

Hongjie Jiang

✉ jianghongjie@stu.pku.edu.cn

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 3% of Class, Ranked **First** 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

August, 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

-  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, multi-variable 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