

# Xiao Li

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## Summary

I am a machine learning researcher with expertise across various domains, including data compression, smart transportation, AI for science (e.g., climate modeling, turbulence), and human-computer interaction. My experience spans foundation models, spatiotemporal data modeling, unsupervised learning, point cloud data processing, and gesture, gaze, and pose estimation. Additionally, I specialize in designing and building large-scale datasets. I will be graduating in Fall 2025 and am currently seeking a summer internship, with the goal of receiving a return offer for continued work starting at the end of 2025.

## Education

<b>University of Florida</b> <i>Ph.D. Student of Computer Science, GPA: 3.8/4.0</i>	<i>Aug 2021 - Oct 2025 (expected)</i>
◦ Advisor: Prof. Sanjay Ranka and Prof. Anand Rangarajan	
<b>Sun Yat-Sen University</b> <i>Master of Electronics and Communication Engineering, GPA: 3.9/4.0</i>	<i>Aug 2018 - Jun 2020</i>
<b>Sun Yat-Sen University</b> <i>Bachelor of Communication Engineering, GPA: 3.7/4.0</i>	<i>Aug 2014 - Jun 2018</i>

## Skills

- **Techniques:** Spatiotemporal Modeling, Transformer Models, Diffusion Models, Variational Autoencoders, Lossy Data Compression, Foundation Models, AI for Science, Point Cloud Processing, Unsupervised Learning, Smart Transportation, Pose Estimation

## Research

<b>Vision-Language Model for Fine-grained Image Understanding</b>	<i>Jan 2025 - Present</i>
◦ Leading a research team to develop a Vision-Language Model focused on fine-grained image understanding, enabling task-specific querying of visual content.	
<b>Foundation Models (FMs) for Scientific Applications</b>	<i>Jun 2022 - Present</i>
◦ Advancing FMs with temporally consistent latent diffusion for efficient data generation and reduction.	
◦ Developed FMs for compressing spatiotemporal scientific data across diverse domains (e.g., climate, turbulence), achieving up to 3× higher compression ratio compared to state-of-the-art (SOTA) methods.	
◦ Applied transformer architectures, variational autoencoders, and hybrid methods to address the challenge of capturing spatiotemporal correlations for efficient data reduction, leading to 5 authored research papers.	
<b>Machine Learning for Smart Traffic Analysis and Management</b>	<i>Oct 2021 - Jun 2022</i>
◦ Built LiDAR point cloud dataset for traffic intersection and label data with semi-supervised method.	
◦ Enhanced semi-supervised labeling tools by integrating multi-object tracking, achieving up to 4× faster annotation while improving data labeling accuracy.	
◦ Proposed a spatiotemporal correspondence approach for unsupervised semantic segmentation for LiDAR point cloud.	
<b>Gesture, Gaze, and Pose Estimation for Human-Computer Interaction</b>	<i>Sept 2019– Jul 2021</i>
◦ Built labeled datasets, including hand keypoints (1M hand images), gaze, and head pose, using synchronized multi-view cameras for keypoints and pose estimation.	
◦ Developed and deployed real-time, lightweight neural networks for hand keypoint detection, hand mesh reconstruction, gaze, and head pose estimation on resource-constrained platforms.	
◦ Enabled the application of hand-computer interaction models in an XR device and the adoption of gaze and head pose models for autism diagnosis in hospitals.	

## Selected Publications (8/13)

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- 2025 **X. Li**, J. Lee, A. Rangarajan, S. Ranka. *Foundation Model for Lossy Compression of Spatiotemporal Scientific Data*. (in submission).
- 2025 J. Lee, **X. Li**, A. Rangarajan, S. Ranka. *Guaranteed Conditional Diffusion: 3D Block-based Models for Scientific Data Compression*. (in submission).
- 2025 **X. Li**, J. Lee, A. Rangarajan, S. Ranka. *Machine Learning Techniques for Data Reduction of Climate Applications*. Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD).
- 2024 **X. Li**, J. Lee, A. Rangarajan, S. Ranka. *Attention Based Machine Learning Methods for Data Reduction with Guaranteed Error Bounds*. IEEE International Conference on Big Data (BigData).
- 2023 **X. Li**, Q. Gong, J. Lee, S. Klasky, A. Rangarajan, S. Ranka. *Hybrid Approaches for Data Reduction of Spatiotemporal Scientific Applications*. Data Compression Conference (DCC).
- 2023 **X. Li**, P. He, A. Wu, S. Ranka, and A. Rangarajan. *A Spatiotemporal Correspondence Approach to Unsupervised LiDAR Segmentation with Traffic Applications*. IEEE 26th International Conference on Intelligent Transportation Systems (ITSC).
- 2023 A. Wu, P. He, **X. Li**, K. Chen, S. Ranka, A. Rangarajan. *An Efficient Semi-Automated Scheme for LiDAR Annotation and A Benchmark Infrastructure Dataset*. ML4IoT Workshop at International Conference on Learning Representations (ML4IoT@ICLR).
- 2022 **X. Li**, D. Zhang, M. Li, and D. J. Lee. *Accurate Head Pose Estimation Using Image Rectification and Lightweight Convolutional Neural Network*. IEEE Transactions on Multimedia (TMM).

## Fellowships & Awards

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- 2024 Gartner Group Graduate Fellowship
- 2020 Outstanding Master's Graduate
- 2019 First Class Scholarship
- 2018 Second Class Scholarship
- 2016 MCM/ICM Contest Meritorious Winner