XIN QIN

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EDUCATION

University of Cambridge *Sep. 2021 - Sep. 2025*
PhD in Information Engineering
Supervisor: Prof. Ioannis Lestas

Tsinghua University *Aug. 2017 - Jun. 2020*
MSc in Electrical Engineering
Supervisor: Prof. Hongbin Sun

Harbin Institute of Technology *Aug. 2013 - Jun. 2017*
BEng in Electrical Engineering
Exchange in Tsinghua University, Jan. 2017 - Jun. 2017
Exchange in Zhejiang University, Jul. 2015 - Jul. 2015

WORKING

Research Assistant, Tsinghua-UC Berkeley Shenzhen Institute (TBSI) *Jul. 2020 - Jun. 2021*
Research Topic: Battery storage contribution to decarbonization, Market participation of battery storage, Electricity market design and operation
Advisor: Prof. Ye Guo

Research Assistant (Admitted PhD student) (Remote), Columbia University *Jun. 2020 - Aug. 2021*
Research Topic: Battery storage contribution to decarbonization, Market participation of battery storage
Advisor: Prof. Bolun Xu

RESEARCH INTEREST

I am dedicated to achieving **affordable energy system decarbonization** with innovative market designs and control approaches. My research interests encompass a wide array of compelling topics, including **control and optimization of smart grids**, **energy storage and electricity markets**, and **multi-energy systems**.

PUBLICATIONS

Ongoing Journal Articles:

[O2] **X. Qin**, I. Lestas. Frequency Control and Optimal Power Sharing with Heat Pump Participation in Combined Heat and Power Networks. *Under review*, 2024.

[O1] **X. Qin**, I. Lestas, B. Xu. Economic Capacity Withholding Bounds of Competitive Energy Storage Bidders. *Under review and revision by Manufacturing & Service Operations Management (MSOM)*, 2024.

Published Journal Articles:

[J7] **X. Qin**, B. Xu, I. Lestas, Y. Guo, H. Sun. The Role of Electricity Market Design for Energy Storage in Cost-Efficient Decarbonization. *Joule*, 2023. (2023 Impact Factor: 46.048)

[J6] X. Yi, Y. Guo, H. Sun, **X. Qin**, Q. Wu. Energy-Grade Double Pricing for Combined Heat and Power Systems. *IEEE Transactions on Power Systems*, 2023, 39(2), 3769-3784.

[J5] N. Zheng, **X. Qin**, D. Wu, G. Murtaugh, B. Xu. Energy Storage State-of-Charge Market Model. *IEEE Transactions on Energy Markets, Policy and Regulation*, 2023.

[J4] **X. Qin**, Y. Guo, X. Shen, H. Sun. Increasing flexibility of combined heat and power systems through optimal dispatch with variable mass flow. *IEEE Transactions on Sustainable Energy*, 2022.

[J3] **X. Qin**, X. Shen, H. Sun, et. al. Combined Electric and Heat System Testbeds for Power Flow Analysis and Economic Dispatch. *CSEE Journal of Power and Energy Systems*, 2021.

[J2] **X. Qin**, H. Sun, Y. Guo. Asynchronous Economic Dispatch for Combined Heat and Power Systems. *IEEE Open Access Journal of Power and Energy*, 2020.

[J1] **X. Qin**, H. Sun, X. Shen, Y. Guo, et. al. A Generalized Quasi-Dynamic Model for Electric-Heat Coupling Integrated Energy System with Distributed Energy Resources. *Applied Energy*, 2019.

Peer-Reviewed Conference Papers:

[C6] **X. Qin**, I. Lestas. Frequency Control and Power Sharing in Combined Heat and Power Networks. *2024 IEEE Conference on Decision and Control (CDC, in Milan, Italy)*, IEEE, 2024.

[C5] **X. Qin**, I. Lestas. Frequency Control and Power Sharing for Combined Heat and Power Networks with Heat Pump Participation. *26th International Symposium on Mathematical Theory of Networks and Systems (MTNS, in Cambridge, UK)*, 2024. (Abstract)

[C4] R. Shi, X. Zhang, **X. Qin**, H. Sun. Optimal Heat Flow in District Heat Networks with Tree Topology: A Convex Approach. *2020 IEEE PES General Meeting*, IEEE, 2020.

[C3] **X. Qin**, X. Zhang, X. Shen, Y. Xu, M. Shahidehpour, H. Sun. Distributed Optimal Frequency Control for Integrated Energy Systems with Electricity and Heat. *2019 IEEE PES General Meeting (in Atlanta, USA)*, IEEE, 2019.

[C2] **X. Qin**, X. Shen, H. Sun, et al. A Quasi-Dynamic Model and Corresponding Calculation Method for Integrated Energy System with Electricity and Heat. *the 10th International Conference on Applied Energy (in Hong Kong), Energy Procedia*, 2019, 158: 6413-6418.

[C1] **X. Qin**, X. Shen, G. Wan, T. Sheng, H. Sun, Q. Guo, L. Tang. Heating network quasi-dynamic model of multi-energy flow system based on forward method. *2017 IEEE Conference on Energy Internet and Energy System Integration (EI2, in Beijing, China)*, IEEE, 2017, 1-6.

