Xuanhao Luo

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EMPLOYMENT

- **Lenovo**, Morrisville, NC — *Jun. 2025 - Aug. 2025*
  Research Intern — LLM Security, Safety Evaluation and Alignment

- **North Carolina State University**, Raleigh, NC — *Aug. 2023 - Present*
  Research/Teaching Assistant — Generative AI, Intelligent Networks

- **Syracuse University**, Syracuse, NY — *May. 2022 - Aug. 2022*
  Research Intern — Data Mining, Natural Language Processing (NLP)

EDUCATION

- **Ph.D. candidate in Computer Science** — *Aug. 2023 - Present*
  North Carolina State University — Raleigh, NC

- **M.S. in Computer Science** — *Aug. 2023 - May. 2025*
  North Carolina State University (awarded en route to Ph.D.) — Raleigh, NC

- **B.E. in Computer Science & Technology** — *Sept. 2019 - July 2023*
  Kunming University of Science and Technology — Kunming, China

PROJECTS

Intelligent Networks — *2020 - Now*

- Generative AI: Radio map generation in mmWave and 5G networks via DDPM, cGAN, pix2pix, and cVAE | Spatial temporal data imputation for wireless sensor networks.
- Deep Learning: Rank-based packet compression with Byte Transformer | Efficient communication for ISAC system with model adaptation | BFM-based positioning with vision Transformer.
- Reinforcement Learning: TD3-based active queue management for the vSwitch in multi-tenant data center | Double DQN-based UAV schedule for sensor networks | Multi-Armed Bandits for context-aware beam management.

LLMs and NLP — *2022 - Now*

- Tool-augmented LLMs: LLM-Enabled active learning for network log data analysis | Evaluated LLMs for advanced computer networks learning support
- Safety: Evaluated LLM safety with existing benchmarks | Built task-specific safety datasets | Explored defense and alignment methods.
- Hate speech detection: Provided benchmarks results on public datasets using TextCNN, RNN, and GNN. | Multi-modal detection using knowledge graph, NLP and image processing.

Embedded System and IoT (*During Bachelor*) — *2019 - 2021*

- STM32: Embedded image recognition system based on CNN | Quadcopter flight control system.
- Raspberry Pi: Machine Vision for Object Detection | Mechanical Arm Control | Path Planning.

SKILLS

Tools: LangChain/OpenAI | Huggingface | **Pytorch/TensorFlow(5 years)**/Keras | Git | ns-3 | Wireshark.

Programming: **Python(5 years)** | Java | C/C++ | MATLAB | SQL | Bash | Assembly | HTML.

Others: STM32 & c51 | Raspberry Pi | Jetson Nano | Embedded System Development | AutoCAD.

PUBLICATIONS (*Papers [14] – [16] are under review)

[16] *X. Luo*, D. Wu, Z. Li, X, Lin, Y. Liu. "**Reshaping Network Data with Generative AI: From Augmentation, Processing to Autonomous Analysis**", *IEEE Communication Magazine (ComMag)*, IF: 8.2. Under review, 2025.

[15] *Z. Li, X. Luo, M. Chen, G. Li, Y. Liu.* "**Beamforming Feedback-Driven Wireless Indoor Positioning: A Transferable Vision Transformer Approach**", *IEEE Transactions on Mobile Computing (TMC)*, IF: 9.2. Under review, 2025.

[14] *J. Xing, G. Sun, H. Sun, L. Pan, S. Mahmood, X. Luo, M. Shahzad.* "**NetSight: Graph Attention Based Traffic Forecasting in Computer Networks**", *The 40th Annual AAAI Conference on Artificial Intelligence (AAAI-26)*, Under review (preprint). 2025.

[13] *X. Luo, Z. Li, M. Chen, R. Yu, S. Mao, Y. Liu.* "**Unified Packet Compression and Model Adaptation for Integrated Sensing and Multi-Modal Communications**", *IEEE Journal on Selected Areas in Communications (JSAC)*, IF: 17.2. 2025.

[12] *X. Luo, S. Jha, A. Sinha, Z. Li, Y. Liu.* "**ALPHA: LLM-Enabled Active Learning for Human-Free Network Anomaly Detection**", *IEEE International Performance Computing and Communications Conference (IPCCC)*, 2025. *code*

[11] *X. Luo, Z. Peng, Z. Li, R. Yu, Y. Liu.* "**Rank-Based Modeling for Universal Packets Compression in Multi-Modal Communications**", *IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM)*, AR: 20.8%. 2025. *code*

[10] *Z. Li, X. Luo, M. Chen, C. Xu, Y. Liu.* "**BFMLoc: Transformer-Based Indoor Positioning Leveraging Beamforming Feedback Matrices**", *IEEE International Conference on Communications (ICC)*, 2025.

[9] *Z. Li, P. Wang, X. Liang, X. Luo, Y. Liu, X. Wang, H. Gu, R. Yu.* "**AdaOrb: Adapting In-Orbit Analytics Models for Location-aware Earth Observation Tasks**", *IEEE International Conference on Pervasive Computing and Communications (PerCom).* AR: 15.7%. 2025.

[8] *X. Luo, Z. Li, Z. Peng, M. Chen, Y. Liu.* "**Denoising Diffusion Probabilistic Model for Radio Map Estimation in Generative Wireless Networks**", *IEEE Transactions on Cognitive Communications and Networking (TCCN).* IF: 7.0, 2025.

