

# Xiao Li

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## Education

<b>University of Florida</b> <i>Ph.D. Student of Computer Science, GPA: 3.8/4.0</i>	<i>Aug 2021 - Dec 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

- **Language and Tools:** Python, C/C++, Matlab, Git, Pytorch, OpenCV, Open3D, Hugging Face
- **Expertise:** Vision Language Models, Diffusion Models, Spatiotemporal Modeling, Transformer Models, Data Compression, Point Cloud Processing, Unsupervised Learning, Smart Transportation, Pose Estimation

## Selected Research Projects

<b>Vision-Language Model for Visual Question Answering</b>	<i>Jan 2025 - Present</i>
◦ Building a vision-language dataset for visual navigation, incorporating diverse environments and task-specific instructions to improve generalization.	
◦ Applied LoRA to the BLIP-2 vision-language model, fine-tuning it for vision-navigation-based query answering, enabling efficient adaptation to new tasks.	
◦ Designed a benchmarking framework to evaluate the model's performance in fine-grained vision-language understanding, especially for spatial reasoning and navigation.	
<b>Foundation Models (FMs) for Video Reduction and Generation</b>	<i>Jun 2022 - Present</i>
◦ Bridging data compression and generation by advancing foundation models with generative latent diffusion for spatiotemporal 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 VR device and the adoption of gaze and head pose models for autism diagnosis in hospitals.	

## Selected Publications

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### Under Review and In Preparation:

- 2025 **X. Li**, B. Gandhi, M. Zhan, M. Nehra, Bonnie J. Dorr. *Visual Navigator: Leveraging Vision-Language Models for Spatial Reasoning and Navigational Query Answering*. (In Preparation 50% completed).
- 2025 **X. Li**, Liangji Zhu, A. Rangarajan, S. Ranka. *Bridging Generation and Compression: Latent Diffusion for Efficient Spatiotemporal Data Reconstruction*. (Submitted to Super Computing Conference).
- 2025 J. Lee, **X. Li**, A. Rangarajan, S. Ranka. *Guaranteed Conditional Diffusion: 3D Block-based Models for Scientific Data Compression*. (Submitted to ECML PKDD).

### Published Papers:

- 2025 **X. Li**, J. Lee, A. Rangarajan, S. Ranka. *Foundation Model for Lossy Compression of Spatiotemporal Scientific Data*. Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD).
- 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 (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).