SELECTED AWARDS

Postgraduate Research and Expenses Fund, Clare College, University of Cambridge	*2024*
Ford of Britain Fund, Department of Engineering, University of Cambridge	*2024*
CSEE JPES Excellent Paper Award, CSEE Journal of Power and Energy Systems	*2023*
EPFL Global Leaders Fellowship, EPFL/EU Horizon 2020 under Marie Skłodowska-Curie grant	*2021*
Li Memorial Fellowship, Columbia University	*2020*
Columbia University TA/RA Scholarships, Columbia University	*2020*
National Scholarship for Postgraduates, MOE of China	*2019*
Excellent Comprehensive Scholarship, Tsinghua University	*2018*
Outstanding Contribution Award for Voluntary Work, IEEE Power and Energy Society	*2017*
Excellent Graduate, Harbin Institute of Technology	*2017*
First Class People's Scholarship (several times), Harbin Institute of Technology	*2014-2017*
National Scholarship for Undergraduates, Ministry of Education (MOE) of China	*2014*

INVITED PRESENTATION

Economic Capacity Withholding Bounds of Competitive Energy Storage Bidders. *2024 IEEE PES General Meeting*, Seattle, **USA**, Jul. 2024. (Poster)

The Role of Electricity Market Design for Energy Storage in Cost-Efficient Decarbonization. *King's College London*, London, **UK**, Jul. 2023.

Impact of Market Bidding and Dispatch Model over Energy Storage Utilization. *2022 Federal Energy Regulatory Commission (FERC) Technical Conference*, Washington DC, **USA**, Jun. 2022. (Presenter: Prof. Bolun Xu)

Agent-based Storage Valuation and Market Participation Analysis. *2021 FERC Technical Conference*, Washington DC, **USA**, Jun. 2021. (Presenter: Prof. Bolun Xu)

Distributed Optimal Frequency Control for Integrated Energy Systems with Electricity and Heat. *2019 IEEE PES General Meeting*, Atlanta, **USA**, Aug. 2019.

A Quasi-Dynamic Model and Corresponding Calculation Method for Integrated Energy System with Electricity and Heat. *10th International Conference on Applied Energy*, **Hong Kong**, Aug. 2018.

Heating Network Quasi-Dynamic Model of Multi-Energy Flow System Based on Forward Method. *2017 IEEE Conference on Energy Internet and Energy System Integration*, Beijing, **China**, Nov. 2017.

SELECTED MEDIA COVERAGE

Improving Market Design for Energy Storage *Links*
News and Twitter *Jun. 2023*

· Featured in reputable media outlets such as *Today Headline, Tech Xplore, Bioengineer, EurekAlert*, and *Columbia University School of Engineering and Applied Science.*
· Recognized by influential Twitter accounts with high impact, including *@Cell Press, @Cell Press Sustainability, @TechXplore*, and *@Lorenzo H. Gomez.*

Latest original research from Applied Energy: A generalized quasi-dynamic model for electric-heat coupling integrated energy system with distributed energy resources *Link*
WeChat post *May. 2019*

· Post has 1.3k Reads.

ACTIVITIES

Teaching:

· **Supervisor**, 3F2 Systems and control, University of Cambridge *2023-2025 Lent*
· **Supervisor**, 3F1 Signals and systems, University of Cambridge *2022-2024 Michaelmas*
· **Supervisor**, 3B3 Switch-Mode Electronics, University of Cambridge *2024 Michaelmas*
· **Demonstrator**, 3F2 Systems and Control, University of Cambridge *2022 Lent*
· **Teaching Assistant**, Introduction of Smart Grid, Tsinghua University *2019 Spring*
Evaluation: A (Highest)
· **Teaching Assistant**, Operations Research and Statistics, Tsinghua University *2018 Fall*
Evaluation: A (Highest)

Volunteering and Social Work:

· **Student helper**, 26th International Symposium on Mathematical Theory of Networks and Systems *2024*
· **Committee Member**, UK Tsinghua Association *2021*
· **Volunteer for IEEE PES Energy Internet Coordinating Committee (EICC)**, Prepared the materials for founding EICC and contacted related technical committees for support *2020*
· **Volunteer for Defending Typhoon**, Helped clean campus after typhoon Mangosteen *2018*
· **Voluntary Presenter at Tsinghua External Advisory Board Conference**, Presented my research work for Tsinghua international advisors from MIT, Stanford, UC Berkeley *2018*
· **Volunteer Team Leader at IEEE Conference on Energy Internet and Energy System Integration**, Led a team of 6 people to serve for the keynote speech with 800+ audiences. *2017*

INDUSTRIAL PROJECTS / ENGINEERING APPLICATION WORK

Design and develop algorithms for power flow analysis and optimal dispatch
Role: Participant and researcher *Mar. 2017 - Jun. 2021*

· Supported by National Natural Science Foundation of China (51537006), and by the National Key R&D Programs of China (2018YFB0905000 and 2016YFB0901300).
· Conducted research on nonlinear power flow calculation and economic dispatch for integrated energy systems, and contributed to industrial applications.

Design Integrated Energy Management Systems (I-EMS) for Jilin Provincial Power Grid
Role: Participant and developer *Mar. 2019 - Jun. 2020*

· Supported by State Grid Corporation of China, $1.08 million.
· Designed optimal dispatch frameworks and communication mechanisms for the heating systems in Changchun City, enabling greater flexibility to help reduce wind curtailment.

Design and develop nonlinear power flow analysis module for I-EMS
Role: Module leader *Nov. 2017 - Jun. 2020*

· Supported by China Power International Development Limited, $2.90 million.

· Designed and developed algorithms for dynamic power flow calculation, and deployed the I-EMS software in Beike Technology Park, China, to reduce operational costs and carbon emissions.

PROFESSIONAL ENGAGEMENT

Reviewer for IEEE Transactions on Power Systems, IEEE Transactions on Smart Grid, IEEE Transactions on Sustainable Energy, IEEE Transactions on Energy Markets, Policy and Regulation, Energy, CSEE Journal of Power and Energy Systems, IET Renewable Power Generation; IEEE PES General Meeting (PESGM), IEEE Conference on Decision and Control (CDC), American Control Conference (ACC), and IEEE Conference on Energy Internet and Energy System Integration