Yuanjian Li, PhD

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Borned on 21, June, 1993 in Shandong province, China

Curriculum Vitae

Brief Introduction : I earned the PhD degree from Centre for Telecommunication Research (CTR), Department of Engineering, Faculty of Natural, Mathematical & Engineering Sciences, King's College London, London WC2R 2LS, U.K., supervised by professor A. Hamid Aghvami, Life Fellow of IEEE, Fellow of IET and Fellow of the Royal Academy of Engineering. My current research interests include *6G Networks, Edge Intelligence, MIMO, Multi-Agent Deep Reinforcement Learning, UAV-Aided Transmissions, RIS, Quantum Artificial Intelligence, Radio Resource Management and Wireless Communication Performance Analysis & Optimization.*

Data Science and Machine Learning : I have gained broad knowledge and hands-on experience of using Pandas (data analysis/processing/cleaning/refining), Numpy (vectorized mathematical operations), Scipy (data distribution conversion/signal processing), Tensorflow/Pytorch (machine learning framework), Sklearn (machine learning model and data preprocessing related) and Seanborn (data visualization, similar tools include Matplotlib, Bokeh and Plotly) from online community of data scientists and machine learning practitioners, i.e., Kaggle.

Education Background

2019.10–2022.12 **Doctor of Philosophy (PhD)**, *King's College London*, London, U.K.
2016.09–2019.06 Research-Based **M.Eng.**, *Huaqiao University*, Xiamen, China
2011.09–2015.06 **B.Eng.**, *Nanjing Tech University*, Nanjing, China

Awards and Honors

2020.05 Winner of Provincial Excellent M.Eng. Thesis (Fujian Province in China)
2019.06 K-CSC PhD Scholarship, *China Scholarship Council and King's College London*
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)

Peer Review and Chairing for Journals and Conferences

1. **Reviewer for Journals :** IEEE Journal on Selected Aera in Communications (JSAC), IEEE Transactions on Wireless Communications (TWC), IEEE Transactions on Neural Networks and Learning Systems (TNLS), IEEE Wireless Communications Magazine (WCM), IEEE Internet of Things Journal (IoTJ), IEEE Internet of Things Magazine (IoTMag), IEEE Transactions on Communications (TC), IEEE Transactions on Vehicular Technology (TVT), IEEE Wireless Communications Letters (WCL), Elsevier Digital Communications and Networks (DCN), SAGE International Journal of Distributed Sensor Networks (IJDSN).
2. **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).
3. **Chairing for Conference :** Session chair for IEEE ICC'22-SAC-05 Machine Learning for Communications Track-Networks

Paper Publications

Published Journals :

- **Yuanjian Li**, A. Hamid Aghvami, and Daoyi Dong, "Path Planning for Cellular-Connected UAV : A DRL Solution with Quantum-Inspired Experience Replay," *IEEE Transactions on Wireless Communications*, vol.21, pp.7897-7912, 2022. DOI : `10.1109/TWC.2022.3162749`
  Deep Reinforcement learning | drones | trajectory design | quantum-inspired experience replay | performance optimization
- **Yuanjian Li**, A. Hamid Aghvami, and Daoyi Dong, "Intelligent Trajectory Planning in UAV-mounted Wireless Networks : A Quantum-Inspired Reinforcement Learning Perspective," *IEEE Wireless Communications Letters*, vol.10, pp.1994–1998, 2021.

DOI : 10.1109/LWC.2021.3089876
Reinforcement learning | quantum mechanics | drones | trajectory planning | quantum-inspired action selection policy

- **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*, vol.19, pp.7779–7795, 2020. DOI : 10.1109/TWC.2020.3015816
  Covert communications | transmission outage | performance analysis | wireless relaying networks | discrete energy harvesting | Markov chain
- **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, Aug., 2018.
  Maximum ratio combining | cooperative relay | decode and forward | artificial noise | imperfect CSI | asymptotic performance analysis
- **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, Jan., 2018.
  Physical layer security | antenna mode switching | convex optimization | KKT conditions | destination-based jamming | optimal power allocation
- 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
- Daliang Ouyang, Rui Zhao, **Yuanjian Li**, "Analysis and Optimization of Wireless Powered 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

Journals Under Preparation

- **Yuanjian Li** and A. Hamid Aghvami, "Radio Resource Management for Cellular-Connected UAV : A Learning Approach," *Minor Revision for IEEE Transactions on Communications, available online : https://arxiv.org/pdf/2102.13222.pdf*, 2023.
  Deep reinforcement learning | drones | resource allocation | beamforming design
- **Yuanjian Li** and A. Hamid Aghvami, "Joint Transmit Power and Trajectory Design for Covertness-Aware UAV Network : A Quantum-inspired PPO Solution," *Will be released for preprint soon*, 2022.
  Covert communications | deep reinforcement learning | UAV | joint transmit power and trajectory optimization | quantum-inspired PPO

Published Conferences

- **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
- **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-inspired experience replay | performance optimization
- **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
- Xing Tan, Rui Zhao, and **Yuanjian Li**, "Large-Scale Antennas Analysis of Untrusted Relay System with Cooperative Jamming," *IEEE CNSM 2017, Japan*, Nov., 2017. DOI : 10.23919/CNSM.2017.8256012
  Destination-based jamming | full-duplex | antenna selection | ergodic achievable secrecy rate | power allocation
- Zhiqiao Nie, Rui Zhao, **Yuanjian Li**, and Xing Tan, " A Full-Duplex SWIPT Relaying Protocol Based on Discrete Energy State," *IEEE WPMC 2017, Indonesia*, Dec., 2017. DOI : 10.1109/WPMC.2017.8301864
  Full-duplex | energy harvesting | Markov chain | outage probability
- Daliang Ouyang, Rui Zhao, **Yuanjian Li**, and Xing Tan, " Wireless Energy Harvesting Relaying Networks Combined with Antenna Selection," *IEEE WPMC 2019, Portugal*, Dec., 2019. DOI : 10.1109/WPMC48795.2019.9096212
  Antenna selection | energy harvesting | opportunistic scheduling | outage probability

Skills

Coding : **Python**, **Matlab**, LaTeX, C/C++ and VHDL.
Theory : *Know Well* **Matrix Analysis, Stochastic Process, Wireless Communication Modeling and Analysis**
Know Well Signals and Systems, Communication Principles, Digital Signal Processing, Digital Communications
Know Optimization Theory (Convex Optimization), Deep Learning, Computer Network Basics
Understand Analog Electronic Technology, Digital Circuits

Languages

Chinese : Native **English :** IELTS Overall Band 7.0