

Xiang Sun

Assistant Professor

Department of Electrical and Computer Engineering

University of New Mexico

Albuquerque, NM, USA, 87131

Phone: (505) 277-1433

Email: sunxiang@unm.edu

Homepage: <http://www.unm.edu/~sunxiang/>

Education

- Ph.D. Electrical Engineering, New Jersey Institute of Technology (NJIT), May, 2018.
- M.E. Computer Science, Hebei University of Engineering (HUE), June, 2011.
- B.E. Electronic Information, Hebei University of Engineering (HUE), July, 2008.

Research Interests

- Federated learning and distributed machine learning
- Deep reinforcement learning for multi-UAV systems and resource management in wireless networks
- Free space optics for ground-to-air and air-to-air communications
- Drone-assisted wireless networks, next-generation mobile networks, aerial and space networks
- Deep neural networks for molecular discovery
- Mobile edge computing empowered Internet of Things (IoT)
- Big data driven network design and optimization, network virtualization, and software-defined networking
- Green computing and communications

Professional Experience

- **Department of Electrical and Computer Engineering, University of New Mexico**, Albuquerque, NM
Assistant Professor Aug. 2018 – present.
- **Advanced Networking Lab., NJIT**, Newark, NJ
Research Assistant Sept. 2012 – May 2018.
- **Mobile Edge Computing Lab. NJIT**, Newark, NJ
Research Assistant Feb. 2017 – May 2018.
- **Convida IoT Team, InterDigital Communications Inc.**, Conshohocken, PA
Co-op intern May 2016 – Dec. 2016.
- **Optical Communications & IoT Research Lab, HUE**, Hebei, China
Research Assistant Sept. 2009 – Jun. 2011.

Honors and Awards

- 2022 Digital Communications and Networks Outstanding Associate Editor Award
- 2019 IEICE Communications Society Best Tutorial Paper Award
- 2019 NJIT NCE Outstanding Doctoral Dissertation
- 2018 InterDigital Innovation Award on IoT Semantic Mashup
- 2018 NJIT Hashimoto Prize
- 2017 IEEE Communications Letters Exemplary Reviewers
- 2016 ICC Best Paper Award

- 2015 IEEE North Jersey Advanced Communications Symposium Second Place Poster Award
- 2014-2015 NJIT Ross Fellowship
- 2011 HUE Outstanding Graduate Student
- 2008 HUE Outstanding Undergraduate Student

Publications

Journal Articles:

