

Hongjie Jiang

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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

August, 25th, 2024

📖 **Graduate Record Examination(GRE) :**

Total 327+3.5: 157 in Verbal Reasoning, 170 in Quantitative Reasoning, 3.5 in Analytical Writing

Jan, 17th, 2023

📖 **The Test of English as Foreign Language (TOEFL-IBT) :**

Total 108: 30 in reading, 29 in listening, 25 in speaking, 24 in writing

Researches and Projects

Oct, 2024 – present

📖 **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:

- Independently implemented major code modifications to adapt PESNet for multistate fitting.
- Refine techniques and validate results with instructions from senior researcher and supervisor.

Skills gained: Expertise in natural gradient descent, variational Monte Carlo, neural network design and optimization, independent problem-solving, Python programming, and numerical experimentation.

Researches and Projects (continued)

Dec, 2023 – present

■ PDE Foundation Model: Mesh-free and Unsupervised PDE Solver

Supervised by Prof. B. Dong

Introduction: Focused on developing a mesh-free, unsupervised method to solve PDEs and inverse problems, enabling fast adaptation to new parameters for applications in scientific computing.

My Work:

- Researched the application of solvers (e.g., Fluent, Matlab PDEToolbox) and evaluated their feasibility for training data generation, providing key insights for team decisions.
- Designed a 3D encoder combining techniques from video coding to optimize the pretraining process of implicit neural representations (INR), laying the foundation for INR-boost research.
- Conducted data screening and quality assessment using traditional numerical methods (e.g., residual calculations and cross-validation) to enhance dataset reliability.

Skills gained: Advanced deep learning techniques, proficiency in Python and MindSpore, video coding integration with INR, numerical analysis methods, and independent literature review capabilities.

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:

- Designed sample codes for players.
- Led team efforts in closed beta testing, identified and corrected invalid operations.
- Optimized game balance through theoretical analysis.

Skills gained: Team collaboration, advanced Python programming, and proficiency in data analysis using NumPy.

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

Skills (continued)

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| Deep Learning Framework | PyTorch, MindSpore, JAX with GPU programming experience. |
| Numerical Methods | Familiarity with numerical solutions to differential equations, optimization, and methods like finite differences or finite element analysis. |
| 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

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| 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 |