

Ruonan LI

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Google Scholar

EDUCATION

The Hong Kong Polytechnic University

Hong Kong

- Ph.D. in Computer Science
- Supervisor: Dr. Xianjin Xia; Co-supervisor: Prof. Yuanqing Zheng

5/2024 – Present

Xidian University

Xi'an, China

- Master's Degree in Information and Telecommunications Engineering
- Supervisor: Prof. Zhiwei Yang

8/2019 – 6/2022

Xidian University

Xi'an, China

B.E. in Information Countermeasures Technology

9/2015 – 6/2019

RESEARCH INTEREST

UAV Communication Networks, Wireless Protocol Design, Wireless Sensing and Localization, LEO Satellite Networking, Artificial Intelligence of Things

PUBLICATIONS

- [1] **Ruonan Li**, Ziyue Zhang, Xianjin Xia, et al., “From Interference Mitigation to Toleration: Pathway to Practical Spatial Reuse in LPWANs”, in *Proceedings of the 31st Annual International Conference on Mobile Computing and Networking (ACM MobiCom'25)*, Hong Kong, China, Nov. 2025.
- [2] Ziyue Zhang, Xianjin Xia, **Ruonan Li**, et al., “Planet-Scale IoT Connectivity via LEO Satellites”, in *Proceedings of the ACM SIGCOMM 2026 Conference (SIGCOMM'26)*, Denver, Colorado, USA, Aug. 2026.
- [3] Ziyue Zhang, Xianjin Xia, **Ruonan Li**, Yuanqing Zheng, “Towards Next-Generation Global IoT: Empowering Massive Connectivity with Harmonious Multi-Network Coexistence”, in *Proceedings of the ACM SIGCOMM 2025 Conference (SIGCOMM'25)*, Coimbra, Portugal, Sep. 2025.
- [4] Jinhong Liu, Ziyue Zhang, Xianjin Xia, **Ruonan Li**, Tao Gu, “Empowering Satellite IoT for Faster Image Transfers”, in *4th Workshop on LEO Networking and Communication (LEO-NET '26)*, Denver, Colorado, USA, Aug. 2026.
- [5] **Ruonan Li**, Zhiwei Yang, et al., “Ship Target Micro-Doppler Features Extracted by Multi-Synchrosqueezing Transform and Inverse Radon Transform,” in 2021 CIE International Conference on Radar, pp. 1545–1549, Haikou, China, 2021.

RESEARCH PROJECTS

1. Wireless Infrastructure for IoT Systems

Project leader Aug. 2023–Sept. 2024

This research explores interference-tolerant spatial reuse for concurrent LoRa communications.

Developed and deployed a full-stack prototype using USRP multi-antenna gateways and commodity LoRa nodes. The main contributions include:

- Characterized LoRa capture mechanisms and their dependence on packet timing and signal power

- Designed a LoRaWAN compatible protocol for joint beamforming, power control, and scheduling
- Completed full-stack development and deployment, from USRP gateways to LoRa nodes and protocols

2. Cellular Infrastructure for UAV Operations Project leader *Aug. 2025–Present*

This research develops reliable cellular communications for beyond-visual-line-of-sight UAV operations. Built an end-to-end prototype integrating cellular modems, onboard computers, PX4 interfaces, and MAVLink. The main contributions include:

- Characterized cellular connectivity challenges and their impact on UAV mission reliability
- Designed multi-link communication and traffic management mechanisms for reliable UAV operations
- Implemented and validated the system through real-world flight experiments

3. Infrastructure-Assisted UAV Navigation Project leader *Nov. 2024–Present*

This research explores how ground-based wireless infrastructure can assist UAV navigation through GNSS-denied areas. The main contributions include:

- Developed infrastructure-assisted localization to maintain position awareness during GNSS outages
- Designed navigation strategies to exit GNSS-denied areas and recover GNSS positioning

4. AI-Driven IoT Systems *Nov. 2024–Feb. 2025*

This research explores scalable LoRaWAN connectivity through coordinated resource allocation and spectrum sharing across coexisting networks. My contributions include:

- Investigated physical layer decoder contention and its impact on network capacity
- Contributed to modeling and measurement analysis for channel planning and spectrum sharing

5. LEO Satellite Network for Ground IoT Communication *Nov. 2025–Jan. 2026*

This research explores efficient and reliable direct-to-satellite IoT communication under intermittent connectivity and asymmetric links. My contributions include:

- Conducted physical layer experiments and analysis to uncover transmission bottlenecks
- Designed and experimentally validated NACK-based feedback and retransmission mechanisms

6. Millimeter-Wave Imaging The University of Hong Kong *Sep. 2022–Jan. 2023*

Worked as a Research Assistant on human sensing and imaging using millimeter-wave MIMO radar. Developed a Vayyar-based prototype with a MATLAB GUI for data acquisition and imaging

PROFESSIONAL SERVICE

- 2026: Reviewer for IEEE Transactions on Mobile Computing (TMC), ACM SIGCOMM Conference (SIGCOMM), and IEEE International Conference on Network Protocols (ICNP)
- 2025: Reviewer for ACM International Conference on Mobile Systems, Applications, and Services (MobiSys), ACM Conference on Embedded Networked Sensor Systems (SenSys), and ACM International Conference on Emerging Networking Experiments and Technologies (CoNEXT)
- 2024: Reviewer for ACM/IEEE International Conference on Internet of Things Design and Implementation (IoTDI) and IEEE Conference on Computer Communications (INFOCOM)

TEACHING EXPERIENCE

- 2026: Computational Thinking and Problem Solving – Teaching Assistant
- 2025: Inter-networking Protocols, Software and Management – Teaching Assistant
- 2024: Big Data Computing – Teaching Assistant

HONORS & AWARDS

- 2024 – 2027: Full Ph.D. Scholarship, PolyU
- 2020: First-Class Scholarship, Xidian University
- 2019, 2021: Second-Class Scholarship, Xidian University
- 2019: Outstanding Graduate, School of Electronic Engineering, Xidian University
- 2016 – 2018: Second-Class Scholarship, Xidian University