

TONGXIN LI

Assistant Professor
Presidential Young Fellow
School of Data Science
The Chinese University of Hong Kong (Shenzhen)

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RESEARCH INTERESTS

- Online control and decision-making
- Machine learning in power systems

EDUCATION

California Institute of Technology, Pasadena 2017 OCT - 2022 JULY

- Ph.D. in Computing and Mathematical Sciences (admitted in Electrical Engineering)
- Dissertation topic: “**Learning-augmented control and decision-making in smart grids**”
- **2022 SIGEnergy Doctoral Dissertation Award (honorable mention)**

The Chinese University of Hong Kong, Shatin 2011 SEP - 2017 OCT

- M.Phil. in Information Engineering
- B.Sc. in Mathematics
- B.Eng. in Information Engineering

EMPLOYMENT

The Chinese University of Hong Kong, Shenzhen 2022 AUG - PRESENT
Assistant Professor, Presidential Young Fellow SCHOOL OF DATA SCIENCE

Amazon Web Services, Virtual 2021 JULY - 2021 OCT
Applied scientist intern (with return offer) CLOUD SECURITY

Amazon Web Services, Virtual 2020 JUNE - 2020 SEP
Applied scientist intern CLOUD SECURITY

École Polytechnique Fédérale de Lausanne, Lausanne 2015 JUN - 2015 SEP
Summer Intern COMPUTER AND COMMUNICATION SCIENCES

Carnegie Mellon University, Pittsburgh 2014 JUN - 2014 SEP
Summer Intern ELECTRICAL AND COMPUTER ENGINEERING

PUBLICATIONS AND PREPRINTS

Journals¹

1. **Li T**, Sun B, Chen Y, Ye Z, Wierman A, Low SH “*Learning-Based Predictive Control via Real-Time Aggregate Flexibility*”, IEEE Transactions on Smart Grids, 12 (6), pp. 4897-4913, 2021.
2. **Li T**, Chen Y, Sun B, Wierman A, Low SH “*Information Aggregation for Constrained Online Control*”, Proceedings of the ACM on Measurement and Analysis of Computing Systems, 5 (2), No.: 18, pp. 1–35, 2021.
3. **Li T**, Yang R, Qu G, Shi G, Yu C, Wierman A, Low SH “*Robustness and Consistency in Linear Quadratic Control with Predictions*”, Proceedings of the ACM on Measurement and Analysis of Computing Systems, 6(1), 1-35, 2022.
4. **Li T**, Werner L, Low SH “*Learning Graph Parameters from Linear Measurements: Fundamental Trade-offs and Applications*”, IEEE Transactions on Signal and Information Processing over Networks, 6, pp. 163-178, 2020.
5. **Li T**, Yang R, Qu G, Lin Y, Low SH, Wierman A “*Certifying Black-Box Policies with Stability for Non-linear Control*”, IEEE Open Journal of Control Systems, pp 49-62, 2023.
6. Chen Y, **Li T**, Zhao C, Wei W “*Decentralized Provision of Renewable Predictions within a Virtual Power Plant*”, IEEE Transactions on Power Systems, 36 (3), pp. 2652-2662, 2020.
7. Sun C, **Li T**, Low SH “*Classification of Electric Vehicle Charging Time Series based on Selective Clustering*”, Electric Power Systems Research, Elsevier, 189, pp. 106695, 2020.
8. Ye Z, **Li T**, Low SH “*Towards Balanced Three-phase Charging: Phase Optimization in Adaptive Charging Networks*”, Electric Power Systems Research, Elsevier, 212, pp. 108322, 2022.
9. Sun B, Alinia B, **Li T**, Hajiesmaili M, Wierman A, Tsang DHK “*Competitive Algorithms for the Online Multiple Knapsack Problem with Application to Electric Vehicle Charging*”, Proceedings of the ACM on Measurement and Analysis of Computing Systems, 4 (3), No.: 51, pp. 1–32, 2020.
10. Chen Y, Wei W, **Li T**, Hou Y, Liu F, J Catalao “*Optimal Bidding of Energy Storage: A Surrogate Method with Combined Spatial-Temporal Entropy*”, (submitted to IEEE Systems Journal).
11. Chen Y, **Li T**, Qiuwei Wu “*Equilibrium Analysis of Coupled Peer-to-Peer Energy Sharing Embedded Power System and Transportation System*”, (submitted to Applied Energy).
12. Sun C, **Li T**, Tang X “*A Data-Driven Approach for Optimizing Early-Stage Electric Vehicle Charging Station Placement*”, IEEE Transactions on Industrial Informatics, pp. 1-11, 2023.
13. **Li T**, “*Learning-Augmented Scheduling for Solar-Powered Electric Vehicle Charging*”, submitted to IEEE Transactions on Smart Grids.

