Xuchuang Wang

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Research Interests

My research is centered on **sequential decision-making under uncertainty**, aiming both to deepen theoretical understanding of decision-making with **realistic feedback** and to enhance practical performance in advanced application domains—especially **multi-agent** systems and **quantum networks**.

Professional Experience

University of Massachusetts Amherst — **Amherst, MA, USA**
Postdoctoral Researcher (2024–Present), Visiting Scholar (2023) — *Jan 2023–Present*
Manning College of Information and Computer Sciences
Supervisors: Prof. Don Towsley and Prof. Mohammad Hajiesmaili

Microsoft Research Asia — **Beijing, China**
Research Intern, Theory Center — *May 2022–Aug 2022*
Supervisor: Dr. Wei Chen

Education

The Chinese University of Hong Kong — **Hong Kong SAR**
Ph.D., Department of Computer Science and Engineering — *Aug 2019–Dec 2023*
Thesis: Online Bandits Learning: Analysis, Algorithms and Applications
Advisor: Prof. John C.S. Lui

Xi'an Jiaotong University — **Xi'an, China**
B.E. (Hons.), The School of Automation Science and Engineering — *Aug 2015–Jun 2019*

Selected Honors and Awards

RGC Junior Research Fellow Scheme (60 recipients worldwide) *2025*

Best Paper Finalists (Top 5), ACM SIGMETRICS *2025*

Selected Publications

1. Xuchuang Wang, Matheus Guedes de Andrade, Guus Avis, Yu-Zhen Janice Chen, Mohammad Hajiesmaili, and Don Towsley, **General Quantum Network Tomography: Identifiability and SPAM Errors.** In submission to Physical Review X Quantum (PRX Quantum)

2. Xuchuang Wang, Qirun Zeng, Jinhang Zuo, Xutong Liu, Mohammad Hajiesmaili, John C.S. Lui, Adam Wierman, **Fusing Reward and Dueling Feedback in Stochastic Bandits.** The 42nd International Conference on Machine Learning (**ICML**), 2025

3. Xuchuang Wang, Maoli Liu, Xutong Liu, Zhuohua Li, Mohammad Hajiesmaili, John C.S. Lui, and Don Towsley, **Learning Best Paths in Quantum Networks.** The IEEE Conference on Computer Communications (**INFOCOM**), 2025

4. Xuchuang Wang*, Yu-Zhen Janice Chen*, Xutong Lui, Lin Yang, Mohammad Hajiesmaili, Don Towsley, and John C.S. Lui (* means equal contribution), **Asynchronous Multi-Agent Multi-Armed Bandits.** The International Conference on Measurement and Modeling of Computer Systems (**SIGMETRICS**), 2025

5. Xuchuang Wang, Lin Yang, Yu-Zhen Janice Chen, Xutong Liu, Mohammad Hajiesmaili, Don Towsley, and

John C.S. Lui, **Achieve Near-Optimal Individual Regret & Low Communications in Multi-Agent Bandits.** The International Conference on Learning Representations (**ICLR**), 2023

Publications

2026

1. Mengfan Xu, Liren Shan, Fatemeh Ghaffari, Xuchuang Wang, Xutong Liu, and Mohammad Hajiesmaili, **Heterogeneous Multi-Agent Multi-Armed Bandits on Stochastic Block Models.** The International Conference on Measurement and Modeling of Computer Systems (**SIGMETRICS**), 2026

2025

2. Xuchuang Wang, Qirun Zeng, Jinhang Zuo, Xutong Liu, Mohammad Hajiesmaili, John C.S. Lui, Adam Wierman, **Fusing Reward and Dueling Feedback in Stochastic Bandits.** The 42nd International Conference on Machine Learning (**ICML**), 2025

3. Xuchuang Wang, Jinhang Zuo, Xutong Liu, John C.S. Lui, and Mohammad Hajiesmaili, **Stochastic Bandits Robust to Adversarial Attacks.** The International Conference on Learning Representations (**ICLR**), 2025

4. Xuchuang Wang, Maoli Liu, Xutong Liu, Zhuohua Li, Mohammad Hajiesmaili, John C.S. Lui, and Don Towsley, **Learning Best Paths in Quantum Networks.** The IEEE Conference on Computer Communications (**INFOCOM**), 2025