[7] *Z. Li, X. Luo, M. Chen, C. Xu, S. Mao, Y. Liu.* "**Contextual Combinatorial Beam Management via Online Probing for Multiple Access mmWave Wireless Networks**", *IEEE Journal on Selected Areas in Communications (JSAC)*, IF: 17.2, CCF: A. 2025.

[6] *X. Luo, Z. Li, Z. Peng, D. Xu, Y. Liu.* "**RM-Gen: Conditional Diffusion Model-Based Radio Map Generation for Wireless Networks**", *IFIP/IEEE Networking*, 2024.

[5] *Z. Li, X. Luo, M. Chen, C. Xu, Y. Liu.* "**Context-Aware Beam Management via Online Probing in Combinatorial Multi-Armed Bandits**", *IEEE International Conference on Communications (ICC).* 2024.

[4] *H. Ma, X. Luo, D. Xu.* "**Intelligent Queue Management of Open vSwitch in Multi-tenant Data Center**", *Future Generation Computer Systems*, IF: 6.1. 2023.

[3] *X. Luo, Y. Feng, C. Wang.* "**A Clothoid Curve based Intersection Collision Warning Scheme in Internet of Vehicles**", *The Computer Journal*, CCF: B. 2022.

[2] *H. Li, R. Zhou, D. Shi, X. Luo, X. Chen, D. Liao.* "**A Lightweight Block Storage Security Scheme based on LT Coding for 6G Network**", *12th International Symposium on Parallel Architectures, Algorithms and Programming (PAAP).* 2021.

[1] *C. Li, J. Mao, D. Li, Z. Ma, X. Luo.* "**Design of embedded image recognition system for lightweight convolutional neural network**", *Journal of Automation and Instrumentation (in Chinese).* 2021.

PATENTS

[2] "**A mobile wireless charging device.**", No.: CN202121232922.7.

[1] "**Handheld lighting terminal based on three axis acceleration sensors.**", No.: CN201820762072.3.

TEACHING

Mentoring

- Mentor, NCSU Gears Program. **(LLM for network defense)** — Winter 2025.
- Mentor, Summer Residential Camps: "Seeing through a Digital World". **(Lectures on ns-3)** — 8/2024.
- Ruichen Gao, NYU, (undergrad intern @ NC State) — 7/2025 - Present
- Haotian Zhu, HUST, (undergrad intern @ NC State) — 1/2025 - 2/2025

Teaching Experience (NC State University)

- Teaching Assistant, CSC 316 - Data Structures and Algorithms. — 2025 Spring.
- Teaching Assistant, CSC 226 - Discrete Mathematics for Computer Scientists. — 2024 Spring.
- Teaching Assistant, CSC 246 - Concepts and Facilities of Operating Systems. — 2024 Spring.
- Teaching Assistant, CSC 226 - Discrete Mathematics for Computer Scientists. — 2023 Fall.

SERVICE

Conference TPC Member

- IEEE International Conference on Communications (**ICC**): ISAC Track — 2026.
- IEEE International Conference on Communications (**ICC**): ISAC Track — 2025.

Journal Reviewer

- IEEE Journal on Selected Areas in Communications (**JSAC**) — 2025.
- Journal of Network and Computer Applications (**JNCA**) — 2025.
- Elsevier Computer Communications (**ComCom**) — 2025.
- Springer Discover Computing — 2025.

Conference Reviewer

- IEEE Conference on Local Computer Networks (**LCN**) — 2025.
- ACM Web Conference (**WWW** '25) — 2025.
- IEEE Global Communications Conference (**Globecom**) Workshop. — 2025.
- IEEE International Conference on High Performance Switching and Routing (**HPSR**) — 2025.
- IEEE International Conference on Communications (**ICC**) — 2025.
- International Joint Conference on Neural Networks (**IJCNN**) — 2025.
- IEEE International Conference on Computer Communications (**INFOCOM**) Workshop — 2025.
- IEEE Global Communications Conference (**Globecom**) Workshop. — 2024.
- IEEE International Conference on Communications (**ICC**) Workshop. — 2024.

AWARDS

NC State Travel Award for *IEEE WoWMoM*	Mar. 2025
NSF Travel Award	May. 2024
NC State graduate student Travel Award for *IEEE ICC*	Feb. 2024
Excellent Graduation Thesis	June. 2023
National Computer Design Competition (***National Second-Class Award***)	Aug. 2021
National Engineering Training Competition for College Students (***Provincial Gold Award***)	Apr. 2021
"Internet plus" Competition (***Provincial Silver Award***)	July. 2021
Service Outsourcing Innovation Competition (***Regional Third-Class Award***)	June. 2021
National College Students Electronic Design Competition (***Provincial Third-Class Award***)	Nov. 2021
Innovation and Entrepreneurship scholarship of the university	Sept. 2021
Second-class scholarship of the university	Sept. 2020

COURSEWORK

- **PhD:** Advanced Topics in Machine Learning (ML) | ML with Graphs | Computer Networks | Graph Theory | Advanced NextG Network Design | Computer & Network Security | Advanced Network Security | Cryptography | Advanced Learning Technologies for CS Education.

- **Bachelor:** C/C++, JAVA & Python | Data Mining | OS | Computer Architecture | Circuit | Compiler.