1. M. Sherman, S. Shao, **X. Sun**, and J. Zheng, "Counter UAV Swarms: Challenges, Considerations, and Future Directions in UAV Warfare," in *IEEE Wireless Communications*, early access, doi: 10.1109/MWC.003.2400047.
2. Zishan Huang, **Xiang Sun**, Yuchen Wang, Zhongcheng Wei, Chao Wang, Yongjian Fan, Jijun Zhao, "A soft actor-critic reinforcement learning approach for over the air active beamforming with reconfigurable intelligent surface," in *Physical Communication*, vol. 66, pp. 102474, Aug. 2024.
3. Zhongcheng Wei, Wei Chen, Weitao Tao, Shuli Ning, Bin Lian, **Xiang Sun**, Jijun Zhao, "CATF-SID: A few-shot human identification system based on cross-domain adversarial training," *Computer Communications*, vol. 224, pp. 275-284 Jun. 2024.
4. L. Wu, J. Qu, S. Li, C. Zhang, J. Du, **X. Sun**, and J. Zhou, "Attention-Augmented MADDPG in NOMA-Based Vehicular Mobile Edge Computational Offloading," in *IEEE Internet of Things Journal*, vol. 11, no. 16, pp. 27000-27014, 15 Aug.15, 2024, doi: 10.1109/JIOT.2024.3397648.
5. D. Manu, J. Yao, W. Liu, and X. Sun, "GraphGANFed: A Federated Generative Framework for Graph-Structured Molecules Towards Efficient Drug Discovery," in *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, vol. 21, no. 2, pp. 240-253, March-April 2024.
6. L. Yu, **X. Sun**, R. Albelaihi, C. Yi, "Latency-Aware Semi-Synchronous Client Selection and Model Aggregation for Wireless Federated Learning", in *Future Internet*, vol. 15, no. 11, pp. 352, 2023.
7. J. -E. Pierre, **X. Sun**, and R. Fierro, "Multi-Agent Partial Observable Safe Reinforcement Learning for Counter Uncrewed Aerial Systems," in *IEEE Access*, vol. 11, pp. 78192-78206, 2023.
8. Y. Chen, W. Wang, **X. Sun**, Y. Tao, Z. Liu, and X. Xu, "A cooperative security monitoring mechanism aided by optimal multiple slave cluster heads for UASNs," in *China Communications*, vol. 20, no. 5, pp. 148-169, May 2023, doi: 10.23919/JCC.fa.2021-0168.202305.
9. R. Albelaihi, A. Alasandagutti, L. Yu, J. Yao, and **X. Sun**, "Deep Reinforcement Learning Assisted Client Selection in Non-orthogonal Multiple Access based Federated Learning," in *IEEE Internet of Things Journal*, vol. 10, no. 17, pp. 15515-15525, 1 Sept.1, 2023, doi: 10.1109/JIOT.2023.3264463.
10. M. Sherman, S. Shao, **X. Sun**, and J. Zheng, "Optimizing AoI in UAV-RIS Assisted IoT Networks: Off Policy vs. On Policy," in *IEEE Internet of Things Journal*, vol. 10, no. 14, pp. 12401-12415, 15 July15, 2023, doi: 10.1109/JIOT.2023.3246925.
11. L. Yu, **X. Sun**, S. Shao, Y. Chen and R. Albelaihi, "Backhaul-aware Drone Base Station Placement and Resource Management for FSO-based Drone-assisted Mobile Networks," in *IEEE Transactions on Network Science and Engineering*, vol. 10, no. 3, pp. 1659-1668, 1 May-June 2023, doi: 10.1109/TNSE.2022.3233004.
12. **Xiang Sun**, Liangkun Yu, and Tianrun Zhang, "Latency Aware Transmission Scheduling for Steerable Free Space Optics," in *IEEE Transactions on Mobile Computing*, vol. 22, no. 4, pp. 2221-2232, 1 April 2023, doi: 10.1109/TMC.2021.3115809.
13. C. Yi, **X. Sun**, T. Zhang, C. Li, Y. Li and Z. Ding, "Random Interleaving Pattern Identification from Interleaved Reed-Solomon Code Symbols," in *IEEE Transactions on Communications*, vol. 70, no. 8, pp. 5059-5070, Aug. 2022.

