BORONG ZHANG

+1 (510) 409-4372 | bzhang388@wisc.edu | Madison WI 53706

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**., Zepeda-Núñez, L. & Li, Q. Solving the Wide-band Inverse Scattering Problem via Equivariant Neural Networks. *Journal of Computational and Applied Mathematics, 451:116050, 2024 DOI:* https://doi.org/10.1016/j.cam.2024.116050

2. **Zhang, B.**, Guerra, M., Li, Q., & Zepeda-Núñez, L. (2024). Back-Projection Diffusion: Solving the Wideband Inverse Scattering Problem with Diffusion Models. *arXiv preprint arXiv:2408.02866.*

3. Huang EG, Yang RY, Xie LY, Chang PY, Yao G, **Zhang B**, Ham DW, Lin Y, Blakely EA & Sachs RK. (2020) Simulating galactic cosmic ray effects: Synergy modeling of murine tumor prevalence after exposure to twoone-ion beams in rapid sequence. *Life Sciences in Space Research.* 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

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

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 multi-grid 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