

Shiping Zhou

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🏢 Department of Computational Mathematics, Science and Engineering
📖 Michigan State University, East Lansing, Michigan, MI 48824

EDUCATION

Missouri University of Science and Technology, Rolla, MO

Ph.D. in Mathematics (Computational and Applied Mathematics Emphasis)

Aug. 2019 – May 2024

Advisor: Prof. Yanzhi Zhang

Shandong University, Jinan, Shandong, China

M.S. in Computational Mathematics

Sep. 2016 – Jun. 2019

Advisor: Prof. Fuzheng Gao

Anhui University of Technology, Ma'anshan, Anhui, China

B.S. in Mathematics and Applied Mathematics

Sep. 2012 – Jul. 2016

Research Interests

- Modeling and simulation of nonlocal models
- Reduced order modeling for PDEs
- Finite element/difference methods and spectral methods
- Data-driven modeling and simulation
- Deep neural network for solving PDEs

Academic Experience

Michigan State University, East Lansing, MI

Postdoctoral Research Associate

Aug. 2024 – present

Missouri University of Science and Technology, Rolla, MO

Graduate Teaching / Research Assistant

Aug. 2019 – May 2024

Publications and Preprints

8. Fast finite difference methods for variable-order fractional Laplacian, **S. Zhou**, and Y. Zhang, to be submitted (2024).
7. 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).
6. Convolutional neural network-based reduced order modeling for parametric nonlocal PDEs, Y. Wang, **S. Zhou**, and Y. Zhang, submitted (2024).
5. Parametric model reduction with convolutional neural networks, Y. Wang, **S. Zhou**, and Y. Zhang, submitted (2024).
4. Analytical and computational aspects of the high-order fractional Laplacian, J. P. Borthagaray, Y. Wu, **S. Zhou**, and Y. Zhang, preprint (2023).
3. Fourier pseudospectral methods for the spatial variable-order fractional wave equations, X. Zhao, Y. Zhang, **S. Zhou**, submitted (2023). [arXiv:10.48550/arXiv.2311.13049](https://arxiv.org/abs/10.48550/arXiv.2311.13049)
2. A novel and simple spectral method for nonlocal PDEs with the fractional Laplacian, **S. Zhou** and Y. Zhang, *Comput. Math. Appl.*, 168 (2024), pp.133–147. [doi:10.1016/j.camwa.2024.06.001](https://doi.org/10.1016/j.camwa.2024.06.001)
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. [doi:10.1016/j.aml.2018.10.023](https://doi.org/10.1016/j.aml.2018.10.023)

Presentations

11. 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
10. 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
9. Poster: Numerical studies on the high-order fractional Laplacian, Pi Day at Missouri University of Science and Technology, Rolla, MO, 2023/3
8. Seminar talk: Accurate and efficient spectral method for fractional wave equations, Numerical Analysis Seminar at University of Pittsburgh, Pittsburgh, PA, 2023/2
7. 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
5. Seminar talk: Numerical methods for acoustic wave equations, Graduate Seminar at Missouri University of Science and Technology, Rolla, MO, 2022/4
4. Poster: Numerical studies on the high-order fractional Laplacian, The University of Kansas Numerical Analysis Day 2022, Lawrence, KS, 2022/3
3. Seminar talk: Numerical studies on the high-order fractional Laplacian, Continuum Mechanics Seminar at University of Nebraska-Lincoln, Online, 2022/3
2. 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
1. Contributed talk: Numerical studies on the high-order fractional Laplacian, Midwest Numerical Analysis Day 2021, Rolla, MO, 2021/10

Awards

- Gaoxiong Gan Scholarship, Missouri S&T, 2022, 2023, & 2024
- Paul W. Elie Graduate Research Award, Missouri S&T, 2022 & 2023
- 8th Annual Meeting of SIAM Central State Section Travel Award, 2023
- First place at the Pi Day Celebration Poster Session, Missouri S&T, 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

Teaching Experiences

Missouri University of Science and Technology

Instructor

Guide: MATH 3304: Elementary Differential Equations

Jan. 2023 – May 2023

98 students in total, **CET score: 3.21**¹

Co-Instructor

Guide: MATH 1214: Mathematics Calculus for Engineers I

Aug. 2020 – Dec. 2020

61 students in total, **CET score: 3.5**

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

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

Skills

- Proficient in numerical PDEs.
- Skilled in MATLAB, Python, Fortran, and \LaTeX .
- Knowledgeable in data-driven machine learning

Professional Membership

- Society for Industrial and Applied Mathematics (SIAM) *Jan. 2021 – present*