

# TONGXIN LI

Computing + Mathematical Sciences  
California Institute of Technology

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## EDUCATION

**California Institute of Technology**, Pasadena 2017 SEP - PRESENT

Advisors: Steven H. Low and Adam Wierman

- Ph.D. in Computing + Mathematical Sciences

**The Chinese University of Hong Kong**, Hong Kong 2011 SEP - 2017 AUG

Advisor: Sidharth Jaggi

- M.Phil. in Information Engineering
  - B.Sc. in Mathematics
  - B.Eng. in Information Engineering
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## RESEARCH INTERESTS

- Control, learning and optimization for cyber-physical systems
  - Artificial intelligence for sustainability
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## WORK EXPERIENCE

**Amazon Web Services**, Virtual 2021 JULY - 2021 OCT  
Role: Research scientist intern (with return offer) FULL-TIME INTERNSHIP

**Amazon Web Services**, Virtual 2020 JUNE - 2020 SEP  
Role: Research scientist intern FULL-TIME INTERNSHIP

**École Polytechnique Fédérale de Lausanne**, Lausanne 2015 JUN - 2015 SEP  
SUMMER RESEARCH INTERNSHIP

**Carnegie Mellon University**, Pittsburgh 2014 JUN - 2014 SEP  
SUMMER RESEARCH INTERNSHIP

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## PUBLICATIONS AND PREPRINTS

### Journals

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, (to appear in 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. 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.
6. Sun C, **Li T** (equal contribution), Low SH “*Classification of Electric Vehicle Charging Time Series based on Selective Clustering*”, Electric Power Systems Research, Elsevier, 189, pp. 106695, 2020.
7. 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.
8. 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).
9. 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).
10. Sun C, **Li T**, Tang X “*A Data-Driven Approach for Optimizing Early-Stage Electric Vehicle Charging Station Placement (revision submitted to IEEE Transactions on Industrial Informatics)*”.

## Conferences

1. **Li T**, Yang R, Qu G, Lin Y, Low SH, Wierman A “*Equipping Black-Box Policies with Model-Based Advice for Stable Nonlinear Control*”, submitted to NeurIPS 2022.
2. Lin Y, Yang H, Qu G, **Li T**, Wierman A “*Bounded-Regret MPC via Perturbation Analysis: Prediction Error, Constraints, and Nonlinearity*”, submitted to NeurIPS 2022.
3. **Li T**, Yang R, Qu G, Shi G, Yu C, Wierman A, Low SH “*Robustness and Consistency in Linear Quadratic Control with Predictions*”, SIGMETRICS 2022.
4. Sun C, **Li T**, Tang X “*Data-driven Electric Vehicle Charging Station Placement for Incentivizing Potential Demand*”, IEEE SmartGridComm 2021.
5. Ye Z, **Li T**, Low SH “*Towards Balanced Three-phase Charging: Phase Optimization in Adaptive Charging Networks*”, The Power Systems Computation Conference (PSCC 2022).
6. 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*”, SIGMETRICS 2021.
7. **Li T**, Chen Y, Sun B, Wierman A, Low SH “*Information Aggregation for Constrained Online Control*”, SIGMETRICS 2021, (acceptance rate 18%).
8. **Li T**, Low SH, Wierman A “*Real-time Flexibility Feedback for Closed-loop Aggregator and System Operator Coordination*”, ACM e-Energy 2020.
9. Sun B, **Li T**, Low SH, Tsang DHK “*ORC: An Online Competitive Algorithm for Recommendation and Charging Schedule in Electric Vehicle Charging Network*”, ACM e-Energy 2020.

10. Liu H, Liu, A, **Li T**, Anandkumar A “*Disentangling Causal Effects from Latent Confounders using Interventions*”, NeurIPS Workshop on causal inference 2019.
  11. Sun C, **Li T** (equal contribution), Low SH “*Classification of Electric Vehicle Charging Time Series based on Selective Clustering*”, The Power Systems Computation Conference (PSCC 2020).
  12. Lee Z, **Li T**, Low SH “*ACN-Data: Analysis and Applications of an Open EV Charging Dataset*”, ACM e-Energy 2019.
  13. **Li T**, Werner L, Low SH “*Learning Graph Parameters from Linear Measurements: Fundamental Trade-offs and Application to Electric Grids*”, IEEE CDC 2019.
  14. **Li T** “*Maximum likelihood upper bounds on the capacities of discrete information stable channel*”, IEEE ITW 2018.
  15. **Li T**, Dey BK, Jaggi S, Langberg M, Sarwate AD “*Quadratically constrained channels with causal adversaries*”, IEEE ISIT 2018.
  16. Sun C, **Li T**, Li VO “*Robust and consistent clustering recovery via SDP approaches*”, IEEE DSW 2018.
  17. **Li T**, Bakshi M, Grover P “*Fundamental limits and achievable strategies for low energy compressed sensing with applications in wireless communication*”, IEEE SPAWC 2016 *Invited Paper*.
  18. **Li T**, Chan CL, Huang W, Kaced T, Jaggi S “*Group testing with prior statistics*”, IEEE ISIT 2014.
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#### SELECTED INDUSTRY PROJECTS

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|---|---------------------|
| <b>Advanced Research Projects Agency–Energy (ARPA-E): NODES</b>   | <i>2018-2019</i>    |
| <ul style="list-style-type: none"> <li>• Simulate real-time OPF for demand response</li> </ul>                            |                     |
| <b>Pasadena Water and Power Department (PWP)</b>  | <i>2020-2021</i>    |
| <ul style="list-style-type: none"> <li>• Distribution network optimal battery placement for voltage regulation</li> </ul> |                     |
| <b>Caltech Facilities</b>   | <i>2021-PRESENT</i> |
| <ul style="list-style-type: none"> <li>• Workplace decarbonization through real-time learning and optimization</li> </ul> |                     |
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#### INVITED TALKS (BY TOPICS)

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

- Seminar, HKUST, Guangzhou
- Seminar, CityU
- 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

### AWARDS, GRANTS AND DISTINCTIONS

2021 Resnick Sustainability Institute Impact Grants	2021
Croucher Summer Course in Information Theory (CSCIT 2017), Best Poster Award	2017
Dean’s List of Science Faculty	2012 - 2013, 2013 - 2014
Head’s List of United College	2012 - 2013, 2013 - 2014
HKSAR Government Scholarship	2013 - 2014
Undergraduate Mathematics Scholarship	2013 - 2014
T C Cheng Scholarship	2013 - 2014
Professor Charles K. Kao Research Exchange Scholarship	2014 SUMMER
GOAL Programme Non-local Exchange Scholarship	2014 SUMMER
Wu Chung Scholarship	2012 - 2013

### PATENTS

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

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

### ACADEMIC SERVICES

Paper Reviewer for

- 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
- 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
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## STRENGTHS

Languages: Python, MATLAB, JavaScript, C, C++,  $\text{\LaTeX}$

Communication Skills: Mandarin Chinese, English, Cantonese