Yuanjian LI, Assistant Professor, PhD, MEng, BEng

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Next-Generation Wireless Networks and Signal Processing + Artificial Intelligence

Brief Introduction: I have been serving as an Assistant Professor in the Department of Communications and Networking, School of Advanced Technology, Xi'an Jiaotong-Liverpool University (XJTLU), Suzhou, China, since March 2025. I earned PhD in Telecommunications from the Centre for Telecommunication Research (CTR), King's College London (KCL), supervised by Professor A. Hamid Aghvami, Life Fellow of IEEE, Fellow of IET and Fellow of the Royal Academy of Engineering (RAEng), and Professor Osvaldo Simone, Fellow of IEEE. Prior to joining XJTLU, I held research positions at several institutions worldwide, including Research Fellow at Nanyang Technological University (Singapore), Research Associate at Heriot-Watt University (UK), and Research Assistant at the University of Warwick (UK).

Research Expertise: Artificial Intelligence (AI)-Native Sixth-Generation (6G) Wireless Systems**;** Multi-Access Edge Computing**;** Internet of Intelligent Things (IoT)**;** Edge Intelligence**;** AI-Enabled Joint Computing and Communication Resource Coordination**;** Non-Terrestrial Communications (e.g., Drone-Aided Networks)**;** (Scalable/Multi-Agent) Deep Reinforcement Learning (DRL)**;** and Compressive Sensing (CS)- and Model-Driven Machine Learning (ML)-Aided Channel Estimation for THz UM-MIMO Systems.

Academic Contributions: I have published over 20 papers in prestigious journals and leading international conferences at the intersection of wireless communications, signal processing, machine learning, and quantum computing. As the first author, I have contributed 12 papers to top-tier venues, including IEEE TWC (3 papers), IEEE TCOM (2 papers), IEEE WCL (1 paper), IEEE GLOBECOM (3 papers), IEEE ICC (2 papers), and IEEE PIMRC (1 paper). Among these, I am the corresponding author for 5 journal publications. I have been granted 9 patents in wireless communications and signal processing. I have reviewed nearly 200 manuscripts (the non-exhaustive clickable peer-review record link) for more than 20 internationally recognized journals, including IEEE JSAC, IEEE TWC, IEEE TCOM, IEEE TIFS, IEEE IoTJ, IEEE TVT, IEEE TMC, and IEEE TNNLS. I have also taken active roles in professional activities, e.g., editorial service, session chair and TPC member for international journals/conferences.

International Collaborators: Hamid. Aghvami (U.K., IEEE Life Fellow)**;** A S Madhukumar (Singapore, IEEE Senior Member)**;** Mathini Sellathurai (U.K., IEEE Fellow)**;** Daoyi Dong (Australia, IEEE Fellow)**;** Gan Zheng (U.K., IEEE Fellow)**;** Walid Saad (U.S., IEEE Fellow)**;** Pei Xiao (U.K., IEEE Senior Member)**;** Yansha Deng (U.K., IEEE Senior Member)**;** Osvaldo Simeone (U.K., IEEE Fellow)**;** Rui Zhao (China, IEEE Member)**;** Feng Shu (China, IEEE Member)**;** An Liu (China, IEEE Senior Member)**;** Tan Zheng Hui Ernest (Singapore).

Employment

2025.03–Present	**Assistant Professor** (PI, PhD Supervisor), Xi'an Jiaotong-Liverpool University, Suzhou, China
2023.07–2025.03	**Research Fellow** (Work Visa, Full-Time), Nanyang Technological University, Singapore
2023.03–2023.06	**Research Associate** (Work Visa, Full-Time), Heriot-Watt University, U.K.
2023.01–2023.02	**Research Assistant** (Student Visa, Part-Time), University of Warwick, U.K.

Education

2019.10–2022.12	**Doctor of Philosophy (PhD)** in Telecommunications, King's College London, U.K.
2016.09–2019.06	**M.Eng.** in Information and Communications Engineering, Huaqiao University, Xiamen, China
2011.09–2015.06	**B.Eng.** in Communications Engineering, Nanjing Tech University, China