¹ Remark: Accepted papers of ACM SIGMETRICS and IEEE PSCC automatically appear in the Proceedings of the ACM on Measurement and Analysis of Computing Systems (POMACS) and Electric Power Systems Research.

14. **Li T**, Y Zhang, B K Dey, S Jaggi, L Langberg, A Sarwate “ *Quadratically Constrained Communication under Causal Attacks*”, plan to submit to IEEE Transactions on Information Theory.

Conferences

1. Pre-print H Liu, **Li T**, Y Wang, Y Yue “ *Information-Theoretic Latent Relational Abstraction*”, submitted to CLeaR 2024.
2. Pre-print Yang J, **Li T**, Wierman A, Ren S “ *Reinforcement Learning for Online Competitive Control with Policy Priors*”, submitted to SIGMETRICS 2023.
3. **NeurIPS 2023** **Li T**, Lin Y, Ren S, Wierman A “ *Beyond Black-Box Advice: Learning-Augmented Algorithms for MDPs with Q-Value Predictions*”.
4. **NeurIPS 2023** Yang J, Li P, **Li T**, Wierman A, Ren S “ *Anytime-Competitive Reinforcement Learning with Policy Prior*”.
5. **NeurIPS 2022** Lin Y, Yang H, Qu G, **Li T**, Wierman A “ *Bounded-Regret MPC via Perturbation Analysis: Prediction Error, Constraints, and Nonlinearity*”.
6. **ACM SIGMETRICS 2022** **Li T**, Yang R, Qu G, Shi G, Yu C, Wierman A, Low SH “ *Robustness and Consistency in Linear Quadratic Control with Predictions*”.
7. **IEEE PSCC 2022** Ye Z, **Li T**, Low SH “ *Towards Balanced Three-phase Charging: Phase Optimization in Adaptive Charging Networks*”.
8. **IEEE SmartGridComm 2021** Sun C, **Li T**, Tang X “ *Data-driven Electric Vehicle Charging Station Placement for Incentivizing Potential Demand*”.
9. **ACM SIGMETRICS 2021** Sun B, Alinia B, **Li T**, Hajiesmaili M, Wierman A, Tsang DHK “ *Competitive Algorithms for the Online Multiple Knapsack Problem with Application to Electric Vehicle Charging*”.
10. **ACM SIGMETRICS 2021** **Li T**, Chen Y, Sun B, Wierman A, Low SH “ *Information Aggregation for Constrained Online Control*”.
11. **ACM e-Energy 2020** **Li T**, Low SH, Wierman A “ *Real-time Flexibility Feedback for Closed-loop Aggregator and System Operator Coordination*”.
12. **ACM e-Energy 2020** Sun B, **Li T**, Low SH, Tsang DHK “ *ORC: An Online Competitive Algorithm for Recommendation and Charging Schedule in Electric Vehicle Charging Network*”.
13. **ACM e-Energy 2019** Lee Z, **Li T**, Low SH “ *ACN-Data: Analysis and Applications of an Open EV Charging Dataset*”.
14. NeurIPS Workshop on causal inference 2019 Liu H, Liu, A, **Li T**, Anandkumar A “ *Disentangling Causal Effects from Latent Confounders using Interventions*”.
15. **IEEE PSCC 2020** Sun C, **Li T**, Low SH “ *Classification of Electric Vehicle Charging Time Series based on Selective Clustering*”.

16. IEEE CDC 2019 **Li T**, Werner L, Low SH “*Learning Graph Parameters from Linear Measurements: Fundamental Trade-offs and Application to Electric Grids*”.
 17. IEEE ITW 2018 **Li T** “*Maximum likelihood upper bounds on the capacities of discrete information stable channel*”.
 18. IEEE ISIT 2018 **Li T**, Dey BK, Jaggi S, Langberg M, Sarwate AD “*Quadratically constrained channels with causal adversaries*”.
 19. IEEE DSW 2018 Sun C, **Li T**, Li VO “*Robust and consistent clustering recovery via SDP approaches*”.
 20. IEEE SPAWC 2016 Invited Paper **Li T**, Bakshi M, Grover P “*Fundamental limits and achievable strategies for low energy compressed sensing with applications in wireless communication*”.
 21. IEEE ISIT 2014 **Li T**, Chan CL, Huang W, Kaced T, Jaggi S “*Group testing with prior statistics*”.
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INVITED TALKS AND SEMINARS (BY TOPICS)

