

Xiaoqi Tan

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Education

Hong Kong University of Science and Technology

Doctor of Philosophy in Electronic and Computer Engineering

Advisor: Danny H.K. Tsang (IEEE Fellow, HKIE Fellow).

Hong Kong SAR, China

09/2012 - 02/2018

Harvard University

Visiting Ph.D. Student in School of Engineering and Applied Science

Hosting Professor: Na Li.

Cambridge, MA, USA

10/2015 - 04/2016

Xi'an Jiaotong University

Bachelor of Engineering in Electronic and Information Engineering

GPA: 91.43/100 (first class honor, rank 1st/180).

Xi'an, China

09/2008 - 06/2012

Employment

University of Toronto

Postdoctoral Fellow

Department of Electrical and Computer Engineering,

Mentor: Alberto Leon-Garcia (IEEE Life Fellow, Fellow of Canadian Academy of Engineering).

Toronto, ON, Canada

07/2018 - Present

Hong Kong University of Science and Technology

Postdoctoral Fellow,

Department of Electronic and Computer Engineering,

Mentor: Danny H.K. Tsang (IEEE Fellow, HKIE Fellow).

Hong Kong SAR, China

03/2018 - 06/2018

Research Summary

I'm interested in **algorithmic and economic aspects of networks**, with particular applications to communication and energy networks. My mission is to understand and optimize the design and operation of networks in the face of dynamics, ranging from changing and possibly strategic user behaviors to network connectivity and resource availability. To achieve this, my research features interdisciplinarity and uses tools from mathematics and economics such as **online algorithms, algorithmic game theory/mechanism design, and optimization**.

Awards and Honors

- Overseas Research Awards, School of Engineering, HKUST, 2015.
- Award of "Energy Technology Concentration", School of Engineering, HKUST, 2013.
- Postgraduate Studentship, School of Engineering, HKUST, 2012-2017.
- B.Eng. with First Class Honors (Rank: 1st/180), Xi'an Jiaotong University, 2012.
- National Scholarship (\approx top 1%), Ministry of Education of P.R.China, 2011.
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- National Scholarship (\approx top 1%), Ministry of Education of P.R.China, 2009.

Professional Services

Technical Reviewer for Journals.....

- IEEE Network.
- IEEE/ACM Transactions on Network.
- IEEE Transactions on Wireless Communication.
- IEEE Transactions on Cybernetics.

- IEEE Transactions on Power System.
- IEEE Transactions on Smart Grid.
- IEEE Transactions on Vehicular Technology.
- IEEE Transactions on Sustainable Energy.
- IEEE Transactions on Industrial Informatics.
- IEEE Transactions on Intelligent Transportation Systems.
- International Journal of Electrical Power & Energy Systems.

Technical Reviewer for Conferences.....

- IEEE International Conference on Smart Grid Communication (SmartGridComm), 2013-2016.
- IEEE Power&Energy Society General Meeting (PES GM), 2014-2015.
- IEEE International Conference on Communication (ICC), 2015-2017.
- IEEE Global Communications Conference (Globecom), 2015-2017.
- International Teletraffic Congress (ITC), 2013-2017.

Technical Program Committee:.....

- IEEE International Conference on Smart Grid Communication (SmartGridComm), 2013-2014.

Membership.....

- ACM Member (2019-Present).
- IEEE Member (2018-Present).

Presentation

Invited Presentation.....

- 10/2018. Enabling Intelligent Decision-Making in Smart Cities: When Internet of Things Meets Multi-Agent Systems, *The 10th CASCON Workshop on Cloud Computing*, Toronto, ON, Canada.
- 07/2015. Understanding the Planning and Operation of Electric Vehicle Battery Swapping Station via Queueing Analysis, *Zhejiang University of Technology, Hangzhou, China*.
- 12/2014. Value-Lifetime Tradeoff Analysis for Battery Energy Storage in Dynamic Electricity Market, *Zhejiang University of Technology, Hangzhou, China*.

Conference Presentation.....

