Tao Li

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Education

† *Indicates expected*

2018–2024 †	Ph.D., Electrical Engineering, New York University, USA Thesis: Theoretical Foundations of Multi-agent Learning under Amorphous Information Structures Supervisors: Dr. Quanyan Zhu
2016	Exchange student, Mathematics, University of Cambridge, UK
2014–2018	B.Sc., Mathematics, Xiamen University, China

Employment

2018–present	Research Assistant Department of Electrical and Computer Engineering, New York University, USA
2017	Undergrad Research Assistant Department of Mathematical and Statistical Sciences, University of Alberta, Canada

Teaching

2023 Fall	ECE-GY 9963 Advanced Project I
2023 Spring	ECE-GY 6263 Game Theory: Course Lecture on Game-theoretic Learning,
2022 Spring	ECE-GY 9963 Advanced Project II
2021 Fall	ECE-GY 9953 Advanced Project I

Supervision

2023 Fall	Xinhong Xie	Self-predictive Large Language Models for Cybersecurity Task Automation
2023 Spring	Juan Guevara	Self-confirming Transformer in Multi-agent Reinforcement Learning
2022 Spring	Dhairya Upadhyay	Vision-based Collusion Avoidance: A Turtlebot Implementation
2022 Spring	Haozhe Lei	Online Meta Reinforcement Learning and its Application in Autonomous Driving
2021 Fall	Haozhe Lei	Adversarial Meta Reinforcement Learning: A Minimax Formulation and Complexity Analysis
2021 Fall	Nikunj Gupta	Informationally Mosaic Multi-agent Reinforcement Learning

Publications

Preprint URLs available at Google Scholar;
[*] *indicates equal contribution*; (α-β) *indicates alphabetical listing*; ___ *indicates correspondence.*

Books and Chapters

[1] **Tao Li**, Yunian Pan, and Quanyan Zhu, "Decision-dominant strategic defense against lateral movement for 5G zero-trust multi-domain networks," in Yingying Chen, Jie Wu, Paul Yu, Xiaogang Wang Eds. *Network Security Empowered by Artificial Intelligence*, pp. 25-76, Springer Nature Switzerland, Cham, 2024.

Journals

[1] **Tao Li**, Zilin Bian, Haozhe Lei, Fan Zuo, Ya-Ting Yang, Quanyan Zhu, Zhenning Li, Zhibin Chen, Kaan Ozbay, "Digital Twin-based Driver Risk-Aware Intelligent Mobility Analytics for Urban Transportation Management," *IEEE Transactions Intelligent Transportation Systems*, 2024, Under Revier.

[2] (α-β) Kim Hammar, **Tao Li**, Rolf Stadler, and Quanyan Zhu, "Automating security strategies through online learning with adaptive conjectures," *IEEE Transactions on Information Forensics and Security*, 2024. Major Revision.

[3] **Tao Li**, Zilin Bian, Haozhe Lei, Fan Zuo, Ya-Ting Yang, Quanyan Zhu, Zhenning Li, and Kaan Ozbay, "Multi-level traffic-responsive tilt camera surveillance through predictive correlated online learning," *Transportation Research Part C: Emerging Technologies*, 2024. Major Revision.

[4] Liu, Shutian, **Tao Li**, and Quanyan Zhu, "Game-theoretic distributed empirical risk minimization with strategic network design," *IEEE Transactions on Signal and Information Processing over Networks*, vol. 9, pp. 542-556, 2023.

[5] **Tao Li**, Guanze Peng, Quanyan Zhu, and Tamer Başar, "The confluence of networks, games, and learning a game-theoretic framework for multiagent decision making over networks," *IEEE Control Systems*, vol. 42, no. 4, 2022, pp. 35-67.

[6] **Tao Li**, Yuhan Zhao and Quanyan Zhu, "The role of information structures in game-theoretic multi-agent learning," *Annual Reviews in Control*, Volume 53, 2022, pp 296-314.

[7] Bin Han*, **Tao Li***, Xiaosheng Zhuang*. "Directional compactly supported box spline tight framelets with simple geometric structure," *Applied Mathematics Letters* 91, 2019, pp 213-219.

