CONTACT Information 77 Massachusetts Ave, 32-D572 Massachusetts Institute of Technology Cambridge, MA 02139

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RESEARCH INTERESTS Machine/Reinforcement Learning, Control Theory, Robotics, Optimization, Game Theory, and their intersections

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA, USA

Ph.D. Student in Electrical Engineering and Computer Science Minor in Mathematics

M.S. in Electrical Engineering and Computer Science, May 2021

Tsinghua University, Beijing, China

B.E. in Automation, Jul. 2019, Top Grade Scholarship (10/3600)

Excellent Graduate Awards, both Tsinghua University and City of Beijing

RESEARCH EXPERIENCE Massachusetts Institute of Technology, Cambridge, MA, USA Sep. 2019 – Present Research Assistant with Suvrit Sra, Laboratory for Information and Decision Systems

- Sample-efficient representation learning for control (also with Russ Tedrake, Kaiging Zhang)
- Sample-efficient reinforcement learning in Markov decision processes and Markov games

Tsinghua University

Oct. 2018 - Jun. 2019

Research Assistant with Keyou You, Institute of System Integration

• Asynchronous and decentralized distributed training of deep neural networks

Tsinghua University

Nov. 2016 - Jun. 2018

Research Assistant with Jiwen Lu, Intelligent Vision Group

- Deep progressive reinforcement learning for skeleton-based action recognition
- Egocentric hand segmentation and its facilitation for action recognition

Industrial Experience Amazon Robotics, Cambridge, MA, USA

May. 2022 – Aug. 2022

Applied Scientist Intern, Manager: Paul Birkmeyer, Mentor: Yifan Hou

• NeRF-based training of dense descriptors for bin manipulation

Amazon Search, Palo Alto, CA, USA

Jun. 2021 – Aug. 2021

Applied Scientist Intern, Manager: Sujay Sanghavi, Mentor: Han Cheng

• Multi-task training of ranking models

Publications & Manuscripts

Haochuan Li*, Jian Qian*, **Yi Tian**, Alexander Rakhlin, Ali Jadbabaie. Convex and Non-Convex Optimization under Generalized Smoothness. 37th Conference on Neural Information Processing Systems (NeurIPS), 2023. (**Spotlight**)

Yi Tian, Kaiqing Zhang, Russ Tedrake, Suvrit Sra. Toward Understanding State Representation Learning in MuZero: A Case Study in Linear Quadratic Gaussian Control. 62nd IEEE Conference on Decision and Control (CDC), 2023.

Yi Tian, Kaiqing Zhang, Russ Tedrake, Suvrit Sra. Can Direct Latent Model Learning Solve Linear Quadratic Gaussian Control? 5th Annual Learning for Dynamics & Control Conference (L4DC), 2023. (Oral)

Ali Jadbabaie, Haochuan Li, Jian Qian, **Yi Tian**. Byzantine-Robust Federated Linear Bandits. 61st IEEE Conference on Decision and Control (CDC), 2022.

Haochuan Li, **Yi Tian**, Jingzhao Zhang, Ali Jadbabaie. Complexity Lower Bounds for Nonconvex-Strongly-Concave Min-Max Optimization. 35th Conference on Neural Information Processing Systems (NeurIPS), 2021.

Tiancheng Yu, **Yi Tian**, Jingzhao Zhang, Suvrit Sra. Provably Efficient Algorithms for Multi-Objective Competitive RL. 38th International Conference on Machine Learning (ICML), 2021. (Long talk)

Yi Tian*, Yuanhao Wang*, Tiancheng Yu*, Suvrit Sra. Online Learning in Unknown Markov Games. 38th International Conference on Machine Learning (ICML), 2021.

Yi Tian*, Jian Qian*, Suvrit Sra. Towards Minimax Optimal Reinforcement Learning in Factored Markov Decision Processes. 34th Conference on Neural Information Processing Systems (NeurIPS), 2020. (Spotlight)

Congyue Deng*, Yi Tian*. Towards Understanding the Trade-off Between Accuracy and Adversarial Robustness. *International Conference on Machine Learning Workshop on Security and Privacy (ICMLW)*, 2019.

Yansong Tang*, Yi Tian*, Peiyang Li, Jiwen Lu, Jie Zhou. Deep Progressive Reinforcement Learning for Skeleton-Based Action Recognition. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018.

Yansong Tang, Yi Tian, Jiwen Lu, Jianjiang Feng, Jie Zhou. Action Recognition in RGB-D Egocentric Videos. *IEEE International Conference on Image Processing (ICIP)*, 2017.

AWARDS	
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Presidential Fellowship, Massachusetts Institute of Technology	2019
Excellent Undergraduate Thesis, Tsinghua University	2019
Qualcomm Scholarship, Tsinghua University	2017
Weimin Zheng Scholarship, highest honor for juniors in the department (1/138)	2017
Silver Medal in the 30th National Physics Olympiad, Chinese Physics Society	2013

TEACHING EXPERIENCE

Massschusets Institute of Technology, Cambridge, MA, USA Jan. 2022 – May 2022 Teaching Assistant for 6.231 Dynamic Programming and Reinforcement Learning

- Taught for the first time in recent years by John Tsitsiklis, many materials newly designed
- Class size about 70, overall subject rating 6.0/7.0, TA rating 6.6/7.0

Presentations

State Representation Learning for Control: Lessons from Linear Systems

• Reinforcement Learning Discussion Group, Microsoft Research, New York Dec. 1, 2023

Can Direct Latent Model Learning Solve Linear Quadratic Gaussian Control?

- 28th Annual LIDS Student Conference, MIT Feb. 2, 2023
- LIDS & Stats Tea Talk, MIT Dec. 7, 2022

Online Learning in Unknown Markov Games

• LIDS & Stats Tea Talk, MIT

Oct. 6, 2021

Towards Minimax Optimal Reinforcement Learning in Factored Markov Decision Processes

• 26th Annual LIDS Student Conference, MIT

Feb. 3, 2021

Academic Service Reviewer

IEEE Conference on Decision and Control (CDC), 2023

International Conference on Artificial Intelligence and Statistics (AISTATS), 2023 & 2024 Conference on Neural Information Processing Systems (NeurIPS), 2022 & 2023 International Conference on Machine Learning (ICML), 2022 (top 10%), 2023 & 2024

OUTREACH

Member of Student Advisory Group for Faculty Search, EECS, MIT 2022 & 2023 Met with faculty candidates and provided feedback to the department

Cultural Chair, Sidney-Pacific Graduate Residence, MIT May 2021 – Apr. 2023 Organized cultural movie series and cultural festivals

President, 11th Spark Talent Program, Tsinghua University Sep. 2017 – Jun. 2019 Organized ten-day industrial visit to Germany and other community building events

Vice President, Student Association of Science and Technology, Department of Automation,
Tsinghua University
Sep. 2017 – Jun. 2018

Co-organized Tsinghua Electronics Design Competition and Programming Competition

SKILLS

Programming: Python (Pytorch/TensorFlow/Keras), C/C++, MATLAB, Julia Languages: Chinese (native), English (fluent), German/French/Spanish (elementary)