

# BORONG ZHANG

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

<https://borongzhang.github.io>

## EDUCATION

### University of Wisconsin–Madison

*Ph.D. Candidate in Mathematics, Advisor: Prof. Qin Li & Leonardo Andrés Zepeda Núñez*

• **Honors:** Mathematics Department Ascending Scholar Fellowship

Madison, WI

09/2020 – Present

### University of California, Berkeley

*Bachelor of Arts in Applied Mathematics & Computer Science*

• **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*

Berkeley, CA

08/2016 – 06/2020

## 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 two-one-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

• Graduate Applied Math Seminar, University of Wisconsin-Madison

09/2024

Madison, WI

Solving the Inverse Scattering Problem: Leveraging Symmetries for Machine Learning

• SIAM Student Chapter Seminar, University of Wisconsin-Madison

11/2024

Madison, WI

## CONFERENCES, WORKSHOPS & SUMMER SCHOOLS

**Junior Researcher Meeting, on Forward and Inverse Kinetic theory**

University of Wisconsin-Madison

09/2022

Madison, WI

**Data-driven PDE-based Inverse Problem, in Theory and Practice**

University of Wisconsin-Madison

08/2024

Madison, WI

## RESEARCH PROJECTS

**Solving the Wide-band Inverse Scattering Problem via Equivariant Neural Networks**

University of Wisconsin-Madison

10/2023

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**

University of Wisconsin-Madison

01/2024 - 08/2024

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**

Supervisor: Dr. Zichao (Wendy) Di

06/2024 - 09/2024

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
<ul style="list-style-type: none"><li>Topic: Solving the Inverse Scattering Problem: Classical Methods and Machine Learning</li></ul>	
Directed Reading Program, Mentor	Spring 2025
<ul style="list-style-type: none"><li>Topic: Stochastic Differential Equations: Score-Based Diffusion Models</li></ul>	

**SKILLS & INTERESTS**

---

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