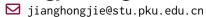
# Hongjie Jiang



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, 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. Y

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]. **O** URL: https://arxiv.org/abs/2507.15409.

## **Skills**

Languages English (Fluent), Mandarin Chinese (Native).

Programming Languages Python, C/C++, MATLAB, Languages Python, C/C++, MATLAB, Languages

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