Teaching

1. SAT005 Introduction to Emerging Technologies (AY2425-semester 2), *Xi'an Jiaotong-Liverpool University*

Peer Review, Chairing, and TPC Member for Journals and Conferences

- **Editorial Service for Journals:** *Senior Reviewer* for IEEE Open Journal of the Communications Society
- **Reviewer for Journals:** IEEE Journal on Selected Area in Communications (*JSAC*), IEEE Transactions on Wireless Communications (*TWC*), IEEE Transactions on Neural Networks and Learning Systems (*TNLS*), IEEE Transactions on Mobile Computing (*TMC*), IEEE Transactions on Systems, Man, and Cybernetics: Systems (*TSMC*), IEEE Journal of Biomedical and Health Informatics (*JBHI*), IEEE Wireless Communications Magazine (*WCM*), IEEE Internet of Things Journal (*IoTJ*), IEEE Transactions on Information Forensics and Security (*TIFS*), IEEE Internet of Things Magazine (*IoTMag*), IEEE Transactions on Communications (*TCom*), IEEE Transactions on Vehicular Technology (*TVT*), IEEE Wireless Communications Letters (*WCL*), IEEE ACCESS, Elsevier Digital Communications and Networks (*DCN*), International Journal of Computing and Digital Systems (*IJCDS*), SAGE International Journal of Distributed Sensor Networks (*IJDSN*).
- **Reviewer for Conferences:** IEEE Global Communications Conference (*GLOBECOM*), IEEE International Conference on Communications (*ICC*), IEEE Vehicular Technology Conference (*VTC*), IEEE International Symposium on Personal,

Indoor and Mobile Radio Communications (*PIMRC*).

- **Chairing for Conferences:** 1) *Session chair* for IEEE ICC'22-SAC-05 Machine Learning for Communications Track-Networks; 2) *Session chair* for IEEE GLOBECOM'24-SAC-AC-S01: Machine learning for UAVs
- **TPC Member for International Conferences:** IEEE Conference on Vehicular Technology (VTC), IEEE Wireless Communications and Networking Conference (WCNC), IEEE International Conference on Wireless Communications and Signal Processing (WCSP), International Conference on Internet of Things (ICIoT), and IEEE/CIC International Conference on Communications in China (ICCC).

Participated Research Grants

1. National Research Foundation (NRF) Singapore, Competitive Research Programme, NRF-CRP23-2019-0005, On-chip Terahertz Topological Photonics for 6G Communication (TERACOMM)
2. NRF Singapore & Infocomm Media Development Authority (IMDA), Future Communications Research & Development Programme, FCP-NTU-RG-2022-014, Hybrid TeraHertz/Free Space Optics (THz/FSO) for 6G Communication Networks, 2022-10 to 2025-03, SGD 910,000
3. EPSRC, Programme Grants, EP/T021063/1, COG-MHEAR: Towards cognitively-inspired 5G-IoT enabled, multi-modal Hearing Aids, 2021-03 to 2026-02, GBP 3,259,000
4. EPSRC, Research Grant, EP/X04047X/1, Platform Driving The Ultimate Connectivity, 2023-05 to 2024-03, GBP 2,030,860

Invited Talks

- **Title:** AI for Next-Generation Wireless Networks: Communication and Computation Resource Management, and Channel Estimation; **Venue:** Hong Kong University of Science and Technology (HKUST); **Date:** 6 Sept 2024
- **Title:** Multi-Agent DRL for Joint Communication and Computation Resource Management in Multi-UAV Multi-User IoT; **Venue:** Shandong University (SDU), China; **Date:** 24 Oct 2024
- **Title:** Introduction to My Research at UESTC; **Venue:** University of Electronic Science and Technology of China (UESTC); **Date:** 23 Dec 2024
- **Title:** Introduction to My Research at SEU; **Venue:** Southeast University (SEU), China; **Date:** 26 Dec 2024

Patents

1. Secrecy rate optimization method for energy-limited untrusted relay network, Filed 2019-10-08, Issued 2022-08-30, *CN Patent No.* ZL201910456910.3
2. Untrusted relay network secure transmission method based on opportunity type wireless energy collection, Filed 2019-10-08, Issued 2022-07-01, *CN Patent No.* ZL201910456465.0
3. Active eavesdropping method based on wireless energy acquisition and full duplex, Filed 2019-04-19, Issued 2022-05-03, *CN Patent No.* ZL201811249636.4
4. A method for selecting secure transmission of unidirectional full-duplex MIMO relay antennas, Filed 2019-01-11, Issued 2021-03-23, *CN Patent No.* ZL201810700060.2
5. Bidirectional and duplex MIMO (Multiple Input Multiple Output) relay antenna selection and safety transmission method, Filed 2018-12-21, Issued 2021-02-02, *CN Patent No.* ZL201810700066.X
6. Artificial noise precoding secure transmission method for full duplex relay system, Filed 2017-08-22, Issued 2020-11-03, *CN Patent No.* ZL201710307921.6
7. Full duplex multi-antenna destination node interference transmission method based on optimum antenna selection, Filed 2017-09-29, Issued 2020-06-26, *CN Patent No.* ZL201710273932.7
8. Full-duplex relay transmission method based on energy state, Filed 2018-04-13, Issued 2019-12-13, *CN Patent No.* ZL201710463555.3
9. Full-duplex opportunistic relaying protocol self-adaptation switching security transmission scheme, Filed 2017-06-23, Issued 2019-10-18, *CN Patent No.* ZL201710016694.1