14. Wei Zhou, Xing Jiang, Qingsong Luo, Bingli Guo, **Xiang Sun**, Fengyuan Sun, Lingyu Meng, “AQROM: A quality of service aware routing optimization mechanism based on asynchronous advantage actor-critic in software-defined networks”, in *Digital Communications and Networks*, early access, doi: 10.1016/j.dcan.2022.11.016.
15. W. Zhou, X. Jiang, Q. Luo, S. Huang, B. Guo, **X. Sun**, S. Li, X. Tan, M. Ma, and T. Fu, “Design and Implementation of Semi-Physical Platform for Label Based Frame Switching in Integrated Satellite Terrestrial Networks,” *Applied Sciences*, vol. 12, no. 13, p. 6674, Jul. 2022.
16. Bin Lian, Zhongcheng Wei, **Xiang Sun**, Zhihua Li, and Jijun Zhao, “A Review on Rainfall Measurement Based on Commercial Microwave Links in Wireless Cellular Networks,” *Sensors*, vol. 22, no. 12, p. 4395, Jun. 2022.
17. Tianrun Zhang, **Xiang Sun**, and Chonggang Wang, “On Optimizing the Divergence Angle of an FSO based Fronthaul Link in Drone Assisted Mobile Networks,” *IEEE Internet of Things Journal*, vol. 9, no. 9, pp. 6914-6921, May 2022.
18. Liangkun Yu, Rana Albelaihi, **Xiang Sun**, Nirwan Ansari, and Michael Devetsikiotis, “Jointly Optimizing Client Selection and Resource Management in Wireless Federated Learning for Internet of Things,” *IEEE Internet of Things Journal*, vol. 9, no. 6, pp. 4385-4395, Mar. 2022.
19. Yougan Chen, Weijian Yu, **Xiang Sun**, Lei Wan, Yi Tao, and Xiaomei Xu. “Environment-aware communication channel quality prediction for underwater acoustic transmissions: A machine learning method,” *Applied Acoustics*, vol. 181, Oct. 2021.
20. Nan Feng, Bin Lian, and **Xiang Sun**, “Applying hierarchical modulation and network coding in IM/DD OFDM-PON,” *Opt Quant Electron*, vol. 53, no. 9, pp. 1-14, Sept 2021.
21. Jianying Zhu, Yougan Chen, **Xiang Sun**, Jianming Wu, Zhenwen Liu, and Xiaomei Xu. “ECRKQ: Machine Learning-Based Energy-Efficient Clustering and Cooperative Routing for Mobile Underwater Acoustic Sensor Networks,” *IEEE Access*, vol. 9, pp. 70843-70855, 2021.
22. **Xiang Sun**, Liangkun Yu, and Yin Yang, “Jointly Optimizing User Clustering, Power Management, and Wireless Channel Allocation for NOMA based Internet of Things,” *Digital Communications and Networks*, vol. 7, no. 1, pp. 29-36, Feb. 2021.
23. Di Wu, **Xiang Sun**, and Nirwan Ansari, “An FSO-based Drone Charging System for Emergency Communications,” *IEEE Transactions on Vehicular Technology*, vol. 69, no. 12, pp. 16155-16162, Dec. 2020.
24. Yougan Chen, Xinrui Zhang, **Xiang Sun**, Yi Tao, and Xiaomei Xu, “MF-HER: Marine Mammal-Friendly Based High Spectral-Efficient Routing for Underwater Acoustic Sensor Networks,” *IEEE Access*, vol. 8, pp. 198624-198636, 2020.
25. Meihuang Wang, Yougan Chen, **Xiang Sun**, Fanggui Xiao and Xiaomei Xu, “Node Energy Consumption Balanced Multi-Hop Transmission for Underwater Acoustic Sensor Networks Based on Clustering Algorithm,” *IEEE Access*, vol. 8, pp. 191231-191241, 2020.
26. Zhiqun Gu, Jiawei Zhang, **Xiang Sun**, and Yuefeng Ji, “Optimizing Networked Flying Platform Deployment and Access Point Association in FSO-Based Fronthaul Networks,” *IEEE Wireless Communications Letters*, vol. 9, no. 8, pp. 1221-1225, Aug. 2020.
27. Di Wu, **Xiang Sun**, and Nirwan Ansari, “An FSO-based Drone Assisted Mobile Access Network for Emergency Communications,” *IEEE Transactions on Network Science and Engineering*, vol. 7, no. 3, pp. 1597-1606, 1 July-Sept. 2020.
28. Nirwan Ansari, Di Wu, and **Xiang Sun**, “FSO as backhaul and energizer for drone-assisted mobile access networks,” *ICT Express*, vol. 6, no. 2, pp. 139-144, Jun. 2020. (Invited Paper)
29. Nan Feng and **Xiang Sun**, “Implementation of network-coding approach for improving the BER performance in non-orthogonal multiple access (NOMA)-PON,” *Optics Communications*, vol. 462, pp. 125301, May 2020.

