

JIANGHAO LIU

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EDUCATION BACKGROUND

SHANGHAI JIAO TONG UNIVERSITY

Shanghai, China 09/2022 - present

Bachelor of science in Mathematics and Applied Mathematics(Zhiyuan Honors Program)

GPA: 3.73 / 4.3

KTH ROYAL INSTITUTE OF TECHNOLOGY

Stockholm, Sweden 01/2025 - 06/2025

Exchange Student in Mathematics

Notable Courses Studied: Mathematical Analysis; Advanced Algebra; Numerical Analysis and scientific Computing; Real Analysis; Complex Analysis; Abstract Algebra; Numerical Methods in ODE and PDE; Methods of Mathematical Physics; Stochastic process

Awards and Scholarships: Mathematical Contest In Modeling, Honorable Mention (Feb.2023); Zhiyuan Honors Scholarship (Dec.2022/Dec.2023/Dec.2024); Undergraduate Merit Scholarship (Dec.2023/Dec.2024); Second Place in the Science Group of the China University Honors College Science Innovation Competition. (Oct.2024)

Research Interests:

- Neural network methods for high dimensional partial differential equations
- Numerical methods for differential equations

ACADEMIC PRACTICE IN MATHEMATICS

Researcher, Numerical Simulation of the Generalized Sine-Gordon Equation

Shanghai Jiao Tong University Advisor: Guofu Yu

Shanghai, China 01/2024 - 01/2025

- Investigated the integrable discretization of the generalized sine-Gordon equation to ensure numerical stability and preservation of intrinsic properties.
- Designed and analyzed adaptive moving mesh methods for efficiently solving the sine-Gordon equation for $\nu = 1$, improving resolution in regions of high gradient.

Researcher, Tensor Neural Network for Solving Schrödinger Equation

Chinese Academy of Sciences Advisor: Hehu Xie

Beijing, China 07/2024 - 09/2024

- Proposed a discrete Tensor Neural Network (TNN) approach to model the electron-electron Coulomb potential, achieving an improvement in computational accuracy by three orders of magnitude compared to previous methods.
- Developed an efficient algorithm for solving the eigenvalue problem of the Schrödinger equation, integrating the TNN interpolation technique with the associated Legendre polynomial expansion to enhance numerical stability and computational performance.

Researcher, High-Performance Algorithms Based on Sum of Gaussian Method and Tensor Neural Network

Zhiyuan Future Scholar Program, SJTU Advisor: Zhenli Xu

Shanghai, China 12/2024 - present

- Developed an innovative algorithm combining the Sum of Gaussian method with Tensor Neural Networks to improve the computational efficiency and precision of Coulomb potential calculations in many-body Schrödinger equations.
- Implemented low-rank tensor expansions for Coulomb potentials to reduce computational complexity while maintaining high accuracy, overcoming the challenges of high-dimensional integration.
- Conducted preliminary comparisons with traditional methods, showing promising results in reducing computational costs while achieving higher accuracy and efficiency.

Researcher, Development of Deep Learning Methods Based on Function Representations

Nanyang Technological University Advisor: Li-lian Wang

Singapore 07/2025 - 09/2025

PREPRINTS & PUBLICATIONS

- Y. Liao, Z. Lin, **J. Liu**, Q. Sun, Y. Wang, T. Wu, & H. Xie . *Solving Schrödinger Equation Using Tensor Neural Network*. arXiv preprint.

EXTRACURRICULAR ACTIVITIES

Deputy Leader of Youth Volunteer Service Team, Student Union, Zhiyuan College	09/2023 - 09/2024
Volunteer Teacher, Shangrao, Shanglu Center Primary School	08/2023

SKILLS

- **Computer Skills:** Matlab, Python, C++