JINGMIN SUN Ph.D.

(+1) 518-414-1691
jingmins@andrew.cmu.edu
http://jingminsun.github.io
GitHub: JingminSun

EDUCATION

Department of Mathematical Science, Carnegie Mellon University   Pittsburgh, PA
Ph.D. in Mathematical Science   2020.09 - 2025.05 *(expected)*
- Advisor: Prof. Hayden Schaeffer (now Prof. in Mathematics at UCLA)
- Research area: Operator learning, PDE-foundation Model, Optimization, Control problem

Department of Mathematical Science, Rensselaer Polytechnic Institute   Troy, NY
Ph.D. student in Mathematics   2020.01 - 2020.05
B.S. in Mathematics   2017.09 - 2019.12
- GPA: 3.98/4.00; Summa Cum Laude

PREPRINTS

1. **Jingmin Sun**, Zecheng Zhang, and Hayden Schaeffer. LeMON: Learning to Learn Multi-Operator Networks, arXiv preprint arXiv:2408.16168 (2024).

2. Derek Jollie*, **Jingmin Sun***, Zecheng Zhang, and Hayden Schaeffer. Time-Series Forecasting, Knowledge Distillation, and Refinement within a Multimodal PDE Foundation Model, arXiv preprint arXiv:2409.11609 (2024). (*Equal contribution)
Under review

PUBLICATIONS

1. **Jingmin Sun**, Yuxuan Liu, Zecheng Zhang, and Hayden Schaeffer. Towards a foundation model for partial differential equations: Multi-operator learning and extrapolation, arXiv preprint arXiv:2404.12355 (2024).
Accepted by *Physics Review E*

2. Yuxuan Liu, **Jingmin Sun**, Xinjie He, Griffin Pinney, Zecheng Zhang, and Hayden Schaeffer. PROSE-FD: A Multimodal PDE Foundation Model for Learning Multiple Operators for Forecasting Fluid Dynamics, arXiv preprint arXiv:2409.09811 (2024).
Foundation model for science workshop at NeurIPS 2024

ON GOING PAPERS

1. **Jingmin Sun**, Zecheng Zhang, and Hayden Schaeffer. BelNet for Control Problems (in progress)

2. Xinjie He, **Jingmin Sun**, Zecheng Zhang, and Hayden Schaeffer. Efficiency and Computer Memory Enhancement of PDE-Foundation Model. (in progress)

3. Min Zhu, Kaiyuan Huang, **Jingmin Sun**, Lu Lu, Zecheng Zhang, and Hayden Schaeffer. Enhancing the Interpretability of the PDE-Foundation Model. (in progress)

4. Yanming Kang, **Jingmin Sun**, Giang Tran, Hans De Sterck, Hayden Schaeffer. Symbolic Information Analysis for PDE-foundation model. (in progress)

PROJECTS	**Enhancing the Interpretability of the PDE-Foundation Model**	2024.06 -present

Work with Prof. Lu Lu's group, Prof. Zecheng Zhang and Prof. Hayden Schaeffer

Symbolic Information Analysis for PDE-Foundation Model   2024.06 -present

Work with Prof. Giang Tran's group, Prof. Hans De Sterck and Prof. Hayden Schaeffer

Efficiency and Memory Enhancement of PDE-Foundation Model 2024.06 -present

Work with Prof. Zecheng Zhang and Prof. Hayden Schaeffer's group

BelNet on Dynamical System   2023.05 - present

Work with Prof. Zecheng Zhang and Prof. Hayden Schaeffer

Kernel Analog Forecasting with Controls   2022.05 - 2023.05

Work with Prof. Rachel Ward and Prof. Hayden Schaeffer

On Sticky Brownian Motion and Numerical Solution   2020.01 - 2020.05

Rensselaer Polytechnic Institute, work with Prof. Fengyan Li

TEACHING AND MENTORING	**REU Co-Mentor** | University of California, Los Angeles	Summer 2024
	TA for Numerical Methods | Carnegie Mellon University	Spring, Fall 2024
	TA for Computational Linear Algebra | Carnegie Mellon University	Fall 2023
	TA for Linear Algebra for Data Science | Carnegie Mellon University	Fall 2023
	TA for Probability (Graduate Level) | Carnegie Mellon University	Spring 2023
	TA for Numerical PDEs | Carnegie Mellon University	Fall 2022
	TA for Integration and Approximation | Carnegie Mellon University	Spring 2022
	TA for Probability | Carnegie Mellon University	Fall 2021
	TA for Matrix Algebra | Carnegie Mellon University	Summer 2021
	TA for Numerical Linear Algebra | Carnegie Mellon University	Spring 2021
	TA for Principle of Analysis 1 | Carnegie Mellon University	Fall 2020
	TA for Linear Algebra | Rensselaer Polytechnic Institute	Spring 2020

AWARDS	• **Travel Award**, SIAM Conference on Mathematics of Data Science	2024.07
	• **The Max Hirsch Prize**, Rensselaer Polytechnic Institute	2020.05

PRESENTATIONS	**Towards a foundation model for partial differential equations: Multi-operator learning and extrapolation**	2024.10

SIAM Conference on Mathematics of Data Science

LeMON: Learning to Learn Multi-Operator Networks   2024.10

Prof. Lu Lu's Seminar at Yale University

PDE Foundation Model: Generalization, Meta-learning and more   2024.09

Applied and Computational Math Seminar at Florida State University

Predicting Operators and Symbolic Expressions using Multimodal Transformers - PDE   2024.03

Prof. Hayden Schaeffer's Seminar at University of California, Los Angeles

SKILLS **Languages:** English, Chinese (Native).

Programming:

- Foundation model engineering and programming (e.g. Transfer learning, meta-learning)
- High-Performance Computing (e.g., Linux/Unix, Bash, CUDA)
- Python (e.g., NumPy, PyTorch, JAX, TensorFlow, SciPy, scikit-learn)
- MATLAB
- R
- LaTeX
- Markdown
- Git/ GitHub
- HTML/ CSS

REFERENCES **Prof. Hayden Schaeffer**   Ph.D. advisor
Professor
Department of Mathematics
University of California, Los Angeles
hayden@math.ucla.edu

Prof. Zecheng Zhang
Assistant Professor
Department of Mathematics
Florida State University
zzhang14@fsu.edu

Prof. Noel Walkington
Professor
Department of Mathematical Science
Carnegie Mellon University
noelw@andrew.cmu.edu

Prof. Jason Howell
Teaching Professor
Department of Mathematical Science
Carnegie Mellon University
howell4@cmu.edu