

Shiping Zhou

Department of Mathematics and Statistics
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Education

- **Ph.D. Candidate in Computational and Applied Mathematics**
Missouri University of Science and Technology (expected graduation: 2024/5)
Advisor: [Prof. Yanzhi Zhang](#)
- **M.S. in Computational Mathematics**
Shandong University, China (2019)
Advisor: [Prof. Fuzheng Gao](#)
- **B.S. in Mathematics and Applied Mathematics**
Anhui University of Technology, China (2016)

Research Interests

- Modeling and simulation of nonlocal models
- Finite difference methods and spectral methods
- Finite element methods
- Data-driven modeling and simulation
- Deep neural network for PDE problems

Awards

- Gaoxiong Gan Scholarship, Missouri S&T, 2022, 2023, & 2024
- 8th Annual Meeting of SIAM Central State Section Travel Award, 2023
- First place at the Pi Day Celebration Poster Session, Missouri S&T, 2023
- Paul W. Elloe Graduate Research Award, Missouri S&T, 2022 & 2023
- Graduate Education Travel Fund, Missouri S&T, 2023
- Nonlocal School on Fractional Equations (NSFE) Travel Award, 2022
- Mathematics and Statistics Alumni Endowed Scholarship, Missouri S&T, 2022
- 7th Annual Meeting of SIAM Central State Section Travel Award, 2022

Publications and Preprints

1. *Weak Galerkin finite element method with second-order accuracy in time for parabolic problems*, **S. Zhou**, F. Gao, B. Li, and Z. Sun, Appl. Math. Lett., 90 (2019), pp. 118-123.
2. *A novel and simple spectral method for nonlocal PDEs with the fractional Laplacian*, **S. Zhou** and Y. Zhang, submitted (2023).
3. *Fourier pseudospectral methods for the spatial variable-order fractional wave equations*, **S. Zhou**, X. Zhao, and Y. Zhang, submitted (2023).
4. *Analytical and computational aspects of the high-order fractional Laplacian*, J. P. Borthagaray, Y. Wu, **S. Zhou**, and Y. Zhang, preprint (2023).
5. *Fast finite difference methods for variable-order fractional Laplacian*, **S. Zhou**, and Y. Zhang, to be submitted (2024).
6. *Data-driven approach for the solutions of time-dependent PDEs using convolutional neural network*, **S. Zhou**, Y. Li, and Y. Zhang, to be submitted (2024).
7. *A novel spectral method for the time-dependent Schrödinger-Poisson equation*, **S. Zhou**, C. Trenchea, and Y. Zhang, in preparation (2024).
8. *A hybrid approach to learning the nonlocal kernels*, **S. Zhou**, O. Burkovska, and Y. Zhang, in preparation (2024).
9. *Rational spectral methods for the spatial fractional viscoacoustic wave equations*, **S. Zhou**, Y. Wu, and Y. Zhang, in preparation (2024).

Presentations

1. Invited talk: *A novel and simple spectral method for nonlocal PDEs with fractional Laplacian*. The 8th Annual Meeting of SIAM Central States Section, Lincoln, NE, 2023/10.
2. Seminar talk: *A novel and simple spectral method for nonlocal PDEs with fractional Laplacian*. Graduate Seminar at Missouri University of Science and Technology, Rolla, MO, 2023/4.
3. Poster: *Numerical studies on the high-order fractional Laplacian*. Pi Day at Missouri University of Science and Technology, Rolla, MO, 2023/3.
4. Seminar talk: *Accurate and efficient spectral method for fractional wave equations*. Numerical Analysis Seminar at University of Pittsburgh, Pittsburgh, PA, 2023/2.
5. Invited talk: *Accurate and efficient spectral method for fractional wave equations*. The 7th Annual Meeting of SIAM Central States Section, Stillwater, OK, 2022/10.

6. Poster: *Numerical studies on the high-order fractional Laplacian*. Theoretical and Applied Aspects for nonlocal Models - Workshop of Banff International Research Station (BIRS), Online, 2022/7.
7. Seminar talk: *Numerical methods for acoustic wave equations*. Graduate Seminar at Missouri University of Science and Technology, Rolla, MO, 2022/4.
8. Poster: *Numerical studies on the high-order fractional Laplacian*. The University of Kansas Numerical Analysis Day 2022, Lawrence, KS, 2022/3.
9. Seminar talk: *Numerical studies on the high-order fractional Laplacian*. Continuum Mechanics Seminar at University of Nebraska-Lincoln, Online, 2022/3.
10. Invited talk: *Numerical studies on the high-order fractional Laplacian*. 4th Annual Meeting of the SIAM Texas-Louisiana Section, South Padre Island, TX, 2021/11.
11. Contributed talk: *Numerical studies on the high-order fractional Laplacian*. Midwest Numerical Analysis Day 2021, Rolla, MO, 2021/10.

Teaching Experiences

Missouri University of Science and Technology

- **Instructor**
MATH 3304: Elementary Differential Equations **Spring 2023**
98 students in total, **CET score: 3.21**¹
- **Co-Instructor**
MATH 1214: Mathematics Calculus for Engineers I **Fall 2020**
61 students in total, **CET score: 3.5**
- **Grader**
MATH 1214: Mathematics Calculus for Engineers I **Spring 2020**
Fall 2019

Advising Experiences

Missouri University of Science and Technology

Opportunities for Undergraduate Research Experiences (OURE) students (Co-advised):

- Megan Benkendorf (2023/9–present)
Project: Numerical study on exciton-polariton Bose-Einstein condensation

Referee for Professional Journals

- Mathematics and Computers in Simulation

¹Course Evaluation of Teaching (CET) score range from 0 (poor) to 4 (excellent).

Skills

- Proficient in numerical PDEs.
- Skilled in MATLAB, Python, Fortran, and L^AT_EX.
- Knowledgeable in data-driven machine learning

Professional Membership

- Society for Industrial and Applied Mathematics (SIAM), 2021–present