Trustworthy Machine Learning for Power Systems in PES GM 2023

Impact of COVID-19 on Learning-Based Electric Vehicle Charging: Challenges and Solutions

- 2022 INFORMS Annual Meeting

Learning-augmented Decision-making and Control: Theory and Applications in Power Systems

- Algorithms with Predictions Seminar Course Talk, University of Massachusetts Amherst
- Seminar, HKUST, Guangzhou
- Seminar, CityU, Hong Kong
- Seminar, CUHK, Shenzhen

System Identification: Fundamental Trade-offs and Applications

- “*Model-based graph learning with linear measurements*” Southern California Applied Mathematics Symposium, April 27, 2019 (SOCAM 2019), April 27, 2019, Pasadena, USA
- (Invited) “*Learning graph parameters from linear measurements: Fundamental trade-offs and application to electric grids*” The 20th INFORMS Applied Probability Society Conference (INFORMS-APS 2019), July 3-5, 2019, Brisbane, Australia

Learning-based Information Aggregation for Large-scale Control

- (Invited) “*Learning Real-time Flexibility for Closed-loop Aggregator and System Operator Coordination*” The INFORMS 25th ANNIVERSARY, Nov 8-13, 2020, Virtual
 - (Invited) “*Learning-based Predictive Control via Real-time Aggregate Flexibility*” The INFORMS 26th ANNIVERSARY, Oct 24-27, 2021, Anaheim, USA
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AWARDS AND DISTINCTIONS

2022 SIGEnergy Doctoral Dissertation Award (Honorable Mention) <i>2 recipients per year</i>	2022
2021 Resnick Sustainability Institute Impact Grants	2021
NSF Graduate Research Fellowship	2018-2022
Croucher Summer Course in Information Theory (CSCIT 2017), Best Poster Award	2017
Dean's List of Science Faculty <i>Top 10%/all students in double-degree program</i>	2012 - 2013, 2013 - 2014
Head's List of United College <i>Top 1/all college students in both information engineering and mathematics</i>	2012 - 2013, 2013 - 2014
HKSAR Government Scholarship	2013 - 2014
Undergraduate Mathematics Scholarship <i>At most 2 students per year</i>	2013 - 2014
T C Cheng Scholarship	2013 - 2014
Professor Charles K. Kao Research Exchange Scholarship <i>Around 10/2000 engineering students per year</i>	2014 SUMMER
GOAL Programme Non-local Exchange Scholarship	2014 SUMMER
Wu Chung Scholarship	2012 - 2013

GRANTS

Start-up funding UDF01002773 of CUHK-Shenzhen (<i>Principal Investigator</i>)	(RMB 1500K)
National Natural Science Foundation of China (<i>Principal Investigator and Co-Investigator</i>)	(RMB 500K)
Energy and Sustainability Young Talent Donation (<i>Principal Investigator</i>)	(RMB 600K)
Peacock Program for Overseas High-Level Talents (<i>Principal Investigator</i>)	(RMB 2400K)

SELECTED INDUSTRY PROJECTS

Advanced Research Projects Agency–Energy (ARPA-E): NODES • Simulate real-time OPF for demand response	2018-2019
Pasadena Water and Power Department (PWP) • Distribution network optimal battery placement for voltage regulation	2020-2021
Caltech Facilities • Workplace decarbonization through real-time learning and optimization	2021-PRESENT

PATENTS

Systems and Methods for Adaptive EV Charging (US Patent Application: 16786803)

Inventors: Zachary J Lee, **Tongxin Li**, Steven H Low, Sunash B Sharma

TEACHING

The Chinese University of Hong Kong (Shenzhen)

Linear Algebra and Applications Fall 2022

Advanced Machine Learning Spring 2023, Spring 2024

Online Algorithms Spring 2024

PROFESSIONAL SERVICES

Technical Program Committee:

- IEEE SmartGridComm 2023
- ICLR 2023 Workshop: Tackling Climate Change with Machine Learning

Session Chair:

- INFORMS Annual Meeting 2023

Paper Reviewer:

- INFORMS Journal on Computing
- IEEE Transactions on Control of Network Systems
- IEEE Transactions on Information Theory
- IEEE Transactions on Communications
- IEEE Transactions on Smart Grid
- IEEE Transactions on Power Systems
- IEEE Open Journal of Control Systems
- Operations Research Letters
- Systems & Control Letters
- Artificial Intelligence
- IEEE (ISIT) International Symposium on Information Theory
- IEEE (CDC) Conference on Decision and Control
- Elsevier Electric Power Systems Research
- Energy Informatics Review Newsletter
- ACM SIGMETRICS
- ACM SIGEnergy
- AAAI

Caltech Keller Colloquium Organizing Committee