

# Tianyu Xiong

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## Research Focus

Scientific Data Visualization, Artificial Intelligence (AI) for Science, Deep Learning, Multi-Modal Large Language Model (LLM), Human-Computer Interaction (HCI)

## EDUCATION

<b>The Ohio State University</b> PhD, Computer Science and Engineering, Research Advisor: Dr. Han-Wei Shen GPA: 3.80/4.00 Honors: Distinguished University Fellowship (\$56,632)	Columbus, OH 2021 - Present
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<b>The Ohio State University</b> B.S., Computer Science and Engineering GPA: 3.98/4.00 Honors: Summa Cum Laude	Columbus, OH 2017 - 2021
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## EXPERIENCE

<b>Ohio State University   Graduate Research Associate</b>	Aug. 2022 - Present
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- **AI Surrogate Models for Accelerated Generation and Analysis of Scientific Simulation Data:**
  - Innovated AI surrogate models for ensemble scientific simulation data to accelerate AI-empowered scientific data generation with new model achieving over 7x speedup compared to the best models
  - Led the research of novel uncertainty quantification methods for neural-network-based scientific data representation, which reduced data storage by over 95% with state-of-the-art model quality
  - Developed a 3D generative AI model for visualization of scientific simulation data, achieved over 360x speedup by replacing hour-long simulation computation with seconds of model inference
  - Proposed an intelligent data-adaptive AI surrogate of scientific simulation, which automatically focuses on its optimization on the challenging training data instances
- **Human-Computer Interaction for AI-Empowered Applications:**
  - Improved efficiency and accessibility of the AI-human interface for research literature understanding with novel interaction algorithms that translate human intentions more easily to AI
  - Researched an Explainable AI visual framework to interpret the optimization progress of generative AI models by visualizing the feature-space distances between AI-generated versus real data

<b>Argonne National Laboratory   Research Aide Intern</b>	Jun. 2023 - Aug. 2023
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- Developed a comprehensive benchmark of recent state-of-the-art research on AI-based scientific data representation and surrogates; gathered statistics and insights that inspired novel research
- Prototyped AI scientific data surrogate models with inherent uncertainty quantification capabilities as one of the first pioneering work in the field of scientific visualization

## PUBLICATIONS

[1] (Under Review) Li, Z., Duan, Y., **Xiong, T.**, Chen, Y. T., Chao, W. L., & Shen, H. W. (2025). High-Fidelity Scientific Simulation Surrogates via Adaptive Implicit Neural Representations.

[2] **Xiong, T.**, Wurster, S. W., Guo, H., Peterka, T., & Shen, H. W. (2024). Regularized multi-decoder ensemble for an error-aware scene representation network. IEEE Transactions on Visualization and Computer Graphics.

[3] Wurster, S. W., **Xiong, T.**, Shen, H. W., Guo, H., & Peterka, T. (2023). Adaptively placed multi-grid scene representation networks for large-scale data visualization. IEEE Transactions on Visualization and Computer Graphics, 30(1), 965-974.

[4] Li, H., **Xiong, T.**, & Shen, H. W. (2022, October). Efficient Interpolation-based Pathline Tracing with B-spline Curves in Particle Dataset. In 2022 IEEE Visualization and Visual Analytics (VIS) (pp. 140-144). IEEE.

## SKILLS

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**Programming:** Python, C++, CUDA, MATLAB

**Frameworks:** PyTorch, Accelerate, MPI, sklearn, SciPy, Pandas, Matplotlib, Docker, Git

**Concepts:** RNN, LSTM, CNN, Transformer, Decision Tree, Generative AI, Diffusion Model, LLM, Regression, Clustering, Classification, Statistical Modeling