30. **Xiang Sun**, Nirwan Ansari, and Rafael Fierro, "Jointly Optimized 3D Drone Mounted Base Station Deployment and User Association in Drone Assisted Mobile Access Networks," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 2, pp. 2195-2203, Feb. 2020.
31. **Xiang Sun** and Nirwan Ansari, "Green Cloudlet Network: A Sustainable Platform for Mobile Cloud Computing," *IEEE Transactions on Cloud Computing*, vol. 8, no. 1, pp. 180-192, 1 Jan.-Mar. 2020.
32. Nan Feng and **Xiang Sun**, "Nyquist Four-level Pulse Amplitude Modulation Scheme (PAM-4) based on Hierarchical Modulation in IM/DD-TDM PON with Hybrid Equalization," *Optics Communications*, vol. 457, pp. 124609, February 2020.
33. Nan Feng and **Xiang Sun**, "Hierarchical Modulation PAM4 with Digital Nyquist Pulse-Shaped for Flexible Multi-ONU Provisioning in IM/DD-TDM-PON," *Optical Fiber Technology*, vol. 53, pp. 102063, Dec. 2019.
34. Nirwan Ansari, Qiang Fan, **Xiang Sun**, and Liang Zhang, "SoarNet," *IEEE Wireless Communications*, vol. 26, no. 6, pp. 37-43, December 2019.
35. **Xiang Sun** and Nirwan Ansari, "Adaptive Avatar Handoff in the Cloudlet Network," *IEEE Transactions on Cloud Computing*, vol. 7, no. 3, pp. 664-676, 1 July-Sept. 2019.
36. Zhiqun Gu, Jiawei Zhang, Yuefeng Ji, Lin Bai, and **Xiang Sun**, "Network Topology Reconfiguration for FSO-based Fronthaul/Backhaul in 5G+ Wireless Networks," *IEEE Access*, vol. 6, pp. 69426-69437, 2018.
37. **Xiang Sun** and Nirwan Ansari, "Dynamic Resource Caching in the IoT Application Layer for Smart Cities," *IEEE Internet of Things Journal*, vol. 5, no. 2, pp. 606-613, April 2018.
38. **Xiang Sun** and Nirwan Ansari, "Traffic Load Balancing among Brokers at the IoT Application Layer," *IEEE Transactions on Network and Service Management*, vol. 15, no. 1, pp. 489-502, March 2018.
39. Nirwan Ansari and **Xiang Sun**, "Mobile Edge Computing Empowers Internet of Things," *IEICE Transactions on Communications*, vol. E101.B, no. 3, pp. 604-619, 2018. (**Best Tutorial Paper Award**)
40. **Xiang Sun** and Nirwan Ansari, "Latency Aware Workload Offloading in the Cloudlet Network," *IEEE Communications Letters*, vol. 21, no. 7, pp. 1481-1484, July 2017.
41. Qiang Fan, Nirwan Ansari, and **Xiang Sun**, "Energy Driven Avatar Migration in Green Cloudlet Networks," *IEEE Communications Letters*, vol. 21, no. 7, pp. 1601-1604, July 2017.
42. **Xiang Sun** and Nirwan Ansari, "Green Cloudlet Network: A Distributed Green Mobile Cloud Network," *IEEE Network*, vol. 31, no. 1, pp. 64-70, January/February 2017.
43. **Xiang Sun** and Nirwan Ansari, "EdgeIoT: Mobile Edge Computing for Internet of Things," *IEEE Communications Magazine*, vol. 54, no. 12, pp. 22-29, December 2016.
44. **Xiang Sun**, Nirwan Ansari, and Ruopeng Wang, "Optimizing Resource Utilization of a Data Center," *IEEE Communications Surveys & Tutorials*, vol. 18, no. 4, pp. 2822-2846, Fourth quarter 2016.
45. Xianshen Guo, Lei Chu, and **Xiang Sun**, "Accurate localization of multiple sources using semidefinite programming based on incomplete range matrix," *IEEE Sensors Journal*, vol. 16, no. 13, pp. 5319-5324, Jul. 2016.
46. Kun Guo, Yonghua Li, Yueming Lu, **Xiang Sun**, Siye Wang, and Ruohan Cao, "An Activity Recognition-assistance Algorithm based on Hybrid Semantic Model in Smart Home," *International Journal of Distributed Sensor Networks*, vol. 12, no. 8, August 2016.
47. Jijun Zhao, **Xiang Sun**, Zhongcheng Wei, and Zhihua Li, "A New MAC Protocol for Moving Target in Distributed Wireless Sensor Networks," *Wireless Sensor Network*, vol. 3, no. 2, pp.62-72, 2011.
48. Jijun Zhao, Zhongcheng Wei, Zhihua Li, and **Xiang Sun**, "An adaptive MAC protocol based on spatial and temporal correlation in wireless sensor networks," *Journal of Communications*, vol. 6, no. 3, pp.262-269, 2011.