Conferences

[1] **Tao Li**, Kim Hammar, Rolf Stadler, and Quanyan Zhu, "Conjectural Online Learning with First-order Beliefs in Asymmetric Information Stochastic Games," *63rd IEEE Conference on Decision and Control*, Toronto, Canada.

[2] Yunian Pan, **Tao Li**, and Quanyan Zhu, "On the Variational Interpretation of Mirror Play in Monotone Games," *63rd IEEE Conference on Decision and Control*, Toronto, Canada.

[3] Mingsheng Yin, **Tao Li**, Haozhe Lei, Yaqi Hu, Sundeep Rangan, and Quanyan Zhu, "Zero-Shot Wireless Indoor Navigation through Physics-Informed Reinforcement Learning," *2024 IEEE International Conference on Robotics and Automation*, Yokohama, Japan, 2024.

[4] Yunian Pan*, **Tao Li***, Henger Li, Tianyi Xu, Zizhan Zheng, and Quanyan Zhu, "A first-order meta Stackelberg method for robust federated learning," *2nd New Frontiers In Adversarial Machine Learning Workshop at 40th International Conference on Machine Learning*, Honolulu, Hawaii, 2023.

[5] **Tao Li** and Quanyan Zhu, "On the price of transparency: A comparison between overt persuasion and covert signaling," *62nd IEEE Conference on Decision and Control (CDC)*, Singapore, Singapore, 2023, pp. 4267-4272.

[6] Yunian Pan, **Tao Li**, and Quanyan Zhu, "Is stochastic mirror descent vulnerable to adversarial delay attacks? A traffic assignment resilience study," *62nd IEEE Conference on Decision and Control (CDC)*, Singapore, Singapore, 2023, pp. 8328-8333.

[7] Ya-Ting Yang*, **Tao Li***, and Quanyan Zhu, "Designing policies for truth: Combating misinformation with transparency and information design," *2023 21st International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)*, pp. 127–134, 2023.

[8] Yunfei Ge*, **Tao Li***, and Quanyan Zhu, "Scenario-agnostic zero-trust defense with explainable threshold policy: A meta-learning approach," *IEEE INFOCOM 2023 - IEEE Conference on Computer Communications Workshops (INFOCOM)*, Hoboken, NJ, USA, 2023, pp. 1-6.

[9] Yunian Pan, **Tao Li**, and Quanyan Zhu, "On the resilience of traffic networks under non-equilibrium learning," *2023 American Control Conference (ACC)*, San Diego, CA, USA, 2023, pp. 3484-3489.

[10] **Tao Li**, Haozhe Lei and Quanyan Zhu, "Self-adaptive driving in nonstationary environments through conjectural online lookahead adaptation," *2023 IEEE International Conference on Robotics and Automation (ICRA)*, London, United Kingdom, 2023, pp. 7205-7211.

[11] Guanze Peng, **Tao Li**, Shutian Liu, Juntao Chen, and Quanyan Zhu, "Locally-aware constrained games on networks," *2021 American Control Conference (ACC)*, virtual, 2021, pp. 4606-4611.

[12] **Tao Li**, Guanze Peng and Quanyan Zhu, "Blackwell online learning for Markov decision processes," *2021 55th Annual Conference on Information Sciences and Systems (CISS)*, virtual, 2021, pp. 1-6.

[13] **Tao Li**, Quanyan Zhu, "On convergence rate of adaptive multiscale value function approximation for reinforcement learning", *2019 IEEE 29th International Workshop on Machine Learning for Signal Processing (MLSP)*, Pittsburgh, PA, USA, 2019, pp. 1-6.

Prepints and Technical Reports

[1] **Tao Li**, Juan Guevara, Xinghong Xie, and Quanyan Zhu, "Self-Confirming Transformer for Locally Consistent Online Adaptation in Multi-Agent Reinforcement Learning," arXiv preprint, 2023, arXiv: 2310.04579.

[2] **Tao Li** and Quanyan Zhu, "Commitment with Signaling under Double-sided Information Asymmetry," arXiv preprint, 2022, arXiv:2212.11446.

[3] Nikunj Gupta, **Tao Li** and Quanyan Zhu, "Informationally-Mosaic Reinforcement Learning," Technical Report (2021), Depart. ECE, NYU (available at google scholar).

