Linying Zhang

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RESEARCH INTEREST

Scientific Machine Learning, Physics-informed Neural Networks, Data-driven Surrogate Modeling, Rarefied Gas Dynamics

EDUCATION

Beihang University, Department of Human Machine and Environment Engineering **Beijing, CHN**
M.S. in Human-Machine and Environment Engineering *September 2022 - January 2025 (expected)*

- GPA: 3.94/4.0
- Rank: Top 3%

Polytechnic University of Milan, Department of Mathematics (MOX) **Milan, IT**
Exchange Student in Mathematical Engineering *September 2023 - February 2024*

Beihang University **Beijing, CHN**
B.E. in Mechanics Engineering *September 2018 - June 2022*

- GPA: 91.13/100
- Rank: 30/264

PUBLICATIONS

- **Simulation of rarefied gas flows using physics-informed neural network combined with discrete velocity method**
  Linying, Zhang and Wenjun, Ma and Qin, Lou and Jun, Zhang
  Physics of Fluid, 2023. **IF: 4.61, Rank: Q1.**
- **Physics-informed neural networks for solving rarefied gas flows combined with discrete velocity method**
  Linying, Zhang and Wenjun, Ma and Jun, Zhang
  in *The Nineteenth International Conference for Mesoscopic Methods in Engineering and Science (ICMMES)*, 2023.

RESEARCH EXPERIENCE

Shape-informed Surrogate Models for Problems in Variable Domains *Sep, 2023 – present*
(Publication in preparation)

Research Internship at MOX, Polytechnic University of Milan, Advisor: Dr. Francesco Regazzoni and Dr. Stefano Pagani

- Developed Shape-informed Neural Networks, a novel surrogate model based on artificial neural networks, applicable to differential problems with physical and geometrical dependencies.
- Utilized DeepSDF model to extract feature of geometry. Model based on an encoder-less neural networks to fit the signed distance function (SDF) and finds the continuous expression in the latent space.
- Overcame limitations of traditional methods with a mesh-less architecture, encoding geometrical variability through latent codes, particularly beneficial in biomedical applications.

Physics-informed Neural Networks for Solving Rarefied Gas Flows *Sep, 2022 - present*

Part of Master dissertation, Advisor: Prof. Jun Zhang

- Developed a novel surrogate model, PINN–DVM, integrating physics-informed neural networks (PINNs) and the discrete velocity method (DVM) for simulating rarefied gas flows.

- Directly encoded the linearized Bhatnagar–Gross–Krook equation into the residual of an artificial neural network within the PINN–DVM model.
- Demonstrated superior performance of PINN–DVM over original PINNs in solving rarefied gas flows, overcoming limitations of conventional numerical methods through streamlined mesh generation and derivative calculations.

Development of PaddleScience PDE Equation Solving Model *Jul, 2023 – Sep, 2023*

Internship in Baidu

- Developed PDE solvers based on the framework of PaddleScience.
- Represented the Physics-Informed Graph Neural Networks and Physics-Informed Neural Operators in PaddlePaddle
- Project Repository : PaddleScience

Neural Network-based Partial Differential Equation Solver and Applications *Dec, 2021 - Jun, 2022*

Advisor: Prof. Jun Zhang

- Diploma thesis. Solving partial differential equation using physics-informed neural networks

Water Quality Prediction Based on Neural Networks and Multi-spectral Image *Sep, 2019 - Sep, 2020*

Advisor: Prof. Jun Zhang

- Predicting of the water quality based on the multi-spectral data

AWARDS & HONORS

- **National Scholarship (top 1% highest scholarship from Ministry of Education of China)**, Sep. 2023
- **First Class Academic Scholarship (3 times)**, Beihang University, Sep. 2023 & Sep. 2022 & Sep. 2020
- **Outstanding Graduates**, Beihang University, 2022
- **Top Student of Academic Records**, Beihang University, 2021

SKILLS

Programming	LaTex, Python, Pytorch, Tensorflow
Languages	Mandarin (Native), English (Fluent, IELTS 6.5), German (Elementary)
Software	Fluent, Catia