Xin-Yang Liu

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Experience

- **Meta** — Menlo Park, CA, USA
  - Research Scientist — Facebook Reels, *Nov 2025 - Present*
    Video Generation, Post-training
  - Research Scientist — Meta Superintelligence Lab, *Jun 2025 - Nov 2025*
    Image generation, Auto evaluation

Education

- **University of Notre Dame** — Notre Dame, IN, USA
  Ph.D. - Mechanical Engineering — *Jan 2020 - May 2025*
  - **Research focus**: Scientific Machine Learning, AI for Science, Computational Physics
- **Xi'an Jiaotong University** — Xi'an, Shannxi, China
  Bachelor of science - Energy & Power Engineering — *Aug 2015 - June 2019*

Publications — *Peer-reviewed paper*

- **Liu, X. Y.***, Parikh, M.H.*, Fan, X., Du, P., Wang, Q., Chen, Y.F. and Wang, J.X., 2024. CoNFiLD-inlet: Synthetic Turbulence Inflow Using Generative Latent Diffusion Models with Neural Fields. *Physical Review Fluids, 10(5), p.054901.*
- **Liu, X.Y.**, Zhu, M., Lu, L., Sun, H. and Wang, J.X., 2024. Multi-resolution partial differential equations preserved learning framework for spatiotemporal dynamics. *Communications Physics,* 7(1), p.31.
- **Liu, X.Y.**, Bodaghi, D., Xue, Q., Zheng, X. and Wang, J.X., 2024. Asynchronous parallel reinforcement learning for optimizing propulsive performance in fin ray control. *Engineering with Computers*, pp.1-18.
- **Liu, X.Y.** and Wang, J.X., 2021. Physics-informed Dyna-style model-based deep reinforcement learning for dynamic control. *Proceedings of the Royal Society A, 477*(2255), p.20210618.
- Movahhedi, M.*, **Liu, X.Y.***, Geng, B., Elemans, C., Xue, Q., Wang, J.X. and Zheng, X., 2023. Predicting 3D soft tissue dynamics from 2D imaging using physics informed neural networks. *Communications Biology*, 6(1), p.541.
- Du, P., Parikh, M.H., Fan, X., **Liu, X.Y.** and Wang, J.X., 2024. Conditional neural field latent diffusion model for generating spatiotemporal turbulence. *Nature Communications, 15*(1), pp.1-22.
- Fan, X., **Liu, X.Y.**, Wang, M., and Wang, J.X., 2025. Diff-FlowFSI: A GPU-Optimized Differentiable CFD Platform for High-Fidelity Turbulence and FSI Simulations. *arXiv preprint arXiv:2505.23940.*, Accepted by *Computer Methods in Applied Mechanics and Engineering*
- Feng, Z., **Liu, X.Y.**, Parikh, M.H., Guo, J., Du, P., Yan, B. and Wang, J.X., 2025. Generative Latent Diffusion Model for Inverse Modeling and Uncertainty Analysis in Geological Carbon Sequestration. *arXiv preprint arXiv:2508.16640.*
- Wang, Q. , Ren, P., Zhou, H., **Liu, X.Y.**, Liu, Y., Deng, Z., Zhang Y., Chengze, R., Liu, H., Wang, Z., Wang, J.X., Wen, J.R., Sun, H., 2024. P^2C^2Net: PDE-Preserved Coarse Correction Network for efficient prediction of spatiotemporal dynamics. *Advances in Neural Information Processing Systems, 37*, pp.68897-68925.

- **Liu, X.Y.**, Fan, X., and Wang, J.X., 2025. MuRFiV: A Multi-Resolution Finite-Volume Inspired Deep Learning Framework for Spatiotemporal Dynamics In preparation, Presented at Crunch seminar

Conference Presentations

- **Liu, X.Y.**, Parikh, M., Fan, X., Du, P., Wang, J.X. Generative Latent Diffusion Model for Spatiotemporal Inflow Turbulence SIAM Computational Science and Engineering, Mar. 2025
- **Liu, X.Y.**, Fan, X., Wang, M. and Wang, J.X. Diff-FlowFSI: A GPU-accelerated, JAX-based Differentiable CFD Solver for Turbulent Flow and Fluid-Structure Interactions American Physical Society Division of Fluid Dynamics (APS DFD), Nov. 2024
- **Liu, X.Y.**, Fan, X., Wang, J.X. Integrating PDE Operators into Neural Network Architecture in A Multi-Resolution Manner for Spatiotemporal Prediction USACM Thematic Conference on Uncertainty Quantification for Machine Learning Integrated Physics Modeling (UQ-MLIP), Aug. 2024
- **Liu, X.Y.**, Fan, X., Wang, J.X. MuRFiV-Net: A Multi-Resolution Finite-Volume Inspired Neural Network for Predicting Spatiotemporal Dynamics APS DFD, Nov. 2023
- **Liu, X.Y.**, Wang, J.X. Multi-Resolution and Finite-Volume Method inspired Neural Network (MuRFiV-Net) for PDE prediction International Congress on Industrial and Applied Mathematics (ICIAM), Aug. 2023
- **Liu, X.Y.**, Wang, J.X. Predicting parametric spatiotemporal dynamics by multi-resolution pde structure-preserved deep learning APS DFD, Nov. 2022
- **Liu, X.Y.**, Sun, H., Wang, J.X. Predicting parametric spatiotemporal dynamics by multi-resolution PDE structure-preserved deep learning Society of Engineering and Science, Oct. 2022
- **Liu, X.Y.**, Bodaghi, D., Zheng, X., Xue, Q., Wang, J.X. Off-Policy Reinforcement Learning for Finsh-Fin-Ray Control Trained in an Asynchronous Parallel Manner UQ-MLIP, Aug. 2022
- **Liu, X.Y.**, Bodaghi, D., Zheng, X., Xue, Q., Wang, J.X. Accelerating deep reinforcement learning with physics-informed models and asynchronous parallel training Society for Industrial and Applied Mathematics Uncertainty Quantification (SIAM UQ), Apr. 2022
- **Liu, X.Y.**, Bodaghi, D., Zheng, X., Xue, Q., Wang, J.X. Deep reinforcement learning for fish fin ray control APS DFD, December 2021
- **Liu, X.Y.**, Wang, J.X. Physics-informed Dyna-Style Model-Based Deep Reinforcement Learning for Dynamic Control. SIAM Annual Meeting, Jul. 2021

Honors and Awards

- USACM Thematic Conference on Uncertainty Quantification for Machine Learning Integrated Physics Modeling (UQ-MLIP) Travel Award Aug., 2024
- Society of Engineering Science Annual Technical Meeting (SES2022) funding support Oct., 2022
- USACM Thematic Conference on Uncertainty Quantification for Machine Learning Integrated Physics Modeling (UQ-MLIP) Travel Award Aug., 2022
- 16^{th} U.S. National Congress on Computational Mechanics Conference Award May., 2021

Skills

- **Coding**: Python (Pytorch, Jax), Julia, Matlab, C++, CUDA