Conference Proceedings:

1. S. Cal, **X. Sun**, and J. Yao, "Client Selection in Fault-Tolerant Federated Reinforcement Learning for IoT Networks," ICC 2024 - IEEE International Conference on Communications, Denver, CO, USA, 2024, pp. 459-464, doi: 10.1109/ICC51166.2024.10622515.
2. K. Prabhath, **X. Sun**, and S. K. Jayaweera, "UAV Base Station Deployment for Assisting Ground Wireless Networks," 2024 IEEE International Conference on Communications Workshops (ICC Workshops), Denver, CO, USA, 2024, pp. 165-170, doi: 10.1109/ICCWorkshops59551.2024.10615813.
3. D. Manu, Y. Lin, J. Yao, Z. Li, and **X. Sun**, "Enhancing IoT Security with Asynchronous Federated Learning for Seismic Inversion," 2024 IEEE International Conference on Communications Workshops (ICC Workshops), Denver, CO, USA, 2024, pp. 1493-1498, doi: 10.1109/ICCWorkshops59551.2024.10615411.
4. L. Yu, Z. Li, J. Yao, and **X. Sun**, "Transformer-Based Multi-Agent Reinforcement Learning for Multiple Unmanned Aerial Vehicle Coordination in Air Corridors," 2024 IEEE International Conference on Communications Workshops (ICC Workshops), Denver, CO, USA, 2024, pp. 505-510, doi: 10.1109/IC-Workshops59551.2024.10615924.
5. S. Cal, **X. Sun**, and J. Yao, "Energy-Efficient Federated Knowledge Distillation Learning in Internet of Drones," 2024 IEEE International Conference on Communications Workshops (ICC Workshops), Denver, CO, USA, 2024, pp. 1256-1261, doi: 10.1109/ICCWorkshops59551.2024.10615935.
6. L. He and **X. Sun**, "IoT-Based Automated Farmland Contamination Monitoring Systems," 2024 International Conference on Smart Applications, Communications and Networking (SmartNets), Harrisonburg, VA, USA, 2024, pp. 1-6, doi: 10.1109/SmartNets61466.2024.10577717.
7. Jean-Elie Pierre, **X. Sun**, and Rafael Fierro, "Learning Safe Multi-UAV Coordination with Temporal-Spatial Constraints", AIAA SCITECH 2024 Forum, Orlando, FL, Jan 8-12, 2024.
8. Fahad Mannan, Logan Moore, Sihua Shao, **Xiang Sun**, and Mostafa Hassanalian, "Sustainable and Portable Vertiports Enabling Autonomous Drone Swarm Inspection in the Oil and Gas Industry" AIAA AVIATION FORUM AND ASCEND, Las Vegas, Nevada, Jul. 29-Aug. 2, 2024.
9. J. Yao and **X. Sun**, "Reliability-Aware Offloading in UAV-Aided Mobile Edge Network by Lyapunov Optimization," 2024 International Conference on Computing, Networking and Communications (ICNC), Big Island, HI, USA, 2024, pp. 856-861, doi: 10.1109/ICNC59896.2024.10556167.
10. **X. Sun**, L. Yu and A. Alazzwi, "Free Space Optics as Full Duplex Fronthauling for Drone-Assisted Mobile Networks," 2023 32nd Wireless and Optical Communications Conference (WOCC), Newark, NJ, USA, 2023, pp. 1-5, doi: 10.1109/WOCC58016.2023.10139511.
11. K. Prabhath, **X. Sun**, S. K. Jayaweera, D. Manu, K. Kakaraparty, S. Pallav, I. Mahbub, J. Manda, S. Rochi, M. Meraz, and K. Namuduri, "Invited Paper: Ground-Based Communication Support for Air Corridors," 2023 IEEE 34th Annual International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), Toronto, ON, Canada, 2023, pp. 1-6, doi: 10.1109/PIMRC56721.2023.10294054.
12. J. Yao and **X. Sun**, "Energy-Efficient Federated Learning in Internet of Drones Networks," 2023 IEEE 24th International Conference on High Performance Switching and Routing (HPSR), Albuquerque, NM, USA, 2023, pp. 185-190, doi: 10.1109/HPSR57248.2023.10147956.
13. Zeinab Akhavan, Mona Esmaili, Babak Badnava, Mohammad Yousefi, **Xiang Sun**, Michael Devetsikiotis, and Payman Zarkesh-Ha, "Deep Reinforcement Learning for Online Latency Aware Workload Offloading in Mobile Edge Computing," in *GLOBECOM 2022 - 2022 IEEE Global Communications Conference*, Rio de Janeiro, Brazil, 2022, pp. 2218-2223.
14. Rana Albelaihi, Liangkun Yu, Warren D. Craft, **Xiang Sun**, Chonggang Wang, and Robert Gazda "Green Federated Learning via Energy-Aware Client Selection," in *GLOBECOM 2022 - 2022 IEEE Global Communications Conference*, Rio de Janeiro, Brazil, 2022, pp. 13-18.

