Minrui Xu

Curriculum Vitae

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New Computing Architecture Researcher
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Education

Aug 2021–Aug 2025 **Ph.D. student, School of Computer Science and Engineering**, *Nanyang Technological University (NTU)*, Singapore.
Advisor: Prof. Dusit Niyato

May 2024–Jun 2024 **Visiting Ph.D. student, Broadband Communications Research Lab**, *University of Waterloo*, Waterloo, Canada.
Advisor: Prof. Xuemin (Sherman) Shen

Jun 2023–Jul 2023 **Visiting Ph.D. student, College of Information and Communication Engineering**, *Sungkyunkwan University*, Suwon, South Korea.
Advisor: Prof. Dong In Kim

Jan 2023–May 2023 **Virtual Exchange Ph.D. student, Communication and Distributed Systems research group**, *University of Bern*, Bern, Switzerland.
Advisor: Prof. Torsten Braun

Sep 2017–Jun 2021 **Bachelor student, School of Computer Science**, *Sun Yat-sen University (SYSU)*, Guangzhou, China.

Working Experience

Nov 2025–Now **New Computing Architecture Researcher, Advanced Computing and Storage Laboratory**, *Huawei Singapore Research Center*, Singapore.

Jun 2025–Nov 2025 **Research Engineer, School of Computing and Information Systems**, *Singapore Management University*, Singapore.
Advisor: Prof. Paul Robert GRIFFIN
Quantum Machine Learning for Financial Fraud Detection, collaborating with OCBC

Apr 2025–Jun 2025 **Research Assistat, National Institute of Education**, *Nanyang Technological University (NTU)*, Singapore.
Advisor: Prof. Quek Choon Lang Gwendoline
Investigating GPT for Enhancing Teaching and Learning: User Readiness and Strategies

Publications

Journal Articles

[1] Minrui Xu, Dusit Niyato, Hongliang Zhang, Jiawen Kang, Zehui Xiong, Shiwen Mao, and Zhu Han. Cached model-as-a-resource: Provisioning large language model agents for edge intelligence in space-air-ground integrated networks. *IEEE Transactions on Networking*. IEEE, 2026.

[2] Minrui Xu, Dusit Niyato, and Christopher G Brinton. Serving long-context llms at the mobile edge: Test-time reinforcement learning-based model caching and inference offloading. *IEEE Transactions on Networking*. IEEE, 2026.

[3] Minrui Xu, Dusit Niyato, Jiawen Kang, Zehui Xiong, Abbas Jamalipour, Yuguang Fang, Dong In Kim, et al. Integration of mixture of experts and multimodal generative ai in internet of vehicles: a survey. *submitted to IEEE Transactions on Cognitive Communications and Networking, under Minor Revision*, 2025.

[4] Minrui Xu, Dusit Niyato, Jiawen Kang, Zehui Xiong, Mingzhe Chen, Dong In Kim, et al. Hybrid reinforcement learning-based sustainable multi-user computation offloading for mobile edge-quantum computing. *submitted to IEEE Transactions on Network and Service Management, under Major Revision*, 2025.

[5] Minrui Xu, Jiani Fan, Xinyu Huang, Conghao Zhou, Jiawen Kang, Dusit Niyato, Shiwen Mao, Zhu Han, Xuemin (Sherman) Shen, and Kwok-Yan Lam. Forewarned is forearmed: A survey on large language model-based agents in autonomous cyberattacks. *submitted to ACM Computing Surveys, under Major Revision*, 2025.

[6] Minrui Xu, Dusit Niyato, Jiawen Kang, Zehui Xiong, Shiwen Mao, Zhu Han, Dong In Kim, and Khaled B. Letaief. When large language model agents meet 6g networks: Perception, grounding, and alignment. *IEEE Wireless Communications*, volume 31, pages 63–71. IEEE, 2024.

[7] Minrui Xu, Dusit Niyato, Jiawen Kang, Zehui Xiong, Song Guo, Yuguang Fang, and Dong In Kim. Generative ai-enabled mobile tactical multimedia networks: Distribution, generation, and perception. *IEEE Communications Magazine*, volume 62, pages 96–102. IEEE, 2024.