Paper Publications

(*The superscript * indicates the corresponding author*)

Manuscripts Under Peer Review:

1. **Yuanjian Li***, and A. S. Madhukumar, "Wideband Hybrid-Field THz UM-MIMO Channel Estimation: An Attention-Aided Deep-Unfolded Bayesian Learning Solution," Submitted to IEEE Transactions on Wireless Communications (**TWC**), 2025.
   Model-driven machine learning | deep unfolding | channel estimation | Terahertz communications | ultra-massive MIMO

2. Jinsong Hu, Duanrui Liao, **Yuanjian Li**, Shihao Yan, Youjia Chen, Jun Wang, Feng Shu, and Jiangzhou Wang, "Near-Field User Localization and Beamforming in Covert Communication," Submitted to IEEE Transactions on Vehicular Technology (**TVT**), 2025.
Covert communication | near-field | beam squint | location estimation | true-time-delay lines | finite blocklength

Published Journals:

14. **Yuanjian Li***, A. S. Madhukumar, Tan Zheng Hui Ernest, Gan Zheng, Walid Saad, and A. Hamid Aghvami, "Energy-Efficient UAV-Driven Multi-Access Edge Computing: A Distributed Many-Agent Perspective," IEEE Transactions on Communications (**TCOM**), 2025. *Early Access*. DOI: 10.1109/TCOMM.2025.3552746
Multi-agent deep reinforcement learning | UAV | energy efficiency | multi-drone multi-user resource association | multi-access edge computing

13. **Yuanjian Li***, and A. S. Madhukumar, "Hybrid Near- and Far-Field THz UM-MIMO Channel Estimation: A Sparsifying Matrix Learning-Aided Bayesian Approach," IEEE Transactions on Wireless Communications (**TWC**), vol.24, no.3, pp.1881-1897, 2025. DOI: 10.1109/TWC.2024.3514141
Channel estimation | THz | ultra-massive MIMO | hybrid near- and far-field radiation | sparse Bayesian learning | adaptive dictionary learning

12. **Yuanjian Li*** and A. Hamid Aghvami, "Radio Resource Management for Cellular-Connected UAV: A Learning Approach," IEEE Transactions on Communications (**TCOM**), vol.71, no.5, pp.2784-2800, 2023. DOI: 10.1109/TCOMM.2023.3262826
Deep reinforcement learning | drones | resource allocation | beamforming design

11. **Yuanjian Li***, A. Hamid Aghvami, and Daoyi Dong, "Path Planning for Cellular-Connected UAV: A DRL Solution with Quantum-Inspiblue Experience Replay," IEEE Transactions on Wireless Communications (**TWC**), vol.21, no.10, pp.7897-7912, 2022. DOI: 10.1109/TWC.2022.3162749
Deep Reinforcement learning | drones | trajectory design | quantum-inspiblue experience replay | performance optimization

10. **Yuanjian Li***, A. Hamid Aghvami, and Daoyi Dong, "Intelligent Trajectory Planning in UAV-mounted Wireless Networks: A Quantum-Inspiblue Reinforcement Learning Perspective," IEEE Wireless Communications Letters (**WCL**), vol.10, no.9, pp.1994-1998, 2021. DOI: 10.1109/LWC.2021.3089876
Reinforcement learning | quantum mechanics | drones | trajectory planning | quantum-inspiblue action selection policy

9. **Yuanjian Li**, Rui Zhao*, YanSha Deng, Feng Shu, Zhiqiao Nie, and A. Hamid Aghvami, "Harvest-and-Opportunistically-Relay: Analyses on Transmission Outage and Covertness," IEEE Transactions on Wireless Communications (**TWC**), vol.19, no.12, pp.7779–7795, 2020. DOI: 10.1109/TWC.2020.3015816
Covert communications | transmission outage | performance analysis | wireless relaying networks | discrete energy harvesting | Markov chain

8. **Yuanjian Li**, Rui Zhao*, Yi Wang, Gaofeng Pan, and Chunguo Li, "Artificial Noise Aided Precoding with Imperfect CSI in Full-Duplex Relaying Secure Communications," IEEE ACCESS, vol.6, pp.44107–44119, 2018. DOI: 10.1109/ACCESS.2018.2851598
Maximum ratio combining | cooperative relay | decode and forward | artificial noise | imperfect CSI | asymptotic performance analysis