- 11/2015. Model Predictive Control of Integrated Room Automation Considering Occupants Preference, *IEEE SmartGridComm 2015*, Miami, USA.
- 11/2014. Optimal Energy Trading with Battery Energy Storage under Dynamic Pricing, *IEEE SmartGridComm 2014*, Venice, Italy.
- 11/2014. Queueing Network Models for Electric Vehicle Charging Station with Battery Swapping, *IEEE SmartGridComm 2014*, Venice, Italy.
- 10/2013. Economic Analysis of Lifetime-Constrained Battery Energy Storage under Dynamic Pricing, *IEEE SmartGridComm 2013*, Vancouver, Canada.

Journal Publications

- X. Tan and A. Leon-Garcia, "Adaptive Online Mechanism for Fog Resource Allocation", preprint.
- X. Tan and A. Leon-Garcia, "Online Mechanism Design for Resource Reservation and Scheduling in Large-scale Computing Clusters", preprint.
- L. Ni, B. Sun, X. Tan*, and D.H.K. Tsang, "Inventory Planning and Real-time Routing for Network of Electric Vehicle Battery Swapping Stations", under review by *IEEE Transactions on Intelligent Transportation Systems*.
- L. Liu, B. Sun, X. Tan*, and D.H.K. Tsang, "Joint Resource Allocation and Subchannel Assignment for NOMA-enabled Multi-access Edge Computing", under review by *IEEE Transactions on Wireless Communications*.

- S. Wang, **X. Tan***, T. Liu, and D.H.K. Tsang, "Aggregation of Demand-Side Flexibility in Electricity Markets: Negative Impact Analysis and Mitigation Method", under review by *IEEE Transactions on Smart Grid*.
 - T. Liu, **X. Tan***, S. Wang, and D.H.K. Tsang, "Robust Economic Dispatch with Flexible Demand and Adjustable Uncertainty Set", under review by *International Journal of Electric Power and Energy Systems*.
 - T. Liu, B. Sun, **X. Tan***, and D.H.K. Tsang, "Chance-Constrained Economic Dispatch with Flexible Loads and RES", under review by *International Journal of Electric Power and Energy Systems*.
 - **X. Tan** and A. Leon-Garcia, "Online Resource Allocation in Communication Networks: Design of Dynamic Link Prices for Bounded Efficiency Loss", to be submitted to *IEEE/ACM Transactions on Networking*.
 - **X. Tan**, A. Leon-Garcia, and B. Sun, "A Real-time Pricing Framework for Demand-Side Management under Arbitrary Arrivals", under review by *IEEE Transactions on Smart Grid*.
 - **X. Tan**, B. Sun, A. Leon-Garcia, Y. Wu, and D.H.K. Tsang, "Mechanism Design for Online Resource Allocation: A Unified Approach", under review by *Proceedings of ACM on Measurement and Analysis of Computing Systems (POMACS)*.
15. **X. Tan**, A. Leon-Garcia, Y. Wu, and D.H.K. Tsang, "Online Combinatorial Auctions for Resource Allocation with Supply Costs and Capacity Limits", to appear in *IEEE Journal of Selected Areas in Communication*. (CCF Ranking: A, Impact Factor = 9.302)
 14. **X. Tan**, A. Leon-Garcia, Y. Wu and D.H.K. Tsang, "Posted-Price Retailing of Transactive Energy: An Optimal Online Mechanism without Prediction", to appear in *IEEE Journal of Selected Areas in Communication (JSAC)*. (CCF Ranking: A, Impact Factor = 9.302)
 13. B. Sun, **X. Tan**, and D.H.K. Tsang, "Eliciting Multi-dimensional Flexibilities from Electric Vehicles: A Mechanism Design Approach", *IEEE Transactions on Power Systems*, in press. (SCI, Impact Factor = 6.807)
 12. **X. Tan**, G. Qu, B. Sun, N. Li, and D.H.K. Tsang, "Optimal Charging Scheduling of Battery Charging Stations Serving Electric Vehicles Based on Battery Swapping", *IEEE Transactions on Smart Grid*, vol. 10, no. 2, pp. 1372-1384, March 2019. (JCR: Q1, Impact Factor = 10.486)
 11. B. Sun, **X. Tan**, and D.H.K. Tsang, "Optimal Charging Operation of Battery Swapping and Charging Stations with QoS Guarantee", *IEEE Transactions on Smart Grid*, vol. 9, no. 5, pp. 4689-4701, Sept. 2018. (SCI, Impact Factor = 10.486)
 10. S. Agheb, **X. Tan**, B. Sun, and D.H.K. Tsang, "Contract Design for Aggregating, Trading, and Distributing Reserves in Demand-side Frequency Regulation", *IEEE Transactions on Industrial Informatics*, vol. 14, no. 6, pp. 2539-2549, June 2018. (SCI, Impact Factor = 7.377)
 9. Y. Wu, L. Qian, H. Mao, X. Yang, H. Zhou, **X. Tan**, and D.H.K. Tsang, "Secrecy-Driven Resource Management for Vehicular Computation-Offloading Networks", *IEEE Network*, vol. 32, no. 3, pp. 84-91, May/June 2018. (SCI, Impact Factor = 7.503)
 8. W. Li, **X. Tan**, B. Sun, and D.H.K. Tsang, "Optimal Power Dispatch of a Centralized Electric Vehicle Battery Charging Station with Renewables", *IET Communications*, vol. 12, no. 5, pp. 579-585, March 2018. (SCI, Impact Factor = 7.197)
 7. **X. Tan**, B. Sun, Y. Wu and D.H.K. Tsang, "Asymptotic performance evaluation of battery swapping and charging station for electric vehicles", *Performance Evaluation (Elsevier)*, vol. 119, pp. 43-57, March 2018. (appears in the list of **Most Downloaded Performance Evaluation Articles**) (CCF Ranking: B, Impact Factor = 1.364)
 6. T. Liu, **X. Tan**, B. Sun, Y. Wu, and D.H.K. Tsang, "Energy Management of Cooperative Microgrids: A Distributed Optimization Approach", *International Journal of Electric Power and Energy Systems*, vol. 96, pp. 335-346, March 2018. (SCI, Impact Factor = 3.610)
 5. B. Sun, Zhe Huang, **X. Tan**, and D.H.K. Tsang, "Optimal Scheduling for Electric Vehicle Charging with Discrete Charging Levels in Distribution Grid", *IEEE Transactions on Smart Grid*, vol. 9, no. 2, pp. 624-634, March 2018. (SCI, Impact Factor = 10.486)