[8] Minrui Xu, Hongyang Du, Dusit Niyato, Jiawen Kang, Zehui Xiong, Shiwen Mao, Zhu Han, Abbas Jamalipour, Dong In Kim, Xuemin Shen, et al. Unleashing the power of edge-cloud generative ai in mobile networks: A survey of aigc services. *IEEE Communications Surveys & Tutorials*, volume 26, pages 1127–1170. IEEE, 2024.

[9] Minrui Xu, Wei Chong Ng, Wei Yang Bryan Lim, and Dusit Niyato. Communication and computing in edge-enabled metaverse. *Realizing the Metaverse: A Communications and Networking Perspective*, pages 19–61. John Wiley & Sons, Inc. Hoboken, NJ, USA, 2024.

[10] Minrui Xu, Xiaoxu Ren, Dusit Niyato, Jiawen Kang, Chao Qiu, Zehui Xiong, Xiaofei Wang, and Victor CM Leung. When quantum information technologies meet blockchain in web 3.0. *IEEE Network*, volume 38, pages 255–263. IEEE, 2023.

[11] Minrui Xu, Dusit Niyato, Hongliang Zhang, Jiawen Kang, Zehui Xiong, Shiwen Mao, and Zhu Han. Sparks of generative pretrained transformers in edge intelligence for the metaverse: Caching and inference for mobile artificial intelligence-generated content services. *IEEE Vehicular Technology Magazine*, volume 18, pages 35–44. IEEE, 2023.

[12] Minrui Xu, Dusit Niyato, Benjamin Wright, Hongliang Zhang, Jiawen Kang, Zehui Xiong, Shiwen Mao, and Zhu Han. Epvisa: Efficient auction design for real-time physical-virtual synchronization in the human-centric metaverse. *IEEE Journal on Selected Areas in Communications*, volume 42, pages 694–709. IEEE, 2023.

[13] Minrui Xu, Dusit Niyato, Junlong Chen, Hongliang Zhang, Jiawen Kang, Zehui Xiong, Shiwen Mao, and Zhu Han. Generative ai-empowered simulation for autonomous driving in vehicular mixed reality metaverses. *IEEE Journal of Selected Topics in Signal Processing*, volume 17, pages 1064–1079. IEEE, 2023.

[14] Minrui Xu and Dusit Niyato. Edge computing technologies for metaverse. *Metaverse Communication and Computing Networks: Applications, Technologies, and Approaches*, pages 183–204. John Wiley & Sons, Inc. Hoboken, NJ, USA, 2023.

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[16] Minrui Xu, Dusit Niyato, Zhaohui Yang, Zehui Xiong, Jiawen Kang, Dong In Kim, and Xuemin Shen. Privacy-preserving intelligent resource allocation for federated edge learning in quantum internet. *IEEE Journal of Selected Topics in Signal Processing*, volume 17, pages 142–157. IEEE, 2022.

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[21] Yongju Tong, Junlong Chen, Minrui Xu, Jiawen Kang, Zehui Xiong, Dusit Niyato, Chau Yuen, and Zhu Han. Multi-attribute auction-based resource allocation for twins migration in vehicular metaverses: A gpt-based drl approach. *IEEE Transactions on Cognitive Communications and Networking*, volume 11, pages 638–654. IEEE, 2025.

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[23] Jiawen Kang, Yongju Tong, Yue Zhong, Junlong Chen, Minrui Xu, Dusit Niyato, Runrong Deng, and Shiwen Mao. Diffusion-based auction mechanism for efficient resource management in 6g-enabled vehicular metaverses. *Science China Information Sciences*, volume 68, pages 1–16. Science China Press, 2025.

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In Conference Proceedings

[52] Minrui Xu, Dusit Niyato, Hongliang Zhang, Jiawen Kang, Zehui Xiong, Shiwen Mao, and Zhu Han. Joint foundation model caching and inference of generative ai services for edge intelligence. In *GLOBECOM 2023-2023 IEEE Global Communications Conference*, pages 3548–3553. IEEE, 2023.

