Liu Yang

Title: Assistant Professor (Presidential Young Professor), from July 2024
      Department of Mathematics
      National University of Singapore

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EDUCATION

Brown University, Providence, RI, USA
Ph.D. in Applied Mathematics, May 2021
Sc.M. in Applied Mathematics, May 2018
Advisor: George Karniadakis
Dissertation: Generative Adversarial Networks for Physics-Informed Learning

Tsinghua University, Beijing, China
B.E. in Engineering Mechanics, July 2016
Tsien Hsue-shen Elite Class in Mechanics
Outstanding Graduate Honor (Top 10%)

WORK

National University of Singapore, Singapore
Assistant Professor, Department of Mathematics, from July 2024
Presidential Young Professor

University of California, Los Angeles, Los Angeles, CA, USA
Assistant Adjunct Professor, Department of Mathematics, July 2022-June 2024
Working with Prof. Stanley Osher.

WeRide Corp, San Jose, CA, USA
Software Engineer, June 2021-June 2022
Working on autonomous driving systems.

RESEARCH INTERESTS

Artificial Intelligence for Science, Physics-Informed Learning, Generative Models, In-Context Learning, Reinforcement Learning

AWARDS

- David Gottlieb Memorial Award, Brown University, USA (March 2021)
- Outstanding Graduate Honor (Top 10%), Tsinghua University, China (July 2016)
- Scholarship for Academic Excellence, Tsinghua University, China (November 2015)
- Scholarship for Academic Excellence, Tsinghua University, China (November 2013)
- Tsien Hsue-shen Elite Class in Mechanics, Tsinghua University, China (2012-2016)

PUBLICATIONS & PREPRINTS

See details in my Google Scholar profile. Citations over 4400, h-index 11, by March 15 2024
∗ indicates equal contribution.

- **Liu Yang**, and Stanley J. Osher. "PDE Generalization of In-Context Operator Networks: A Study on 1D Scalar Nonlinear Conservation Laws" *arXiv:2401.07364* (2024).
- **Liu Yang**, Siting Liu, and Stanley J. Osher. "Fine-Tune Language Models as Multi-Modal Differential Equation Solvers" *arXiv:2308.05061* (2023).

- **Liu Yang**, Siting Liu, Tingwei Meng, and Stanley J. Osher. "In-Context Operator Learning With Data Prompts for Differential Equation Problems" *Proceedings of the National Academy of Sciences* 120.39 (2023): e2310142120.

- *Xuhui Meng, ***Liu Yang**, Zhiping Mao, José del Águila Ferrandis, and George Em Karniadakis. "Learning Functional Priors and Posteriors from Data and Physics." *Journal of Computational Physics* 457 (2022): 111073.

- **Liu Yang**, Constantinos Daskalakis, and George E. Karniadakis. "Generative Ensemble Regression: Learning Particle Dynamics From Observations of Ensembles With Physics-Informed Deep Generative Models" *SIAM Journal on Scientific Computing* 44.1 (2022): B80-B99.

- **Liu Yang**, Tingwei Meng, and George E. Karniadakis. "Measure-Conditional Discriminator with Stationary Optimum for GANs and Statistical Distance Surrogates. " *arXiv:2101.06802* (2021).

- George Em Karniadakis, Ioannis G. Kevrekidis, Lu Lu, Paris Perdikaris, Sifan Wang, and **Liu Yang**. "Physics-Informed Machine Learning" *Nature Reviews Physics* 3.6 (2021): 422-440. (alphabetical order)

- ***Liu Yang**, *Xuhui Meng, and George Em Karniadakis. "B-PINNs: Bayesian Physics-Informed Neural Networks for Forward and Inverse PDE Problems With Noisy Data" *Journal of Computational Physics* 425 (2021): 109913.

- Xiaoli Chen, **Liu Yang**, Jinqiao Duan, and George Em Karniadakis. "Solving Inverse Stochastic Problems From Discrete Particle Observations Using the Fokker–Planck Equation and Physics-Informed Neural Networks" *SIAM Journal on Scientific Computing* 43.3 (2021): B811-B830.

- *Dixia Fan, ***Liu Yang**, *Zhicheng Wang, Michael S. Triantafyllou, and George Em Karniadakis. "Reinforcement Learning for Bluff Body Active Flow Control in Experiments and Simulations" *Proceedings of the National Academy of Sciences* 117.42 (2020): 26091-26098.

- **Liu Yang**, and George Em Karniadakis. "Potential Flow Generator With L_2 Optimal Transport Regularity for Generative Models" *IEEE Transactions on Neural Networks and Learning Systems* 33.2 (2020): 528-538.

- **Liu Yang**, Dongkun Zhang, and George Em Karniadakis. "Physics-Informed Generative Adversarial Networks for Stochastic Differential Equations" *SIAM Journal on Scientific Computing* 42.1 (2020): A292-A317.

- Guofei Pang, **Liu Yang**, and George Em Karniadakis. "Neural-Net-Induced Gaussian Process Regression for Function Approximation and PDE Solution" *Journal of Computational Physics* 384 (2019): 270-288.

- Dongkun Zhang, **Liu Yang**, and George Em Karniadakis. "Bi-Directional Coupling Between a PDE-Domain and an Adjacent Data-Domain Equipped With Multi-Fidelity Sensors" *Journal of Computational Physics* 374 (2018): 121-134.

TEACHING

- Instructor, Program in Computing 16A: Python with Application, UCLA (Winter 2023, Spring 2023, Fall 2023)

- Instructor, Program in Computing 10A: Introduction to Programming (C++), UCLA (Fall 2022, Spring 2024)

- Instructor, Program in Computing 10B: Intermediate Programming (C++), UCLA (Winter 2024)

- Teaching assistant, Summer@ICERM 2020 Program: Fast Learning Algorithms for Numerical Computation and Data Analysis, The Institute for Computational and Experimental Research in Mathematics (Summer 2020)

- Teaching assistant, Operations Research: Deterministic Models, Brown University (Spring 2020)

- Teaching assistant, Statistical Inference, Brown University (Fall 2019)

SERVICES   Peer reviewer for: *Journal of Machine Learning Research, SIAM Journal on Scientific Computing, Computer Methods in Applied Mechanics and Engineering, Journal of Computational Physics, etc.*

SELECTED TALKS

- The American Mathematical Society's Mathematics Research Communities Program (May 28–June 3, 2023)
- Generative Ensemble-Regression: Learn Particle Dynamics from Observations of Ensembles with Physics-Informed Deep Generative Models. SIAM Conference on Applications of Dynamical Systems (May 14-18, 2023)
- Generative Ensemble-Regression: Learn Particle Dynamics from Observations of Ensembles with Physics-Informed Deep Generative Models. U.S. National Congress on Computational Mechanics (July 25-29, 2021)
- Generative Ensemble-Regression: Learning Stochastic Dynamics from Discrete Particle Ensemble Observations. SIAM Conference on Computational Science and Engineering (March 1-5, 2021)
- Physics-Informed Neural Networks (PINNs), Physics-Informed GANs and Bayesian PINNs. IBM Corporation (July 23, 2020)
- Physics-Informed GANs for Stochastic Differential Equations. SIAM Conference on Computational Science and Engineering (February 25-March 1, 2019)