SONGYUAN ZHANG

LAB: REALM Lab, MIT Building 31, 70 Vassar St, Cambridge, MA 02139, U.S.
HOMEPAGE: http://syzhang092218-source.github.io **EMAIL:** szhang21@mit.edu

RESEARCH INTERESTS

Reinforcement Learning (Online/Offline), Generative Models, Safe Control for Robotics, Imitation Learning, Multi-Agent Systems, Control Theory

EDUCATION

Massachusetts Institute of Technology Feb. 2024 - Now
Ph.D. Student at Department of Aeronautics and Astronautics *Advisor: Prof. Chuchu Fan*

Massachusetts Institute of Technology Aug. 2021 - Feb. 2024
Master of Science in Aeronautics and Astronautics *Advisor: Prof. Chuchu Fan*

Tsinghua University Sep. 2017 - Jul. 2021
B.E. in Tsien Excellence in Engineering Program (honored degree)
Advisor: Prof. Yanan Sui, Prof. Hao Wu, Prof. Gangtie Zheng

Stanford University Jun. 2020 - July. 2021
Remote Visiting Scholar in Computer Science *Advisor: Prof. Dorsa Sadigh*

University of California, Berkeley July. 2019 - Sept. 2019
Visiting Scholar in Mechanical Engineering *Advisor: Prof. Masayoshi Tomizuka*

PUBLICATIONS

[ICRA'26] Akila Saravanan, Travis Manderson, Songyuan Zhang, Nicholas Roy, and Chuchu Fan. "Beyond Waypoints: Semantic-Centric Autonomy with Unreliable Maps Through Learned Abstractions." *IEEE International Conference on Robotics and Automation (ICRA)*, 2026.

[ICLR'26] Songyuan Zhang, Oswin So, H. M. Sabbir Ahmad, Eric Yang Yu, Matthew Cleaveland, Mitchell Black, and Chuchu Fan. "ReFORM: Reflected Flows for On-support Offline RL via Noise Manipulation." *International Conference on Learning Representations (ICLR)*, 2026.[Website]

[ICLR'26] Oswin So, Eric Yang Yu, Songyuan Zhang, Matthew Cleaveland, Mitchell Black, and Chuchu Fan. "Solving Parameter-Robust Avoid Problems with Unknown Feasibility using Reinforcement Learning." *International Conference on Learning Representations (ICLR)*, 2026.[Website]

[NeurIPS'25] H. M. Sabbir Ahmad, Ehsan Sabouni, Alexander Wasilkoff, Param Budhraja, Zijian Guo, Songyuan Zhang, Chuchu Fan, Christos Cassandras, and Wenchao Li. "HMARL-CBF – Hierarchical Multi-Agent Reinforcement Learning with Control Barrier Functions for Safety-Critical Autonomous Systems." *The Thirty-ninth Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2025.[Website]

[RSS'25 (Best Student Paper Award)] Songyuan Zhang*, Oswin So*, Mitchell Black, Zachary Serlin, and Chuchu Fan. "Solving Multi-Agent Safe Optimal Control with Distributed Epigraph Form MARL." *Proceedings of Robotics: Science and Systems (RSS)*, 2025.[Website]

[ICLR'25] Songyuan Zhang, Oswin So, Mitchell Black, and Chuchu Fan. "Discrete GCBF Proximal Policy Optimization for Multi-agent Safe Optimal Control." *International Conference on Learning Representations (ICLR)*, 2025.[Website]

[T-RO'25] Songyuan Zhang*, Oswin So*, Kunal Garg, and Chuchu Fan. "GCBF+: A Neural Graph Control Barrier Function Framework for Distributed Safe Multi-Agent Control." *IEEE Transactions on Robotics*, 2025.[Website]

[L4DC'24] Songyuan Zhang, and Chuchu Fan. "Learning to stabilize high-dimensional unknown systems using Lyapunov-guided exploration." *6th Annual Learning for Dynamics & Control Conference (L4DC)*, 2024.[Website]

