

# Walter Yu

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## RESEARCH INTEREST

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Robotics and Deep Learning; Graph Neural Networks; Motion Planning; Multi-Agent Planning

## EDUCATION

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### University of California, San Diego

- Ph.D. in Computer Science, Advisor: Prof. [Sicun Gao](#)

Sept. 2021 - Jun. 2025 (Expected)

### University of California, San Diego

- M.S. in Computer Science

Sept. 2019 - Jun. 2021

## PUBLICATION

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6. [NeurIPS 23] Milan Ganai, Zheng Gong, [Chenning Yu](#), Sylvia Herbert, Sicun Gao. “Iterative Reachability Estimation for Safe Reinforcement Learning.” *The Conference on Neural Information Processing Systems*, 2023.
5. [IROS 23] Hongzhan Yu, Chiaki Hirayama, [Chenning Yu](#), Sylvia Herbert, Sicun Gao. “Sequential Neural Barriers for Scalable Dynamic Obstacle Avoidance.” *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2023. *Best Robocup Paper Award*.
4. [ICRA 23] [Chenning Yu\\*](#), Qingbiao Li\*, Sicun Gao, Amanda Prorok. “Accelerating Multi-Agent Planning Using Graph Transformers with Bounded Suboptimality.” *IEEE International Conference on Robotics and Automation*, 2023.
3. [NeurIPS 22] Ruipeng Zhang, [Chenning Yu](#), Jingkai Chen, Chuchu Fan, Sicun Gao. “Learning-based Motion Planning in Dynamic Environments Using GNNs and Temporal Encoding.” *The Conference on Neural Information Processing Systems*, 2022.
2. [CoRL 22] [Chenning Yu](#), Hongzhan Yu, Sicun Gao. “Learning Control Admissibility Models with Graph Neural Networks for Multi-Agent Navigation.” *The Conference on Robot Learning*, 2022.
1. [NeurIPS 21] [Chenning Yu](#), Sicun Gao. “Reducing Collision Checking for Sampling-Based Motion Planning Using Graph Neural Networks.” *The Conference on Neural Information Processing Systems*, 2021.

## ACADEMIC EXPERIENCE

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### Reliable Autonomous Systems Lab, MIT

Jun. 2022 - Oct. 2022

*Designing Generalizable Reinforcement Learning Agents with Highly Safe Performances*

Advisor: Prof. [Chuchu Fan](#)

- Designed a set-theoretic formulation of RL policies to guarantee the forward invariance for safety-critical constraints.
- Generalized the RL agents to out-of-distribution tasks using the compositionality, and attaining highly safe performances.
- Tested the approach in a safety-critical MuJoCo robot environment with a performance of over 90% per-state safeness.

### Prorok Lab, University of Cambridge

Jun. 2022 - Sept. 2022

*Accelerating Multi-Agent Planning using Graph Transformers and Contrastive Learning*

Advisor: Prof. [Amanda Prorok](#)

- Incorporated the Graph Transformers into a provably near-optimal planning framework for computation acceleration.
- Analyzed the approach in continuous clustered environments up to 30 agents, which are infeasible for traditional planners.
- Increased the success rates of the multi-agent planners by over 25% on average, with near-optimal performances.

### Automation Algorithms Group, UC San Diego

Feb. 2020 - Present

*Accelerating Motion Planning using Graph Neural Networks and Imitation Learning*

Advisor: Prof. [Sicun Gao](#)

- Applied Graph Neural Networks to motion planning tasks, which enables faster planning with success rate guarantees.
- Evaluated the method with PyBullet robot arms from 2 to 14 degrees of freedom. The result has a 99% success rate and requires only 17% of the collision checking queries compared to the state-of-the-art learning-based planner.
- Extended the proposed method to dynamic environments and accelerated the total planning time by up to 95%.

## TECHNICAL SKILLS

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### Programming

Python, Bash, MATLAB

### Development & Tools

PyTorch, JAX, TensorFlow, PyBullet, Jupyter Notebook, ROS, Raspberry Pi, Linux, Git

## PROFESSIONAL ACTIVITIES

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### Conference Reviewer

AAAI 2023, ICLR 2024, ICRA 2023/2024, L4DC 2023, NeurIPS 2023