7. **Yuanjian Li**, Rui Zhao*, Lisheng Fan, and An Liu, "Antenna Mode Switching for Full-Duplex Destination-Based Jamming Secure Transmission," IEEE ACCESS, vol.6, pp.9442–9453, 2018. DOI: 10.1109/ACCESS.2018.2791638
Physical layer security | antenna mode switching | convex optimization | KKT conditions | destination-based jamming | optimal power allocation

6. Hongxin Lin, **Yuanjian Li***, Guanghui Chen, Zening Liu, and Yongming Huang*, "Performance Analysis for MmWave Cell-Free Access Network Based on Terahertz Backhaul," IEEE Communications Letters (**CL**), 2025. Early Access. DOI: 10.1109/LCOMM.2025.3555748
Terahertz backhaul | millimeter wave cell-free network | fluctuating two-ray fading | adaptive decoding transmission | performance analysis

5. Ke Yang, Siling Feng, Rongen Dong, Xuehui Wang, Yan Wang, Jiatong Bai, **Yuanjian Li**, and Jiangzhou Wang, "IRS-User Matching and Beamforming Design for Multi-Active-IRS-and-UAV-Aided Secure Directional Modulation Networks," Elsevier Chinese Journal of Aeronautics (**CJA**), 2024. *To Appear*. DOI: 10.1016/J.CJA.2025.103422
Directional modulation | active intelligent reflecting surface | secrecy sum-rate | intelligent reflecting surface | unmanned aerial vehicle

4. Daliang Ouyang, Rui Zhao, **Yuanjian Li**, Rongxin Guo, and Yi Wang, "Antenna Selection in Energy Harvesting Relaying Networks Using Q-Learning Algorithms," China Communications, vol.18, pp.64–75, Apr., 2021.
Q-learning | optimal power split factor | outage probability | ergodic capacity | antenna selection

3. Rui Zhao, Xing Tan, **Yuanjian Li**, Yucheng He, Chunguo Li, and Zhiqiao Nie, "Asymptotic performance analysis of untrusted relay system with full-duplex jamming destination," Journal on Communications, vol.39, pp.20-30, Sep., 2018.
Physical layer security | full-duplex destination jamming | optimal antenna selection | ergodic secrecy rate | secrecy outage probability

2. Daliang Ouyang, Rui Zhao, **Yuanjian Li**, "Analysis and Optimization of Wireless Poweblue Untrusted Relay System with Multiple Destinations," Physical Communication, vol.42, pp.101161, Jul., 2020.
Physical layer security | antenna mode switching | destination selection | ergodic secrecy rate | non-linear energy harvesting

1. Daliang Ouyang, Rui Zhao, Yi Wang, **Yuanjian Li**, and Yulin Yang, "Analysis of Ergodic Security Performance in Multi-User Diversity and Energy-Constrained Untrusted Relay Systems," Journal of Signal Processing, vol.35, Feb., 2019.
Physical layer security | energy harvesting | ergodic secrecy rate | opportunistic scheduling | untrusted relay

Published Conferences

11. **Yuanjian Li**, A. S. Madhukumar, Tan Zheng Hui Ernest, Gan Zheng, Walid Saad, and A. Hamid Aghvami, "Energy-Efficient UAV-Aided Computation Offloading on THz Band: A MADRL Solution," IEEE Global Communications Conference (**GLOBECOM**), Cape Town, South Africa, Dec., 2024.
Multi-agent deep reinforcement learning | drones | energy efficiency | THz | edge computing | multi-dimension optimization

10. **Yuanjian Li**, Mathini Sellathurai, Zheng Chu, Pei Xiao and A. Hamid Aghvami, "DRL-Aided Joint Resource Block and Beamforming Management for Cellular-Connected UAVs," IEEE Global Communications Conference (**GLOBECOM**), Kuala Lumpur, Malaysia, Dec., 2023.
UAV | deep reinforcement learning | beamforming | cellular networks

9. **Yuanjian Li**, Mathini Sellathurai and A. Hamid Aghvami, "Secrecy Performance Analysis on UAV Down-Link Broadcasting with a Full Duplex Receiver," IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (**PIMRC**), Toronto, Canada, Sep., 2023.
Physical layer security | UAV | full duplex | secrecy performance analysis | Monte Carlo simulation