15. **X. Sun**, T. Zhang, S. Shao, B. Tice, P. Tice and S. Jayaweera, "Low Cost ATP System Design for Free Space Optics based Drone Assisted Wireless Networks," 2022 IEEE Globecom Workshops (GC Wkshps), Rio de Janeiro, Brazil, 2022, pp. 891-896.
16. Michelle Sherman, Sihua Shao, **Xiang Sun**, and Jun Zheng, "UAV Assisted Cellular Networks With Renewable Energy Charging Infrastructure: A Reinforcement Learning Approach," in *2021 IEEE Military Communications Conference (MILCOM)*, pp. 495-502.
17. Rana Albelaihi, **Xiang Sun**, Warren D. Craft, Liangkun Yu and Chonggang Wang, "Adaptive Participant Selection in Heterogeneous Federated Learning," in *2021 IEEE Global Communications Conference (GLOBECOM)*, pp. 1-6.
18. **Xiang Sun**, Rana Albelaihi, and Zeinab Akhavan, "Caching IoT Resources in Green Brokers at the Application Layer," *The Fifth ACM/IEEE Symposium on Edge Computing*, November 11-13, 2020, pp. 430-434.
19. Di Wu, **Xiang Sun**, and Nirwan Ansari, "A Cooperative Drone Assisted Mobile Access Network for Disaster Emergency Communications," in *Proceedings of 2019 IEEE Global Communications Conference (GLOBECOM)*, Waikoloa, HI, USA, 2019, pp. 1-6.
20. Shuai Zhang, **Xiang Sun**, and Nirwan Ansari, "Placing Multiple Drone Base Stations in Hotspots," in *2018 IEEE 39th Sarnoff Symposium*, Newark, NJ, Sept. 2018, pp. 1-6.
21. **Xiang Sun** and Nirwan Ansari, "Jointly Optimizing Drone-Mounted Base Station Placement and User Association in Heterogeneous Networks," in *2018 IEEE International Conference on Communications (ICC)*, Kansas City, MO, May 2018, 1-6.
22. **Xiang Sun** and Nirwan Ansari, "Latency Aware Drone Base Station Placement in Heterogeneous Networks," in *Proceedings of 2017 IEEE Global Communications Conference (GLOBECOM)*, Singapore, 2017, pp. 1-6.
23. **Xiang Sun** and Nirwan Ansari, "PRIMAL: P_{RO}fit Maximization Avatar pLacement for Mobile Edge Computing," in *2016 IEEE International Conference on Communications (ICC)*, Kuala Lumpur, Malaysia, 2016, pp. 1-6. (Best Paper Award)
24. **Xiang Sun**, Nirwan Ansari, and Qiang Fan, "Green Energy Aware Avatar Migration Strategy in Green Cloudlet Networks," in *2015 IEEE 7th International Conference on Cloud Computing Technology and Science (CloudCom)*, Vancouver, BC, 2015, pp. 139-146.
25. **Xiang Sun** and Nirwan Ansari, "Energy-optimized bandwidth allocation strategy for mobile cloud computing in LTE networks," in *2015 IEEE Wireless Communications and Networking Conference (WCNC)*, New Orleans, LA, 2015, pp. 2120-2125.
26. **Xiang Sun** and Nirwan Ansari, "Improving Bandwidth Efficiency and fairness ins cloud computing," in *2013 IEEE Global Communications Conference (GLOBECOM)*, Atlanta, GA, 2013, pp. 2313-2318.
27. Jijun Zhao, **Xiang Sun**, Zhihua Li, Hua Hou, and Pei Sun, "A novel date collision rate-aware energy model design with single-channel CSMA/CA MAC in Wireless Sensor Networks," in *2010 2nd International Conference on Computer Engineering and Technology (ICCET)*, Chengdu, China, 2010, pp. 483-486.
28. Jijun Zhao, Hua Li, and **Xiang Sun**, "Research on the Signal Random Attenuation Coefficient Based on RSSI in WSN Localization Technology," in *2009 5th International Conference on Wireless Communications, Networking and Mobile Computing*, Beijing, China, 2009, pp. 1-4.
29. Jijun Zhao and **Xiang Sun**, "MAC protocol based on T-MAC multi-hop reservation for low-latency wireless sensor network," in *2008 11th IEEE International Conference on Communication Technology (ICCT)*, Hangzhou, China, 2008, pp. 114-117.

