Han Zhou

Email: hzhou24@sas.upenn.edu
Mobile: +1 (267) 979-5378

Employment

- **Department of Mathematics, University of Pennsylvania** — Philadelphia, PA, USA
  AMCS Postdoctoral Fellow — *Sep. 2024 -*

Education

- **Shanghai Jiao Tong University** — Shanghai, PRC
  Ph.D., Mathematics, Advisor: Wenjun Ying. — *Sept. 2020 - Jun. 2024*
- **Shanghai Jiao Tong University** — Shanghai, PRC
  B.S., Mathematics and Applied Mathematics — *Sept. 2016 - Jun. 2020*

Research Interest

- **Scientific Computing & Numerical Analysis**: PDE interface problems; fast Cartesian grid-based algorithms
- **Mathematical Physiology**: Modeling and simulation of cells and vesicles; membrane dynamics
- **PDE Well-posedness Theory**: fluid–structure interaction; PDEs with open boundaries

Papers and Preprints

1. **Han Zhou**, Yuan-Nan Young, Yoichiro Mori. Modeling and Simulation of Open Membranes in Stokes Flow with Mixed-Dimensional Coupling. Multiscale Modeling & Simulation, accept, arXiv:2504.16823.
2. Pengsong Yin, Wenjun Ying, Yulin Zhang, **Han Zhou**. A kernel-free boundary integral method for elliptic interface problems on surfaces. arXiv:2508.16061.
3. **Han Zhou**, Wenjun Ying. A Cartesian grid-based boundary integral method for moving interface problems. arXiv:2309.01068.
4. **Han Zhou**, Minsheng Huang, Wenjun Ying. ADI schemes for the heat equation on arbitrary 3D domains and their applications. arXiv:2309.00979.
5. **Han Zhou**, Wenjun Ying, A correction function-based kernel-free boundary integral method for elliptic PDEs with implicitly defined interfaces, *Journal of Computational Physics*, 496:112545, 2024.
6. **Han Zhou**, Jiahe Yang, Wenjun Ying, A kernel-free boundary integral method for the nonlinear Poisson-Boltzmann equation, *Journal of Computational Physics*, 493:112423, 2023.
7. **Han Zhou**, Wenjung Ying, A dimension splitting method for time dependent PDEs on irregular domains, *Journal of Scientific Computing*, 94(1):20, 2023.
8. **Han Zhou**, Shuwang Li, Wenjun Ying, An alternating direction implicit method for mean curvature flows, *Journal of Scientific Computing* 101:65 (2024).
9. Jiacheng Xu, Dan Hu, **Han Zhou**, A phase-field method for elastic mechanics with large deformation, *Journal of Computational Physics*, 471:111630, 2022.

Talks

- Mechanics of Life 3 Workshop (poster), Flatiron Institute, New York City, — Dec. 2025
- SIAM Great Lakes Section Annual Meeting and Conference, IIT, Chicago, — Sept. 2025
- Mathematical Modeling, Computational Methods, and Biological Fluid Dynamics: Research and Training, NITMB, Chicago — Aug. 2025
- Numerical analysis and PDE seminar, University of Delaware, Newark, Delaware — May. 2025
- Fluid Mechanics and Waves Seminar, NJIT, Newark — Nov. 2024
- NCTS Seminar on PDE and Machine Learning, online — Oct. 2024

- The 10th International Congress on Industrial and Applied Mathematics, Waseda University, Tokyo Aug. 2023
- SICIAM Workshop on Recent Advances in Fast Algorithms, The Chinese University of Hong Kong, Shenzhen Aug. 2023
- The 13th Annual Meeting of the Chinese Mathematical Society in Computational Mathematics, Nanjing Normal University, Nanjing Jul. 2023
- The 6th CSIAM Student Forum, online Nov. 2022
- The 16th Shanghai Symposium on Scientific and Engineering Computing Methods, University of Shanghai for Science and Technology, Shanghai Nov. 2021

Honors and Scholarships

- Good Teaching Awards for Spring 2025 (UPenn math) 2025
- National Scholarship 2023
- Academic Scholarship for Graduate Students 2020-2022
- Excellent Bachelor Thesis of School of Mathematical Sciences 2020

Teaching

University of Pennsylvania

- **Instructor**, AMCS 6025, Numerical and Applied Analysis I, Fall 2025
- **Instructor**, AMCS 6035, Numerical and Applied Analysis II, Spring 2025
- **Instructor**, AMCS 6025, Numerical and Applied Analysis I, Fall 2024

Shanghai Jiao Tong University

- **Teaching Assistant** Differential geometry (Fall 2023), Convex optimization (Spring 2022, Fall 2022), Scientific computing (Spring 2021, Fall 2021), Calculus (Fall 2020)

Graduate projects supervision(UPenn):

- Rui Xu (graduate student, AMCS) 2025
- JiYao Zhang (graduate student, AMCS) 2025

Technical Skills

Language: Mandarin, English
Computer programming C++, Python, MATLAB.

Academic Service

Organizer, weekly UPenn AMCS Seminar 2025-2026
Organizer, weekly UPenn Mathematical Biology Seminar 2024-2025