5. Xuchuang Wang*, Yu-Zhen Janice Chen*, Xutong Lui, Lin Yang, Mohammad Hajiesmaili, Don Towsley, and John C.S. Lui (* means equal contribution), **Asynchronous Multi-Agent Multi-Armed Bandits.** The International Conference on Measurement and Modeling of Computer Systems (**SIGMETRICS**), 2025

6. Xuchuang Wang, Yu-Zhen Janice Chen, Matheus Guedes de Andrade, Jonathan Allcock, Mohammad Hajiesmaili, John C.S. Lui, and Don Towsley, **Best Arm Identification with Quantum Oracles.** The 39th Annual AAAI Conference on Artificial Intelligence (**AAAI**), 2025

7. Haoran Zhang, Yang Xu, Xuchuang Wang, Hao-Xu Chen, Hao Qiu, Lin Yang, and Yang Gao, **Federated Multi-Armed Bandits with Efficient Bit-Level Communications.** Advances in Neural Information Processing Systems (**NeurIPS**), 2025

8. Haoran Zhang, Xuchuang Wang, Hao Qiu, Lin Yang, and Hao-Xu Chen, **Near-Optimal Regret Bounds for Federated Multi-Armed Bandits with Fully Distributed Communication.** The 41th Conference on Uncertainty in Artificial Intelligence (**UAI**), 2025

9. Amirmahdi Mirfakhar, Xuchuang Wang, Jinhang Zuo, Yair Zick, and Mohammad Hajiesmaili, **Heterogeneous Multi-Agent Bandits with Parsimonious Hints.** The 39th Annual AAAI Conference on Artificial Intelligence (**AAAI**), 2025

10. Fatemeh Ghaffari, Xuchuang Wang, Jinhang Zuo, Mohammad Hajiesmaili, **Multi-Agent Stochastic Bandits Robust to Adversarial Corruption.** The 7th Annual Learning for Dynamics & Control Conference (**L4DC**), 2025

11. Xutong Liu, Xiangxiang Dai, Xuchuang Wang, Mohammad Hajiesmaili, and John C.S. Lui, **Combinatorial Logistic Bandits.** The International Conference on Measurement and Modeling of Computer Systems (**SIGMETRICS**, *Best Paper Finalists, Top 5*), 2025

2024

12. Maoli Liu, Zhuohua Li, Xuchuang Wang, and John C.S. Lui, **LinkSelFiE: Link Selection and Fidelity Estimation in Quantum Networks.** The IEEE Conference on Computer Communications (**INFOCOM**), 2024

13. Xutong Liu, Siwei Wang, Jinhang Zuo, Han Zhong, Xuchuang Wang, Zhiyong Wang, Shuai Li, Mohammad Hajiesmaili, John C.S. Lui, and Wei Chen, **Combinatorial Multivariant Multi-Armed Bandits with**

Applications to Episodic Reinforcement Learning and Beyond. In The 41st International Conference on Machine Learning (**ICML**), 2024

2023

14. Xuchuang Wang, Qingyun Wu, Wei Chen, and John C.S. Lui, **Multi-Fidelity Multi-Armed Bandits Revisited.** Advances in Neural Information Processing Systems (**NeurIPS**), 2023

15. Xuchuang Wang, Lin Yang, Yu-Zhen Janice Chen, Xutong Liu, Mohammad Hajiesmaili, Don Towsley, and John C.S. Lui, **Exploration for Free: How Does Reward Heterogeneity Improve Regret in Cooperative Multi-Agent Bandits?** The 39th Conference on Uncertainty in Artificial Intelligence (**UAI**), 2023

16. Xuchuang Wang, Lin Yang, Yu-Zhen Janice Chen, Xutong Liu, Mohammad Hajiesmaili, Don Towsley, and John C.S. Lui, **Achieve Near-Optimal Individual Regret & Low Communications in Multi-Agent Bandits.** The International Conference on Learning Representations (**ICLR**), 2023

17. Xuchuang Wang, Hong Xie, and John C.S. Lui, **Analyzing Queueing Problems via Bandits with Linear Reward and Nonlinear Workload Fairness.** The IEEE Transactions on Mobile Computing (**TMC**), 2023

