YUXIN CHEN

PhD · Control · Robotics · Machine Learning

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Summary

The primary objective of my research endeavors is centered around developing trustworthy and safe-guaranteed interactive autonomous agents (e.g., autonomous vehicles, mobile robots, robot manipulators) that can perceive and comprehend the physical world, engage with their surroundings, collaborate with humans and other agents to better serve the society. My specific focus lies in enhancing the robustness and safety of learning-based autonomous robot systems. I have been pursuing interdisciplinary research in cutting-edge domains including deep learning, reinforcement learning, embodied AI, optimization, and control theory.

Education

University of California, Berkeley — *Berkeley, CA*
PH.D. MECHANICAL ENGINEERING (CONTROL) — *Aug 2022 – May 2027*
- Advisor: Prof. Masayoshi Tomizuka
- Minors: Machine Learning, Optimization

University of Michigan, Ann Arbor — *Ann Arbor, MI*
M.S. ROBOTICS — *Aug 2020 – May 2022*
- Advisor: Prof. Ram Vasudevan

University of Michigan, Ann Arbor — *Ann Arbor, MI*
B.S.E. AEROSPACE ENGINEERING (SUMMA CUM LAUDE) — *Sep 2018 – May 2020*
- Minor: Computer Science

Shanghai Jiao Tong University — *Shanghai, China*
B.S. MECHANICAL ENGINEERING — *Sep 2016 – Aug 2020*

Research Experience

University of California, Berkeley — *Berkeley, CA*
GRADUATE STUDENT RESEARCHER — *Aug 2022 – Present*
Faculty member: Prof. Masayoshi Tomizuka
Affiliation: Mechanical Systems Control (MSC) Laboratory & Berkeley AI Research (BAIR) & Berkeley DeepDrive (BDD)

University of Michigan, Ann Arbor — *Ann Arbor, MI*
GRADUATE STUDENT RESEARCHER — *May 2020 – Jul 2022*
Faculty member: Prof. Ram Vasudevan
Affiliation: Robotics and Optimization for the Analysis of Human Motion (ROAHM) Laboratory

University of Michigan, Ann Arbor — *Ann Arbor, MI*
UNDERGRADUATE RESEARCH ASSISTANT — *Oct 2018 – May 2020*
Faculty member: Prof. Ella Atkins & Prof. Brent Gillespie
Affiliation: Autonomous Aerospace Systems (A2SYS) Laboratory & HAPTIX Laboratory

Working Experience

Mitsubishi Electric Research Laboratories — *Cambridge, MA*
RESEARCH INTERN. (MENTOR: DEVESH JHA & DIEGO ROMERES) — *May 2024 – Aug 2024*
- Developed algorithms for fine-tuning diffusion policy with human preference
- Explored potential application of vision-language model (VLM) on robotic tasks

Zoox, Inc. — *Foster City, CA*
SOFTWARE ENGINEERING INTERN. (MENTOR: RICK ZHANG) — *May 2021 – Aug 2021*
- Developed real-time motion planning algorithms for autonomous vehicle in uncertain environments with complex traffic conditions
- Conducted vehicle tests at Stanford Linear Accelerator Center (SLAC) National Accelerator Laboratory

Honda R&D Americas, LLC — *Ann Arbor, MI*
STUDENT MEMBER, MULTIDISCIPLINARY DESIGN PROGRAM (MENTOR: TYLER NAES) — *Jan 2021 – Dec 2021*
- Developed a graph neural networks (GNN) model to provide traffic/weather forecast for the on-board navigation system
- Designed the Human-Machine Interface (HMI) of the navigation system on an Acura RLX-5 host vehicle

ZF (China) Investment Co., Ltd *Shanghai, China*

SOFTWARE DEVELOPMENT & TESTING INTERN. *Jan 2018 – Mar 2018*

- Built the CANoe user interface with CAPL and tested the networks for the ECU test platform of Aston Martin
- Wrote test cases in CANoe and tested the Active Kinematics Control (AKC) system for Porsche 992 in CANape

PUBLICATIONS

Journal

[1] P. Ewen, A. Li, **Y. Chen**, S. Hong and R. Vasudevan, "These Maps are Made for Walking: Real-Time Terrain Property Estimation for Mobile Robots," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 4, pp. 7083-7090, 2022.

Conference Proceeding

[1] **Y. Chen**, D. Jha, M. Tomizuka, D. Romeres, "FDPP: Fine-tune Diffusion Policy with Human Preference," *under review*, 2024.

