QIRUI LIU

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🎓 EDUCATION

Peking University (PKU), Beijing, China   2024 – Present

Boya Postdoc Fellow in the School of Computer Science, supervisor: Prof. Chenren Xu

Beihang University (BUAA), Beijing, China   2019 – 2024

Ph.D. (Hons.) in Communication and Information System, supervisor: Prof. Rongke Liu

Nanyang Technological University (NTU), Singapore   2022 – 2023

Visiting Ph.D. in School of Computer Science and Engineering, supervisor: Prof. Mo Li

University of Science and Technology Beijing (USTB), Beijing, China   2015 – 2019

B.Eng. in Communication Engineering

⚙ RESEARCH INTERESTS

- Aircraft communication, navigation, monitoring in low altitude economy
- Integrated communication and sensing technology in 6G network
- Supply chain scheduling driven by artificial intelligence models

👥 RESEARCH PROJECTS

China Postdoctoral Science Foundation Project   2024 – 2026

Principal Investigator   Research on Ground Terminal Localization Enhancement Technology Assisted by Low altitude Drones in 5G Advanced Scenarios

Excellent Academic Funding Project in Beihang University   2023 – 2024

Principal Investigator   Research on Positioning Enhancement Technology in 5G-Advanced

Shenzhen Fundamental Research Program   2022 – 2025

Participants   Research on Key Technologies of Integrated Sensing and System Implementation

Shenzhen Key Research and Development (R&D) Plan   2022 – 2025

Participants   Research on Key Technologies for 5G-Redcap Modules

Beijing Natural Science Foundation Key Project   2020 – 2023

Participants   Research on Key Technologies of LEO Satellite Internet for B5G

Beijing Municipal Science and Technology Project   2018 – 2020

Participants   Research on Key Technologies of 5G Physical Layer Enhancement

📖 PUBLICATIONS

[1] **[Bulletin of NSFC'25]** C. Xu, **Q. Liu** (co-first author), X. Liu. "Key Technologies, Challenges and Development Suggestions of Sensing-connectivity Integration in Physical Internet," ***Bulletion of National Natural Science Foundation of China***, 2025, 39(2): 250—262. (in Chinese)

[2] **[MNET'25] Q. Liu**, R. Liu, C. Xu. "Prospective UAV-assisted Positioning Architecture and Technologies for 6G Network Edge," ***IEEE Network***, 2025.

[3] **[TITS 2023] Q. Liu**, R. Liu, Y. Zhang, Y. Yuan, Z. Wang, H. Yang, L. Ye, M. Guizani, and J. S. Thompson, "Management of Positioning Functions in Cellular Networks for Time-Sensitive Transportation Applications," in *IEEE Transactions on Intelligent Transportation Systems*, vol. 24, no. 11, pp. 13260-13275, Nov. 2023.

[4] **[IOTJ 2021] Q. Liu**, R. Liu, Z. Wang, L. Han and J. S. Thompson, "A V2X-Integrated Positioning Methodology in Ultradense Networks," in *IEEE Internet of Things Journal*, vol. 8, no. 23, pp. 17014-17028, Dec. 2021.

[5] **[WCL 2021] Q. Liu**, R. Liu, Z. Wang and J. S. Thompson, "UAV Swarm-Enabled Localization in Isolated Region: A Rigidity-Constrained Deployment Perspective," in *IEEE Wireless Communications Letters*, vol. 10, no. 9, pp. 2032-2036, Sept. 2021.

[6] **[IWCMC 2019] Q. Liu**, R. Liu, Z. Wang and Y. Zhang, "Simulation and Analysis of Device Positioning in 5G Ultra-Dense Network," 15th International Wireless Communications & Mobile Computing Conference (*IWCMC*), Tangier, Morocco, 2019, pp. 1529-1533.

[7] R. Liu, Z. Wang, L. Han, **Q. Liu**, W. Zhao, "Spatial Precise Positioning and Sensing," in *IMT-2030 (6G) Technical Report* for Massive MIMO, 2021.