8. **Yuanjian Li** and A. Hamid Aghvami, "Covertness-Aware Trajectory Design for UAV: A Multi-Step TD3-PER Solution," IEEE International Conference on Communications (**ICC**), Seoul, May, 2022. DOI: 10.1109/ICC45855.2022.9839093
Covert communications | deep reinforcement learning | UAV | trajectory optimization | Gaussian-noised location

7. **Yuanjian Li** and A. Hamid Aghvami, "Intelligent UAV Navigation: A DRL-QiER Solution," IEEE International Conference on Communications (**ICC**), Seoul, May, 2022. DOI: 10.1109/ICC45855.2022.9838566
Deep Reinforcement learning | drones | trajectory design | quantum-inspiblue experience replay | performance optimization

6. **Yuanjian Li**, Rui Zhao, Xing Tan, and Zhiqiao Nie, "Secrecy Performance Analysis of Artificial Noise Aided Precoding in Full-Duplex Relay Systems," IEEE Global Communications Conference (**GLOBECOM**), Singapore, Dec., 2017. DOI: 10.1109/GLOCOM.2017.8254504
Full-duplex relay | Rayleigh fading channel | artificial noise aided precoding | Gaussian-Laguerre approximation | beamforming

5. Ze Zhang, Qian Dong, Zuhao Teng, Bintao Hu, Jingchen Wang, **Yuanjian Li**, Ji Li, Yinlin Wu, Chongxiang Zhang, and Xi Chen, "RAIL: An Accurate and Fast Angle-inferblue Localization Algorithm for UAV-WSN Systems," IEEE/CIC International Conference on Communications in China (ICCC Workshops), Shanghai, China, Aug., 2025.
Unmanned aerial vehicle (UAV) | localization | low-altitude economy | positioning | wireless sensor networks

4. Duanrui Liao, Jinsong Hu, **Yuanjian Li**, Shihao Yan, Youjia Chen, and Jun Wang, "Beam Squint Assisted Near-Field Covert Communication," IEEE/CIC International Conference on Communications in China (ICCC), Shanghai, China, Aug., 2025.
Covert communication | near-field | beam squint | location estimation | true-time-delay lines | finite blocklength

3. Xing Tan, Rui Zhao, and **Yuanjian Li**, "Large-Scale Antennas Analysis of Untrusted Relay System with Cooperative Jamming," IEEE International Conference on Network and Service Management (CNSM), Japan, Nov., 2017. DOI: 10.23919/CNSM.2017.8256012
Destination-based jamming | full-duplex | antenna selection | ergodic achievable secrecy rate | power allocation

2. Zhiqiao Nie, Rui Zhao, **Yuanjian Li**, and Xing Tan, "A Full-Duplex SWIPT Relaying Protocol Based on Discrete Energy State," IEEE International Symposium on Wireless Personal Multimedia Communications (WPMC), Indonesia, Dec., 2017. DOI: 10.1109/WPMC.2017.8301864
Full-duplex | energy harvesting | Markov chain | outage probability

1. Daliang Ouyang, Rui Zhao, **Yuanjian Li**, and Xing Tan, "Wireless Energy Harvesting Relaying Networks Combined with Antenna Selection," IEEE International Symposium on Wireless Personal Multimedia Communications (WPMC), Portugal, Dec., 2019. DOI: 10.1109/WPMC48795.2019.9096212
Antenna selection | energy harvesting | opportunistic scheduling | outage probability

Awards and Honors

2020.05 Winner of Provincial Excellent M.Eng. Thesis (Fujian Province in China)
2019.06 Excellent Graduate Student, *Huaqiao University*
2018.12 First Class Scholarship for Postgraduate Student, *Huaqiao University*
2018.11 National Scholarship for Graduate Students, *The Ministry of Education of the People's Republic of China*
2017.08 Academic Scholarship for Master Student, *Huaqiao University*
2016.12 General Scholarship for Master, *Huaqiao University*
2011–2014 Received academic awards many times from Nanjing Tech University

Graduate Teaching Assistant

- 7CCEMDCO Digital Communications (22∼23 SEM1 000001)
- 5CCE2MCT Mechatronics (21∼22 SEM2 000001)
- 7CCSMMPC Mobile and Personal Communications (20∼21 SEM2 000001)

Programming

Languages:	**Python**, **Matlab**, LaTeX, Mathematica, C/C++ and VHDL.
Frameworks:	**PyTorch**, **TensorFlow**, **Keras**, Scikit-learn.
Quantum Frameworks:	**PennyLane**, **IBM Qiskit**, **TensorFlow Quantum**, Google Cirq.

Languages

Chinese-Mandarin: Native English: IELTS (Academic) Overall Band 7.0

Last updated on July 8, 2025