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Preprint Papers

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Fellowships & Awards

Dec 2025 ***Exemplary Reviewer of IEEE Transactions on Network Science and Engineering***

Jun 2025 ***Best Paper Award - 2025 IEEE International Conference on Communications***

Dec 2024 ***Exemplary Reviewer of IEEE Transactions on Network Science and Engineering***

Oct 2024 ***IEEE Vehicular Technology Society Daniel E. Noble Fellowship***, Received at the 2024 IEEE 100th Vehicular Technology Conference, Award amount: 5000 USD

June 2024 ***Best Paper Award - 1st Workshop on Fluid Antenna Systems for 6G, 2024 IEEE International Conference on Communications***

Jul 2024 ***SECOND PRIZE - the 2024 ComSoc Social Network Technical Committee (SNTC) Student Competition***

June 2024 ***Third Prize - IEEE ComSoc Four-Minute-Thesis (4MT) Competition at IEEE ICC 2024***, Award amount: 300 USD

Dec 2023 ***Exemplary Reviewer of IEEE Communications Letters***

Dec 2023 ***IEEE Student Travel Grant (Globecom 2023)***, Award amount: 1000 USD

Jul 2023 ***Best Paper Award - International Workshop on Social and Metaverse Computing and Networking (SocialMeta)***

May 2023 ***Best Paper Award - The Web Conference 2023 (WWW'23) Workshop: The 3rd International Workshop on Deep Learning for the Web of Things***

March 2023 ***SECOND PRIZE - 2022 Shanghai Industry Web3.0 Application Innovation Competition***

Technical Reviewers

1 IEEE Internet of Things Journal
2 IEEE Network Magazine
3 IEEE Transactions on Network Science and Engineering
4 IEEE Transactions on Mobile Computing
5 IEEE Transactions on Vehicular Technology
6 IEEE Wireless Communications
7 IEEE Communications Surveys & Tutorials
8 IEEE Transactions on Green Communications and Networking
9 IEEE Transactions on Cognitive Communications and Networking
10 IEEE Communications Letters
11 IEEE Communications Magazine
12 IEEE Transactions on Parallel and Distributed Systems
13 China Communications
14 IET Communications
15 IEEE Consumer Electronics Magazine
16 IEEE Transactions on Wireless Communications
17 IEEE Systems Journal
18 IEEE Transactions on Industrial Informatics
19 IEEE Transactions on Networking
20 IEEE MultiMedia
21 IEEE Transactions on Network and Service Management
22 Science China Information Sciences
23 ACM Computing Surveys
24 Electronics
25 Frontiers of Computer Science
26 IEEE Transactions on Communications
27 IEEE Transactions on Smart Grid
28 Transactions on Consumer Electronics
29 ACM Transactions on Intelligent Systems and Technology
30 ACM Transactions on Internet Technology
31 Enterprise Information Systems
32 IEEE Internet of Things Magazine
33 IEEE Open Journal of the Communications Society
34 IEEE Transactions on Computers
35 IEEE Transactions on Image Processing
36 IEEE Transactions on Information Forensics and Security
37 IEEE Transactions on Sustainable Computing
38 Proceedings of the IEEE
39 Transactions on Services Computing
40 ACM Transactions on Multimedia Computing, Communications, and Applications
41 Behaviour & Information Technology

42 Computers
43 IEEE Networking Letters
44 IEEE Transactions on Computational Social Systems
45 IEEE Transactions on Systems, Man, and Cybernetics: Systems
46 IEEE Vehicular Technology Magazine
47 IET Quantum Communication
48 International Journal of Human-Computer Interaction
49 Transactions on Emerging Telecommunications Technologies
50 IEEE Journal on Selected Areas in Communications
51 Journal of Network and Computer Applications
52 Technical Program Committee (TPC) member/reviewer for ACM MM, WCNC, ICC, Globecom, PIMRC, iMETA, ISMAR, VTC, and so on

Technical skills

Research Interests	6G Wireless Communication and Networking, Generative Artificial Intelligence (AI) and Large Language Models (LLMs), Metaverse and Digital Twins, Quantum Internet and Quantum Information Technologies (Quantum Machine Learning), Federated and Distributed Learning, Deep Reinforcement Learning, and **Auction and Game Theory**
Languages	English; Mandarin; Cantonese
Programming Languages	Matlab, Python, C/C++, JAVA, Rust, Javascript, Typescript
Packages	LaTeX, Linux, Solana, PyTorch, Pennylane, **Model Context Protocols**
Hobbies	Running, Rowing, Dragon boat racing

Teaching Experience

Fall, 2022 : **Teaching Assistant, Object-oriented Programming**, CCDS, NTU.
Spring, 2023 : **Teaching Assistant, Computer Networks**, CCDS, NTU.

Referees

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