Others:

1. **Xiang Sun** and Nirwan Ansari, “Cloudlet Networks: Empowering Mobile Networks with Computing Capabilities,” *IEEE COMSOC MMTC Communications – Frontiers*, vol. 12, no. 4, pp. 6-12, July 2017.

Patent:

1. **Xiang Sun**, Chonggang Wang, Xu Li, Quang Ly, Dale Seed, and Hongkun Li, “Enabling Semantic Mashup in Internet of Things,” US Patent No. 11,076,013, issued on Jul. 27, 2021. (Some contents of this patent application have been adopted into oneM2M Release 2 Specifications TR007 2.11.1 and oneM2M Draft Release 3 Technical Specifications TS-0034.)
2. Quang Ly, Chonggang Wang, Xu Li, and **Xiang Sun**, “Mechanisms for Resource-Directory to Resource-Directory Communications,” US Patent No. 10,979,879, issued on Apr. 13, 2021.
3. Nirwan Ansari and **Xiang Sun**, “Virtual machine placement in a heterogeneous data center,” US Patent No. 10,310,884, issued on Jun. 4, 2019.
4. Nirwan Ansari and **Xiang Sun**, “Virtual machine resource utilization in a data center,” US Patent No. 10,102,025, issued on Oct. 16, 2018.
5. Nirwan Ansari and **Xiang Sun**, “Management of bandwidth efficiency and fairness in cloud computing,” US Patent No. 9,742,675, issued on Aug. 22, 2017.

Patent Applications:

1. **Xiang Sun**, Chonggang Wang, Quang Ly, and Xu Li, “Dynamic Protocol Switching,” US/PCT Non-Provisional Patent Application no. PCT/US18/13299, filed on Jan. 11, 2018.
2. Xu Li, Chonggang Wang, Quang Ly, and **Xiang Sun**, “Semantic Query Processing with Information Asymmetry,” US/PCT Non-Provisional Patent Application no. PCT/US18/16103, filed on Sept. 29, 2017. (Some contents of this patent application have been adopted into oneM2M Release 2 Specifications TR007 2.11.1 and oneM2M Draft Release 3 Technical Specifications TS-0034.)

Teaching Experience

- ECE437/CS481 Computer Operating Systems Fall 2018-2024
- ECE595-008 Mobile Edge Comp & Network Spring 2019-2024
- ECE335 Integrated Software Systems Fall 2022-2024

Professional Activities

- **Associate Editor** of Digital Communications and Networks and IEEE Open Journal of the Computer Society.
- **Posters & Demos Chair** of the 2023 IEEE International Conference on High Performance Switching and Routing (HPSR 2023).
- **Publicity and Social Media Chair** of the 15th EAI International Conference on Heterogeneous Networking for Quality, Reliability, Security and Robustness (Qshine 2019).
- **Symposium co-chair** of the Social Computing and Semantic Data Mining (SCSD) symposium in the IEEE International Conference on Computing, Networking and Communications (ICNC) 2019.
- **Technical Committee** of Computer Communications.
- **TPC member** for *IEEE CCNC* 2018–2023, *ICDCN* 2022, *IE* 2022, *IEEE BRAINS* 2020-2022, *IEEE Globecom* 2020-2022, *SensorNet* 2021, *CSI* 2021, and *MobiEdge* 2018.

-
- **Reviewer** for many journals, such as *IEEE Journal on Selected Areas in Communications*, *Transactions on Parallel and Distributed Systems*, *IEEE Transactions on Big Data*, *IEEE Transactions on Emerging Topics in Computing*, *IEEE Transactions on Network Science and Engineering*, *IEEE Transactions on Multimedia*, *IEEE Transactions on Mobile Computing*, *IEEE Internet of Things Journal*, *IEEE Communications Magazine*, *IEEE Wireless Communications*, *IEEE Network Magazine*, *IEEE Communications Letter*, *IEEE Access*, *Wireless Communications and Mobile Computing*, *Computer Communications*, *Journal of Computing and Information Technology*, *Digital Communications and Networks*, *Recent Advances in Electrical & Electronic Engineering*, and many conference paper reviews.