1. **Zhang, B.**, Li, Q., & Di, Z. W. (2025). Stochastic Multigrid Minimization for Ptychographic Phase Retrieval. ArXiv.org. https://arxiv.org/abs/2504.10118

2. **Zhang, B.**, Guerra, M., Li, Q., & Zepeda-Núñez, L. (2024). Back-Projection Diffusion: Solving the Wideband Inverse Scattering Problem with Diffusion Models. ArXiv.org. https://arxiv.org/abs/2408.02866

3. **Zhang, B.**, Zepeda-Nunez, L., & Li, Q. (2024). Solving the wide-band inverse scattering problem via equivariant neural networks. Journal of Computational and Applied Mathematics, 451, 116050–116050. https://doi.org/10.1016/j.cam.2024.116050

4. Huang, E. G., Wang, R.-Y., Xie, L., Chang, P., Yao, G., **Zhang, B.**, Ham, D. W., Lin, Y., Blakely, E. A., & Sachs, R. K. (2020). Simulating galactic cosmic ray effects: Synergy modeling of murine tumor prevalence after exposure to two one-ion beams in rapid sequence. Life Sciences in Space Research, 25, 107–118. https://doi.org/10.1016/j.lssr.2020.01.001

TALKS

Solving the Inverse Scattering Problem: Leveraging Symmetries for Diffusion Models 09/2024
- Graduate Applied Math Seminar, University of Wisconsin-Madison Madison, WI

Solving the Inverse Scattering Problem: Leveraging Symmetries for Machine Learning 11/2024
- SIAM Student Chapter Seminar, University of Wisconsin-Madison Madison, WI

Multigrid-based Stochastic Minimization for Ptychographic Phase Retrieval 03/2025
- Graduate Applied Math Seminar, University of Wisconsin-Madison Madison, WI

Solving the Wideband Inverse Scattering Problem with Diffusion Models 03/2025
- Atlanta SIAM Student Conference Atlanta, GA

Multigrid-based Stochastic Minimization for Ptychographic Phase Retrieval 04/2025
- Copper Mountain Conference On Iterative and Multigrid Methods Denver, CO

(tentative) **Efficient Symmetry-Driven Diffusion Models for Wideband Inverse Scattering** 05/2025
- SIAM Conference on Applications of Dynamical Systems Denver, CO

CONFERENCES, WORKSHOPS & SUMMER SCHOOLS

Junior Researcher Meeting, on Forward and Inverse Kinetic theory 09/2022
- University of Wisconsin-Madison Madison, WI

Data-driven PDE-based Inverse Problem, in Theory and Practice 08/2024
• University of Wisconsin-Madison Madison, WI

Atlanta SIAM Student Conference 03/2025
• Georgia Institute of Technology Atlanta, GA

Copper Mountain Conference On Iterative and Multigrid Methods 04/2025
• Copper Mountain Denver, CO

(tentative) **SIAM Conferences SIAM Conference on Applications of Dynamical Systems** 05/2025
• Sheraton Denver Downtown Hotel Denver, CO

(tentative) **Statistical and Computational Challenges in SciML** 06/2025
• The Institute for Mathematical and Statistical Innovation Chicago, IL

RESEARCH PROJECTS

Solving the Wide-band Inverse Scattering Problem via Equivariant Neural Networks 10/2023
University of Wisconsin-Madison Madison, WI
• Proposed novel deep neural network architecture for solving the inverse scattering problem with wide-band datasets
• Designed, implemented and tested the network in TensorFlow.

Solving the Wideband Inverse Scattering Problem with Diffusion Models 01/2024 - 08/2024
University of Wisconsin-Madison Madison, WI
• Proposed an end-to-end probabilistic framework for approximating the posterior distribution induced by the inverse scattering map from wideband scattering data.
• Designed, implemented and tested the model in JAX/Flax.

Internship at Argonne National Laboratory 06/2024 - 09/2024
Supervisor: Dr. Zichao (Wendy) Di Lemont, IL
• Proposed stochastic multigrid methods for solving ptychographic phase retrieval.

TEACHING EXPERIENCE

Math 221: Calculus and Analytic Geometry I, TA Fall 2020
Math 222: Calculus and Analytic Geometry II, TA Spring 2021
Math 521: Analysis I, TA Summer 2022
Math 211: Calculus, TA Fall 2022
Math 234: Calculus - Functions of Several Variables, TA Spring 2023
Math 112: College Algebra, Instructor Fall 2023-Fall 2024
Math 211: Calculus, Head TA Spring 2025

ORGANIZATIONS & OUTREACH

Directed Reading Program, Mentor Fall 2024
• Topic: Solving the Inverse Scattering Problem: Classical Methods and Machine Learning
Directed Reading Program, Mentor Spring 2025
• Topic: Stochastic Differential Equations: Score-Based Diffusion Models

SKILLS & INTERESTS

Programming Languages: Python, Java, MatLAB, Julia, R, C
Libraries, APIs, and Technologies: Git, Jupyter, SciPy, NumPy, JAX, Flax, Tensorflow, PyTorch