

Mengdi Wang

Postdoctoral Fellow, University of British Columbia

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Research Summary

My research develops multiscale representations, interface and transport algorithms, and adaptive GPU solvers for physical simulation, while exploring simulation as a two-way interface between AI and the real world: AI expands what can be simulated, and physics provides testable principles for reliable, human-centered intelligent systems.

Research Areas: Physical Simulation, Computer Graphics, Scientific Computing, GPU Computing, Scientific Machine Learning

Academic Appointments

University of British Columbia, Postdoctoral Fellow 2026.9 - Present
◦ Department of Computer Science, PhysAI Lab, working with Prof. Peter Yichen Chen

Education

Georgia Institute of Technology, Ph.D. in Computer Science 2024.1 - 2026.5
◦ School of Interactive Computing, advised by Prof. Bo Zhu
Dartmouth College, Ph.D. Program in Computer Science (Transferred) 2020.9 - 2023.12
◦ Guarini School of Graduate and Advanced Studies, advised by Prof. Bo Zhu
Peking University, B.S. in Computer Science, *summa cum laude* 2016.9 - 2020.6
◦ Center on Frontiers of Computing Studies, advised by Prof. Baoquan Chen

Publications

Matrix-Free GPU Implementation of Algebraic Multigrid Poisson Solver on Adaptive Octree with Irregular Domains JCP 2026 (in submission)
Mengdi Wang, Yuchen Sun, Bo Zhu
Cirrus: Adaptive Hybrid Particle-Grid Flow Maps on GPU SIGGRAPH 2025
Mengdi Wang, Fan Feng, Junlin Li, Bo Zhu (Featured in video trailer)
Real-Time Knit Deformation and Rendering SIGGRAPH 2025
*Mengdi Wang**, Tao Huang*, Haoyang Shi* (joint first authors), Yuxing Qiu, Yin Yang, Kui Wu
An Interface Tracking Method with Triangle Edge Cuts JCP 2025.1
Mengdi Wang, Matthew Cong, Bo Zhu
Hydrophobic and Hydrophilic Solid-Fluid Interaction SIGGRAPH ASIA 2022
Jinyuan Liu, *Mengdi Wang*, Fan Feng, Annie Tang, Qiqin Le, Bo Zhu
A moving eulerian-lagrangian particle method for thin film and foam simulation SIGGRAPH 2022

Yitong Deng, *Mengdi Wang*, Xiangxin Kong, Shiyong Xiong, Zangyueyang Xian, Bo Zhu

A Clebsch method for free-surface vortical flow simulation SIGGRAPH 2022

Shiyong Xiong, Zhecheng Wang, *Mengdi Wang*, Bo Zhu (Featured in video trailer)

Thin-film smoothed particle hydrodynamics fluid SIGGRAPH 2021

Mengdi Wang, Yitong Deng, Xiangxin Kong, Aditya H. Prasad, Shiyong Xiong, Bo Zhu (Featured in video trailer)

Visual data analysis and simulation prediction for COVID-19 arXiv preprint (2020)

Baoquan Chen, Mingyi Shi, Xingyu Ni, Liangwang Ruan, Hongda Jiang, Heyuan Yao, *Mengdi Wang*, Zhenhua Song, Qiang Zhou, Tong Ge

Research Experience

Research Intern, Lightspeed Studio, Tencent IEG, 2024.5 - 2024.8 Los Angeles, CA

- Designed a real-time yarn-level knit fabric simulation framework, resulting in a co-first-author SIGGRAPH 2025 paper.

Research Intern, NVIDIA, 2022.6 - 2022.9 Santa Clara, CA

- Designed a GPU-accelerated geometric multigrid Poisson solver and VOF-based interface tracking method, published in *Journal of Computational Physics*. Mentored by Ken Museth, Eftychios Sifakis.

Teaching Experience

Instructor, Dartmouth College, COSC 294 (Graduate Seminar) Fall 2021

Additional Instructor, Dartmouth College / Georgia Tech Multiple terms

Head Teaching Assistant, Dartmouth College, COSC 277 Computer Graphics Fall 2023

Academic Service

Reviewer: ACM Transactions on Graphics (SIGGRAPH), Computer Graphics Forum (CGF), Journal of Computational Physics

Awards and Honors

ACM-ICPC Asia Qingdao Regional Contest 2016

Gold Medal (Rank 4th)