Hongjie Jiang

jianghongjie@stu.pku.edu.cn https://hongjiejiang.github.io/

Education

Sep, 2022 – present

B.S. in Mathematics, Peking University
Relevant Coursework: Partial Differential Equations, Real Analysis, Numerical Algebra, Introduction to Numerical Analysis, Optimization Methods, Foundations of Machine Learning, Fluid Mechanics, etc.
GPA: 3.87/4.00, Top 5% of Class, Ranked 3rd in My Major

Standard Tests

March, 5th, 2025

The Test of English as Foreign Language (TOEFL–IBT) :
Total 108: 30 in reading, 29 in listening, 25 in speaking, 24 in writing

Augest, 25th, 2024

Graduate Record Examination(GRE) :
Total 327+3.5: 157 in Verbal Reasoning, 170 in Quantitative Reasoning, 3.5 in Analytical Writing

Researches and Projects

June, 2025 – Present

Solving PDEs with Machine Precision: TENG with Arbitrary Boundaries and Multi-variables
Supervised by Prof. D. Luo
Introduction: Explored Time-Evolving Natural Gradient (TENG) methods for machine-precision PDE solving, extending the framework to arbitrary boundary conditions and multi-variable settings.
My Work:

- Developed and implemented optimization algorithms to handle Neumann and Robin boundary conditions.
- Designed neural architectures tailored for multi-variable PDEs.
- Conducted numerical experiments with traditional solvers to benchmark precision and efficiency.

Oct, 2024 – Aug, 2025

Numerically Solving Schrödinger Equation: Enhancing PESNet for Multistate Fitting
Supervised by Prof. L. Wang
Introduction: Focused on enhancing PESNet to simultaneously fit multiple lowest-energy states, enabling accurate ground-state energy estimation even in the presence of state crossings.
My Work:

- Implemented major code modifications for multistate fitting.
- Designed algorithms to correctly identify and match states across energy crossings.
- Refined training strategies and validated results on molecular systems.

Researches and Projects (continued)

Dec, 2023 – June, 2025

PDE Foundation Model: Mesh-free and Unsupervised PDE Solver
Supervised by Prof. B. Dong
Introduction: Focused on developing a mesh-free method to solve PDEs and inverse problems, enabling fast adaptation to new parameters for applications in scientific computing.
My Work:

- Designed a 3D encoder architecture inspired by video coding techniques.
- Generated datasets using traditional PDE solvers and designed cross-validation pipelines for data filtering.
- Contributed to pretraining/finetuning and baseline model comparisons.

April, 2023 – June, 2023

PKUDSA Eraser: A Self-Designed Program for Assignment Battles
Supervised by Prof. B. Chen, Prof. Y. Liu, in collaboration with the TA team
Introduction: Developed an online program allowing students to participate in game-like battles, with a visualization of battle processes.
My Work:

- Created sample codes and APIs for player submissions.
- Detected and fixed invalid operations during closed beta testing.
- Improved gameplay balance through theoretical analysis.

Publications

arXiv Preprint

1. Z. Ye, Z. Liu, B. Wu, **H. Jiang**, L. Chen, M. Zhang, X. Huang, Q. M. J. Zou, H. Liu, and B. Dong, *Pdeformer-2: A versatile foundation model for two-dimensional partial differential equations*, 2025. arXiv: 2507.15409 [math.NA]. URL: https://arxiv.org/abs/2507.15409.

Skills

Languages	English (Fluent), Mandarin Chinese (Native).
Programming Languages	Python, C/C++, MATLAB, LaTeX, Markdown
Deep Learning Framework	PyTorch, MindSpore, JAX with GPU programming experience.
Numerical Methods	Familiarity with multiple NPDE (FDM, FEM, Spectral) and optimization methods.
Theoretical Skills	Strong foundation in fundamental mathematics (linear algebra, multivariable calculus) and physics (classical mechanics, fluid mechanics, quantum mechanics).

Miscellaneous Experience

Awards and Achievements

Sep, 2024 — **China Merchants Securities(CMS) Scholarship**, Peking University

— **Academic Excellence Scholarship**, Peking University

June, 2024 — **Applied Mathematics Honors Program**, the School of Mathematical Sciences, Peking University

Sep, 2023 — **The Peking University Zheng Geru Scholarship**, Peking University

— **Merit Student**, Peking University

Sep, 2022 — **Scholarship for Freshman**, Peking University

May, 2022 — **The Winner of Gold Medal in the 22nd Asian Physics Olympiad**, Asian Physics Olympiad