[2] T. Zhang, Z. Wu, **Y. Chen**, Y. Wang, B. Liang, S. Moura, M. Tomizuka, M. Ding, W. Zhan, "Physics-Aware Robotic Palletization with Online Masking Inference," *under review*, 2024.

[3] S. Zhao*, X. Zhu*, **Y. Chen**, C. Li, X. Zhang, M. Ding, M. Tomizuka, "DexH2R: Task-oriented Dexterous Manipulation from Human to Robots," *under review*, 2024.

[4] **Y. Chen***, C. Tang*, C. Li, R. Tian, P. Stone, M. Tomizuka, W. Zhan, "MEReQ: Max-Ent Residual-Q Inverse RL for Sample-Efficient Alignment from intervention," *under review*, 2024.

[5] Y. Xu*, **Y. Chen***, J. Nie, Y. Wang, H. Zhuang, M. Okumura, "Advancing Cross-domain Discriminability in Continual Learning of Vision-Language Models," *Advances in Neural Information Processing Systems (NeurIPS)*, 2024.

[6] **Y. Chen**, C. Tang, R. Tian, C. Li, J. Li, M. Tomizuka and W. Zhan, "Quantifying Interaction Level Between Agents Helps Cost-efficient Generalization in Multi-agent Reinforcement Learning," *Proceedings of the 1st Reinforcement Learning Conference (RLC)*, 2024.

[7] **Y. Chen**, C. Tang, R. Tian, C. Li, J. Li, M. Tomizuka and W. Zhan, "Quantifying Agent Interaction in Multi-Agent Reinforcement Learning for Cost-efficient Generalization," *Proceedings of the 23rd International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, pp. 2201-2203, 2024.

[8] P. Ewen, J. -P. Sleiman, **Y. Chen**, W.C. Lu, M. Hutter and R. Vasudevan, "Generating Continuous Motion and Force Plans in Real-Time for Legged Mobile Manipulation," *2021 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 4933-4939, 2021.

[9] M. Romano, **Y. Chen**, O. Marshall, and E. Atkins, "Nailed it: Autonomous Roofing with a Nailgun-Equipped Octocopter," *AIAA Aviation 2021 Forum,* pp. 3211, 2021.

TEACHING EXPERIENCE

University of California, Berkeley *Berkeley, CA*

ADVANCED CONTROL SYSTEM I (MECENG 232) - GRADUATE STUDENT INSTRUCTOR *Aug 2024 – Dec 2024*

Instructor: Prof. Masayoshi Tomizuka

ADVANCED CONTROL SYSTEM II (MECENG 233) - GRADUATE STUDENT INSTRUCTOR *Jan 2024 – May 2024*

Instructor: Prof. Masayoshi Tomizuka

AI FOR AUTONOMY (MECENG 292B) - GRADUATE STUDENT INSTRUCTOR *Jan 2024 – May 2024*

Instructor: Dr. Wei Zhan

University of Michigan, Ann Arbor *Ann Arbor, MI*

SELF-DRIVING CARS: PERCEPTION AND CONTROL (ROB 535) - GRADUATE STUDENT INSTRUCTOR *Aug 2021 – Dec 2021*

Instructor: Prof. Ram Vasudevan

MOTION PLANNING (EECS 598) - COURSE ASSISTANT *Jan 2021 – Apr 2021*

Instructor: Prof. Dmitry Berenson

INTRODUCTION TO AEROSPACE SYSTEMS (AERO 201) - COURSE ASSISTANT *Aug 2019 – Dec 2019*

Instructor: Prof. Ella Atkins

ACADEMIC SERVICES

Journal Reviewer

- IEEE Robotics and Automation Letters (RA-L)

Conference Reviewer / Program Committee

- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Automated Vehicle Validation Conference (IAVVC)

Awards and Scholarships

2020 **Outstanding Graduates of Shanghai (top 3%)**, *Ministry of Education of Shanghai*
2020 **Capstone Design Gold Award (top 1%)**, *Shanghai Jiao Tong University*
2020 **James B. Angell Scholar**, *University of Michigan*
2019 **Roger King Scholarship**, *University of Michigan*
2018 **Longey-SJTU Global Elite Scholarship**, *Shanghai Jiao Tong University*
2017 **Rongchang Science and Technology Innovation Scholarship**, *Shanghai Jiao Tong University*
2017 **Undergraduate Academic Excellence Scholarship**, *Shanghai Jiao Tong University*