18. Xuchuang Wang, Hong Xie, Pinghui Wang, and John C.S. Lui, **Optimizing Recommendations under Abandonment Risks: Models and Algorithms.** Performance Evaluation (**PEVA**), 2023

19. Yu-Zhen Janice Chen, Lin Yang, Xuchuang Wang, Xutong Liu, Mohammad Hajiesmaili, John C.S. Lui, and Don Towsley, **On-Demand Communication for Asynchronous Multi-Agent Bandits.** The 26th International Conference on Artificial Intelligence and Statistics (**AISTATS**), 2023

2022

20. Xuchuang Wang, Hong Xie, and John C.S. Lui, **Multi-Player Multi-Armed Bandits with Finite Shareable Resources Arms: Learning Algorithms & Applications.** The 31st International Joint Conference on Artificial Intelligence (**IJCAI**), 2022

21. Xuchuang Wang, Hong Xie, and John C.S. Lui, **Multiple-Play Stochastic Bandits with Shareable Finite-Capacity Arms.** The 39th International Conference on Machine Learning (**ICML**), 2022

In Submission

22. Xuchuang Wang, Matheus Guedes de Andrade, Guus Avis, Yu-Zhen Janice Chen, Mohammad Hajiesmaili, and Don Towsley, **General Quantum Network Tomography: Identifiability and SPAM Errors.** In submission

23. Xuchuang Wang, Yu-Zhen Janice Chen, Matheus Guedes de Andrade, Mohammad Hajiesmaili, John C.S. Lui, Ting He, and Don Towsley, **Online Experimental Design for Quantum and Classical Network Tomography.** In submission, arXiv:2504.21549

24. Xuchuang Wang, Bo Sun, Hedyeh Beyhaghi, John C.S. Lui, Mohammad Hajiesmaili, and Adam Wierman, **Competitive Algorithms for Multi-Agent Ski-Rental.** In Submission, arXiv:2507.15727

25. Lin Yang*, Xuchuang Wang*, Mohammad Hajiesmaili, Lijun Zhang, John C.S. Lui, Don Towsley, **Cooperative Multi-Agent Bandits: Distributed Algorithms with Optimal Individual Regret and Constant Communication Costs.** Major revision at IEEE/ACM Transactions on Networking (ToN). arXiv:2308.04314

26. Jinhang Zuo*, Zhiyao Zhang*, Xuchuang Wang*, Cheng Chen, Shuai Li, John C.S. Lui, Mohammad Hajiesmaili, and Adam Wierman, **Adversarial Attacks on Cooperative Multi-Agent Bandits.** In submission. arXiv:2311.01698

27. Daoyuan Zhou, Xuchuang Wang, Lin Yang, and Yang Gao, **Fully Distributed Algorithms for Multi-Agent Multi-Armed Bandits with Collision.** In submission.

28. Qirun Zeng, Eric He, Richard Hoffmann, Xuchuang Wang, and Jinhang Zuo, **Practical Adversarial Attacks on Stochastic Bandits via Fake Data Injection.** In submission. arXiv:2505.21938

29. Fatemeh Ghaffari, Xutong Liu, Xuchuang Wang, and Mohammad Hajiesmaili, **Nonlinear Combinatorial Bandits Robust to Adversarial Corruptions.** In submission.

30. Jingyuan Liu, Zeyu Zhang, Xuchuang Wang, Xutong Liu, Mohammad Hajiesmaili, John C.S. Lui, and Carlee Joe-Wong, **Offline Clustering of Linear Bandits: Unlocking the Power of Clusters in Data-Limited Environments.** In submission. arXiv:2505.19043

31. Xiangxiang Dai, Yuejin Xie, Maoli Liu, Xuchuang Wang, Zhuohua Li, Huanyu Wang, and John C.S. Lui, **Multi-Agent Conversational Bandits to Online Evaluate and Select User-Aligned LLM Responses.** In submission. arXiv:2501.01849

Talks

Multi-Agent Ski-Rental Problems
– Computer Science Theory Seminar, University of Massachusetts, Amherst, MA, USA *November 2025*
– Host: Prof. Adam Wierman, California Institute of Technology, Pasadena, CA, USA *August 2025*

