

# Jie Lu

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**Highlights:** IEEE INFOCOM 2026; IEEE ICC 2023; IEEE Transactions Journals

**Research Interests:** O-RAN, 5G NR, and Machine Learning for Wireless Networks

## Education

<b>Ph.D.</b> , Computer Science and Engineering, Michigan State University, USA (Advisor: Prof. Huacheng Zeng)	08/2024 - Present
<b>M.Eng.</b> , Communication Engineering, Chongqing University, China	09/2021 - 06/2024
<b>B.Eng.</b> , Electronic Information Engineering, South-Central Minzu University, China	09/2017 - 06/2021

## Technical Skills

**Programming Languages:** C++, Python (PyTorch), MATLAB, Linux/Bash

**Skills:** 5G NR (MAC Layer), O-RAN (xApp Development), Near-real-time Radio Resource Management, Deep Reinforcement Learning (PPO, SAC), End-to-end O-RAN testbed implementation with USRP/commercial radio unit and 10+ smartphones

## Research Experience

<b>EExAPP: Energy-Aware Resource Slicing in Open Radio Access Network (O-RAN)</b> – NTIA and NSF	01/2025–07/2025
• Developed an online-learning xApp using a Dual-Actor-Dual-Critic Proximal Policy Optimization (PPO) framework to jointly optimize sleep scheduling and resource slicing for 5G O-RAN in near-real-time.	
• Implemented a Transformer-based encoder and Graph Attention Network (GAT) to enable scalable resource management for dynamic user populations.	
• Validated performance on a real-world O-RAN testbed with commercial RU and live traffic, achieving 62% reward improvement while maintaining QoS. (Outcomes: <b>P1</b> ).	
<b>xSlice: Graph-Learning Enhanced Resource Slicing</b> – NTIA and NSF	10/2024–01/2025
• Designed an online-learning xApp that adaptively adjusts MAC-layer resource allocation based on time-varying channel conditions and traffic fluctuations in near-real-time.	
• Integrated Graph Convolutional Networks (GCN) with PPO to minimize performance regret by 67% in heterogeneous traffic scenarios.	
• Conducted over-the-air experiments with USRP and commercial smartphones to evaluate near-real-time QoS optimization and spectrum efficiency. (Outcomes: <b>P2</b> ).	
<b>Interference Management in UAV-Assisted Heterogeneous Network</b> – NSFC	01/2022–08/2023
• Proposed a UAV-assisted Heterogeneous Cloud Radio Access Network (H-CRAN) architecture using multiple UAVs as flying radio remote heads (RRHs) to offload traffic and provide seamless coverage.	
• Developed a comprehensive Interference Management scheme (SIC-STIA-IS) to mitigate cross-tier and co-channel interference in H-CRAN.	
• Performed extensive simulations to optimize beamforming and sector division, achieving a 45% increase in the sum rate. (Outcomes: <b>P3 &amp; P4</b> ).	

## Selected Publications

- [P1] J. Lu, P. Yan, and H. Zeng, "EExApp: GNN-Based Reinforcement Learning for Radio Unit Energy Optimization in 5G O-RAN", *IEEE International Conference on Computer Communications (INFOCOM)*, 2026. [Acceptance rate: 18.9%]
- [P2] P. Yan, J. Lu, H. Zeng., and Y.T. Hou, "Near-Real-Time Resource Slicing for QoS Optimization in 5G O-RAN using Deep Reinforcement Learning", *IEEE/ACM Transactions on Networking*, 2025.
- [P3] J. Lu, J. Li, F.R. Yu, et al., "UAV-Assisted Heterogeneous Cloud Radio Access Network With Comprehensive Interference Management", *IEEE Transactions on Vehicular Technology*, 2024.
- [P4] J. Lu, J. Nie, J. Li, et al., "SIC-STIA-IS: An Interference Management Scheme for the UAV-assisted Heterogeneous Network", *ICC 2023-IEEE International Conference on Communications*, 2023.

## Honors & Awards

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| • National Scholarship for Graduate Students ( <b>Top 1%</b> , highest honor for graduate students in China)           | 2023             |
| • Outstanding Graduate Award   | 2023             |
| • First-Class Graduate Scholarship   | 2022             |
| • National Scholarship for Undergraduate Students ( <b>Top 1%</b> , highest honor for undergraduate students in China) | 2018, 2019, 2020 |