[ARC'24] Kunal Garg, Songyuan Zhang, Oswin So, Charles Dawson, and Chuchu Fan. "Learning Safe Control for Multi-Robot Systems: Methods, Verification, and Open Challenges." *Annual Reviews in Control*, 2024.[arXiv]

[CoRL'23] Songyuan Zhang, Kunal Garg, and Chuchu Fan. "Neural Graph Control Barrier Functions Guided Distributed Collision-avoidance Multi-agent Control." *7th Conference on Robot Learning (CoRL)*, 2023.[Website]

[SG'23] Lizhi Wang, Songyuan Zhang, Yifan Zhou, Chuchu Fan, Peng Zhang, and Yacov A. Shamash. "Physics-Informed, Safety and Stability Certified Neural Control for Uncertain Networked Microgrids." *IEEE Transactions on Smart Grid*, 2023.[PDF]

[PESGM'23] Lizhi Wang, Songyuan Zhang, Yifan Zhou, Chuchu Fan, Peng Zhang, and Yacov A. Shamash. "Learning-Based, Safety and Stability-Certified Microgrid Control." *2023 IEEE Power & Energy Society General Meeting (PESGM)*, 2023.[PDF]

[L4DC'23 (ORAL)] Songyuan Zhang, Yumeng Xiu, Guannan Qu, and Chuchu Fan. "Compositional Neural Certificates for Networked Dynamical Systems." *5th Annual Learning for Dynamics & Control Conference (L4DC)*, 2023.[Website]

[NeurIPS'21] Songyuan Zhang*, Zhangjie Cao*, Dorsa Sadigh, and Yanan Sui. "Confidence-Aware Imitation Learning from Demonstrations with Varying Optimality." *Conference on Neural Information Processing Systems*, 2021.[Website]

HONORS AND AWARDS

2025-2026 Schwarzman College of Computing Amazon AI Research Innovation Fellowship	2025
Best Student Paper Award of Robotics: Science and Systems (RSS) 2025	2025
Best Paper Award Finalist of Robotics: Science and Systems (RSS) 2025	2025
Outstanding Graduate of Tsinghua University	2021
Outstanding Graduate of Beijing	2021
Outstanding Graduate of Scientific Research at TEEP	2021
Outstanding Graduate of Creativity at TEEP	2021

Honor Degree of Tsien Class, Tsinghua University	2021
Tsinghua Scholarship for Technological Innovation	2020
National Scholarship, China	2019
First Prize in Excellent Student Research Training Contest of Tsinghua University	2019
First Prize in "Challenge Cup" Science and Technology Competition of Tsinghua University	2019

ACADEMIC SERVICES

Journal Reviewer:
IEEE Transactions on Robotics (T-RO), IEEE Transactions on Automatic Control (T-AC), Automatica, Annual Reviews in Control (ARC), IEEE Open Journal of Control Systems (OJ-CSYS), IEEE Robotics and Automation Letters (RA-L), IEEE Transactions on Cybernetics (T-CYB), IEEE Transactions on Control Systems Technology (TCST)

Conference Reviewer:
NeurIPS, ICLR, ICML, RSS, CoRL, ICRA, L4DC, IROS, AAAI, AISTATS, CDC, ACC, NeuS, NFM, DARS, RV, TACAS

Teaching Assistant at Tsinghua University: X-idea (2021 Spring)

LEADERSHIP & MEMBERSHIP

Chairman of 13th *Spark* Innovative Talents Training Program at Tsinghua University

Vice-monitor of Tsien Class 2017

Member of the Second Team of Middle and Long Distance Running at Tsinghua University

SELECTED PRESS COVERAGE

MIT engineers help multirobot systems stay in the safety zone, *MIT News*, 2025. [Website]

Nine MIT PhD students named Amazon AI Fellows, *MIT Schwarzman College of Computing*, 2025. [Website]

HOBBIES

Photography, Hiking, Badminton, Running, Skiing, Piano, Drum kit, Taekwondo, Poker Magic