Online Experimental Design for Quantum and Classical Network Tomography
– Session Host: Dr. Mark S. Squillante,
MAthematical performance Modeling and Analysis (MAMA) Workshop, Stony Brook, NY, USA *June 2025*

Asynchronous Multi-Agent Multi-Armed Bandits
– Session Host: Dr. Mengfan Xu, INFORMS Annual Meeting, Atlanta, GA, USA *October 2025*
– Host: Prof. Lei Ying, University of Michigan, Ann Arbor, MI, USA *June 2025*
– Session Host: Prof. Lili Su, ACM SIGMETRICS Conference, Stony Brook, NY, USA *June 2025*

Learning Best Links and Paths in Quantum Networks
– Quantum Network Workshop, Amherst, MA, USA *June 2025*

Multi-Fidelity Multi-Armed Bandits
– Information Theory and Applications Workshop, San Diego, CA, USA *February 2024*

Achieving Near-Optimal Individual Regret & Low Communications in Multi-Agent Bandits
– Host: Dr. Shuai Li, John Hopcroft Center, Shanghai Jiao Tong University, Shanghai, China *March 2023*

Academic Service

TPC Member: ACM SIGMETRICS 2026, ACM MobiHoc 2025.
Session Chair: IEEE International Conference of Quantum Computer and Engineering (QCE) 2025.
PC Member/Reviewer: NeurIPS (since 2022), ICML (since 2022), ICLR (since 2023), AAAI (since 2023), AISTATS (2025).
Journal Reviewer: npj Quantum Information, IEEE/ACM Transactions on Networking (ToN), IEEE Transactions on Mobile Computing (TMC), IEEE Transactions on Network Science and Engineering (TNSE), IEEE Transactions on Cloud Computing (TCC), ACM Transactions on Modeling and Performance Evaluation of Computing Systems (ToMPECS), ACM Transactions on Intelligent Systems and Technology (TIST), Performance Evaluation (PEVA).

Teaching Experience

CSMS5728: Decision Analysis and Game Theory, CUHK
Teaching Assistant *Fall 2020,2021,2022*

CSCI3320: Fundamentals of Machine Learning, CUHK
Tutorial Instructor & Teaching Assistant *Spring 2020,2021*

CSCI2040: Introduction to Python, CUHK
Lab Tutor & Teaching Assistant *Fall 2019,2020,2021,2022*

CSCI1520: Computer Principles and C++ Programming, CUHK
Teaching Assistant *Spring 2022*

Mentorship

UMass Amherst (with Prof. Mohammad Hajiesmaili), CICS
Fatemeh Ghaffari (Ph.D. in CICS at UMass Amherst), 2023-Present: L4DC'25 $\times 1$
Amirmahdi Mirfakhar (Ph.D. in CICS at UMass Amherst), 2023-Present: AAAI'25 $\times 1$
Jackson Bibbens (Ph.D. in CICS at UMass Amherst), 2024-Present
Avni Gunjikar (Undergraduate in CICS at UMass Amherst), 2025-Present
Nanjing University (with Prof. Lin Yang), SIST
Haoran Zhang (Ph.D. in SIST at NJU), 2023-Present: NeurIPS'25 $\times 1$, UAI'25 $\times 1$
Jingyuan Liu (Undergraduate in SIST at NJU), 2023-Present

Funding Experiences

Contributed to the awarded funding proposals:
NSF SaTC Core Small ($500K) 2025–2028
Corruption-Robust Online Optimization: from Theory to Applications
PIs: Mohammad Hajiesmaili at UMass Amherst and Thodoris Lykouris at MIT.
NSF NeTS Core Small ($550K) 2025–2028
CoLeNe: Cooperative Learning in Heterogeneous Edge Networks
PIs: Mohammad Hajiesmaili at UMass Amherst and Carlee Joe-Wong at CMU.

Referees

Don Towsley
Distinguished University Professor
Director of the Quantum Information Systems Institute
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Choh-Ming Li Chair Professor of Computer Science and Engineering
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Adam Wierman
Carl F Braun Professor of Computing and Mathematical Sciences
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