4. **X. Tan**, Y. Wu and D.H.K. Tsang, "A Stochastic Shortest Path Framework for Quantifying the Value and Lifetime of Battery Energy Storage under Dynamic Pricing", *IEEE Transactions on Smart Grid*, vol. 8, no. 2, pp. 769-778, March 2017. (JCR: Q1, Impact Factor = 10.486)
3. **X. Tan**, Y. Wu and D.H.K. Tsang, "Pareto Optimal Operation of Distributed Battery Energy Storage Systems for Energy Arbitrage under Dynamic Pricing", *IEEE Transactions on Parallel and Distributed Systems*, vol. 27, no. 7, pp. 2103-2115, July 2016. (CCF Ranking: A, Impact Factor = 3.402)
2. S. Niafar, **X. Tan**, and D.H.K. Tsang et al, "Optimal Downlink Scheduling for Heterogeneous Traffic in LET-A Based on MDP and Chance-Constrained Approaches", *ACM/Springer Mobile Networks and Applications (MONET)*, vol. 21, no. 3, pp. 390-401, June 2016. (SCI, Impact Factor = 2.497)
1. Y. Wu, **X. Tan**, L. Qian, D.H.K. Tsang, W. Song, and L. Yu, "Optimal Pricing and Energy Scheduling for Hybrid Energy Trading Market in Future Smart Grid", *IEEE Transactions on Industrial Informatics*, vol. 11, no. 6, pp. 1585-1596, December 2015. (SCI, Impact Factor = 7.377)