[8] Z. Wang, R. Liu, **Q. Liu**, J. S. Thompson and M. Kadoch, "Energy-Efficient Data Collection and Device Positioning in UAV-Assisted IoT," in *IEEE Internet of Things Journal*, vol. 7, no. 2, pp. 1122-1139, Feb. 2020.

[9] Z. Wang R. Liu, **Q. Liu**, L. Han, J. S. Thompson, Y. Lin and W. Mu, "Toward Reliable UAV-Enabled Positioning in Mountainous Environments: System Design and Preliminary Results," in *IEEE Transactions on Reliability*, vol. 71, no. 4, pp. 1435-1463, Dec. 2022.

[10] Z. Wang, R. Liu, **Q. Liu**, L. Han, Y. Wu and J. S. Thompson, "QoS-Oriented Sensing–Communication–Control Co-Design for UAV-Enabled Positioning," in *IEEE Transactions on Green Communications and Networking*, vol. 7, no. 1, pp. 497-511, March 2023.

Full list: https://scholar.google.com/citations?hl=zh-CN&user=2Xbm2FkAAAAJ

🏆 Honors and Awards

Excellent Graduates in Beihang University	2024
Excellent Academic Funding for PhD Students in Beihang University	2023
China Scholarship Council (CSC)-Joint PhD scholarship in Nanyang Technological University (NTU)	2022
First Class Scholarship for Excellent Students in Beihang University	2021
2nd Prize of World 5G Convention Conference-5G Application Design in Guangdong-Hong Kong-Macao Greater Bay Area	2021
1st Prize of Three Minute Scientific Research English Speech Competition Beihang University	2020
Excellent Graduates and Graduation Projects, awarded by Beijing Municipal Education Commission	2019
China National Scholarship, awarded by Chinese Ministry of Education	2018

▤ PATENTS

[1]. R. Liu, **Q. Liu** and Z. Wang. A Device Positioning Method in Ultra-dense Networks, CN110856251B.

[2]. R. Liu, **Q. Liu** and Z. Wang. A Positioning Reference Signal Transmission Method based on Pseudo-random Sequence Modulation, CN112996002B.

[3]. H. Zhang, **Q. Liu**, F. Huang, J. Dong and K. Long. Wireless Resource Allocation based on Deep Reinforcement Learning, CN109474980B.

⬡ PROFESSIONAL ACTIVITIES

1. Member of IEEE, ACM, CCF and CIE

2. Reviewer for Journals: Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (PACM IMWUT), IEEE Transactions on Vehicular Technology, IEEE Vehicular Technology Magazine, IEEE Journal on Selected Areas in Communications, IEEE Journal on Selected Areas in Signal Processing, IEEE Transactions on Intelligent Transportation Systems, IEEE Internet of Things Journal, IEEE Wireless Communications Magazine, China Communications, The Journal of Supercomputing, Automatika, EURASIP Journal on wireless communications and networking

3. Reviewer for conferences such as IEEEE GLOBECOM, ICC, INFOCOM, VTC-23, 24

4. TPC for IEEE JSAC-SI-PS' 24, ICC IoTSN Symposium' 24, VTC' 22, ICC WC Symposium'24, 25, WCNC' 24 Track 3, IEEE 10th World Forum on Internet of Things (WF-IoT)' 24

🗐 TEACHING EXPERIENCE

Peking University (PKU), Beijing, China   2024 – 2025
Assistant lecturer for postgraduate courses: Computer Networks

Beihang University (BUAA), Beijing, China   2022 – 2023
Assistant lecturer for postgraduate courses: Advanced Wireless Communication Systems

Beihang University (BUAA), Beijing, China   2023 – 2024
Assistant lecturer for postgraduate courses: Wireless Channel Modeling

Beihang University (BUAA), Beijing, China   2019 – 2020
Tutor for postgraduates in Shenyuan Honors College

👥 COLLABORATORS

China Mobile, DATANG/CATT, Huawei, Alibaba, The University of Edinburgh, etc.

♡ HOBBIES

Badminton, table-tennis, swimming, diving and travelling, etc.