[4] **Tao Li**, Haozhe Lei and Quanyan Zhu, "Sampling Attacks on Meta Reinforcement Learning: A Minimax Formulation and Complexity Analysis," arXiv preprint, 2021, arxiv:2208.00081.

[5] **Tao Li**, Yuan Ni, Michael Stanley, Nikhil Supekar, "Regularized Optimal Transport," Technical Report, (2020), Courant Institute, NYU (available at google scholar).

[6] Bannon James*, Brad Windsor*, Wenbo Song*, and **Tao Li***. "Causality and Batch Reinforcement Learning: Complementary Approaches To Planning In Unknown Domains." arXiv preprint, 2020, arXiv:2006.02579.

[7] Bin Han*, **Tao Li***, Xiaosheng Zhuang*, "Directional Compactly Supported Box Spline Tight Framelets with Simple Structure," arXiv preprint, 2017, arXiv:1708.08421.

Presentations

[1] "Automated Security Response Through Conjectural Online Learning under Information Asymmetry," Invited Talk at Autonomous Robotics and Control Lab, Caltech, CA, USA, Jun 21, 2024.

[2] “A First Order Meta Stackelberg Method for Robust Federated Learning,” International Conference on Machine Learning, Honolulu, HI, USA, Jul 27, 2023.

[3] “On the Resilience of Traffic Networks under Non-Equilibrium Learning,” American Control Conference, San Diego, CA, USA, May 31, 2023.

[4] “On the role of Information Structures in Multi-agent Learning,” International Conference on Game Theory, Stony Brook, NY, USA, Jul. 21, 2022.

[5] “Informationally Mosaic Reinforcement Learning,” Contributed talk, SIAM 2022 Annual Meeting, Pittsburgh, PA, US, Jul. 12, 2022.

[6] “Self-Adaptive Driving in Nonstationary Environments,” Tandon Research Excellence Exhibit, Brooklyn, NY, US, Apr. 29, 2022.

[7] ”Blackwell Online Learning for Markov Decision Processes,” 55th Annual Conference on Information Sciences and Systems, Online, Mar. 24, 2021.

[8] “Correlated Learning over Networks,” Informs Annual Meeting, Online, Nov. 16, 2020.

[9] “On Reinforcement Learning with Multiscale Representations,” 29th International Workshop on Machine Learning for Signal Processing, Pittsburg, USA, Oct. 13, 2019.

[10] ”Directional Framelets and its Application in Medical Imaging,” PIMS-AMI Workshop on Applied Harmonic Analysis, University of Alberta, Aug. 2017.

Professional Activities

- Conference Organizing Committee:
  - Technical Program Chair: IEEE Conference on Communications and Network Security, Cyber Resilience Workshop (CNS-CRW).
  - Session Chair: SIAM Annual Meeting (SIAM-AN2022), International Conference on Game Theory (2022), Conference on Decision and Game Theory for Security (GameSec-2022/2021), Conference on Decision and Control (CDC 2020: Learning and Security for Multi-agent Systems)
- Conference Reviewer: International Conference on Robotics Automation (ICRA-24/23), Conference on Decision and Control (CDC-23/22/21), Conference on Communications and Network Security (CNS-2023), International Conference on Machine Learning (ICML-22), International Joint Conferences on Artificial Intelligence (IJCAI-22), Annual Learning for Dynamics & Control Conference (L4DC-2023), Conference on Decision and Game Theory for Security (GameSec-20).
- Journal Reviewer: IEEE Robotics and Automation Letters, IEEE Transactions on Emerging Topics in Computational Intelligence, Journal of Industrial and Production Engineering, Nonlinear Analysis: Hybrid Systems

Selected Honours and Awards

2024	The Dante Youla Award For Research Excellence in Electrical Engineering
2023	MidWest Control and Game Theory Travel Award
2022	GameSec-2022 Travel Grant
2022	Tandon Research Excellence CCS Spotlight
2019	Best Student Paper Finalist, IEEE Machine Learning for Signal Processing
2017	NSERC Mitacs-Globalink Research Award, University of Alberta
2015	National Scholarship, Ministry of Education of China

References

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