Conference Publications

- o **X. Tan**, B. Sun, A. Leon-Garcia, Y. Wu, and D.H.K. Tsang, "Mechanism Design for Online Resource Allocation: A Unified Approach", preprint.
18. **X. Tan**, A. Leon-Garcia, and D.H.K. Tsang, "Optimal Posted Prices for Online Resource Allocation with Supply Costs", in proceedings of *ACM Sigmetrics Workshop on MAMA*, 2019.
 17. **X. Tan**, A. Leon-Garcia, B. Sun, and D.H.K. Tsang, "A Novel Online Mechanism for Demand-Side Flexibility Management under Arbitrary Arrivals", (Extended Abstract), in *Proceedings of ACM e-Energy*, 2019.
 16. L. Liu, B. Sun, **X. Tan**, Y.S. Xiao, D.H.K. Tsang, "Energy-efficient Resource Allocation and Channel Assignment for NOMA-based Mobile Edge Computing", in *Proceedings of IEEE Wireless Communications and Networking Conference (WCNC)*, April. 2019, Marrakech, Morocco.
 15. **X. Tan** and A. Leon-Garcia, "Autonomous Mobility and Energy Service Management in Future Smart Cities: An Overview", in *Proceedings of IEEE UIV 2018*, MIT, Boston, MA, USA.
 14. L. Ni, B. Sun, **X. Tan** and D.H.K. Tsang, "Online Price-based Vehicle-to-Station Recommendations for EV Battery Swapping", in *Proceedings of IEEE SmartGridComm 2018*, Aalborg, Denmark.
 13. A. Zhang, B. Sun, T. Liu, **X. Tan**, S. Wang and D.H.K. Tsang, "Joint Voltage and Frequency Regulation by EV Charging Scheduling in the Distribution Network," in *Proceedings of IEEE ISGT*, Washington D.C., USA, Feb. 2018.
 12. S. Wang, B. Sun, T. Liu, **X. Tan**, and D.H.K. Tsang, "Real-time Market-based Coordination Mechanism for Transmission and Distribution Networks", in *Proceedings of IEEE SmartGridComm 2017*, Oct. 2017.
 11. T. Liu, B. Sun, **X. Tan**, and D.H.K. Tsang, "Market for Multi-Dimensional Flexibility with Parametric Demand Response Bidding", in *Proceedings of 49th North American Power Symposium (NAPS)*, Sept. 2017.
 10. S. Agheb, **X. Tan**, and D.H.K. Tsang, "Model Predictive Control of Integrated Room Automation Considering Occupants Preference", in *Proceedings of IEEE SmartGridComm 2016*, March 2016.
 9. W. Li, **X. Tan**, and D.H.K. Tsang, "Smart Home Energy Management Systems Based on Non-Intrusive Load Monitoring", in *Proceedings of IEEE SmartGridComm 2015*, Nov. 2015.
 8. T. Liu, **X. Tan**, B. Sun, Y. Wu, X. Guan, and D.H.K. Tsang, "Energy Management of Cooperative Microgrids with P2P Energy Sharing in Distribution Networks", in *Proceedings of IEEE SmartGridComm 2015*, Nov. 2015.
 7. Y. Wu, **X. Tan**, L. Qian and D.H.K. Tsang, "Optimal Management of Local Energy Trading in Future Smart Microgrid via Pricing", *IEEE INFOCOM Workshop, Smart Data Pricing*, 2015.
 6. **X. Tan**, B. Sun and D.H.K. Tsang, "Queueing Network Models for EV Charging Station with Battery Swapping", in *Proceedings of IEEE SmartGridComm 2014*, Nov. 2014.

5. **X. Tan**, Y. Wu and D.H.K. Tsang, "Optimal Energy Trading with Battery Energy Storage under Dynamic Pricing", in Proceedings of *IEEE SmartGridComm 2014*, Nov. 2014.
4. B. Sun, **X. Tan** and D.H.K. Tsang, "Optimal Charging Operation of Battery Swapping Stations with QoS Guarantee", in Proceedings of *IEEE SmartGridComm 2014*, Nov. 2014.
3. S. Niafar, **X. Tan** and D.H.K. Tsang, "The Optimal User Scheduling for LTE-A Downlink with Heterogeneous Traffic Types", [invited paper], in Proceedings of the *10th International Conference on Heterogeneous Networking for Quality, Reliability, Security and Robustness (Qshine 2014)*, Rhodes, Greece, 2014.
2. Y. Wu, X. Sun, **X. Tan**, L. Meng, L. Yu, W. Song and D.H.K. Tsang, "Cooperative Distributed Energy Generation and Energy Trading for Future Smart Grid", The 33rd *Chinese Control Conference (CCC)*, Nanjing, China, Jul. 2014.
1. **X. Tan**, Y. Wu and D.H.K. Tsang, "Economic Analysis of Lifetime-Constrained Battery Storage under Dynamic Pricing", in Proceedings of *IEEE SmartGridComm 2013*, Oct. 2013.

References

(Available upon request)