ZIYI ZHOU

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INTERESTS

I'm passionate about full-stack planning, control, and estimation for contact-rich manipulation and legged locomotion, especially: 1) **Distributed trajectory optimization** and **model predictive control**; 2) **Agile but safe locomotion** on challenging terrains; 3) **Imitation** and **reinforcement learning** for whole-body loco-manipulation; 4) **Task and motion planning** for single- and multi-robot system.

EDUCATION

Georgia Institute of Technology   *Aug. 2020 - Present*
Ph.D. in Electrical and Computer Engineering   *Advisor: Ye Zhao*

Georgia Institute of Technology   *Aug. 2018 - May. 2020*
M.S. in Electrical and Computer Engineering

Northeastern University   *Oct. 2014 - Jun. 2018*
B.E. in Automation

WORK AND RESEARCH EXPERIENCE

Georgia Institute of Technology   *Jan. 2019 - Present*
Graduate Research Assistant

· Distributed Trajectory Optimization for Legged Locomotion

- Designed distributed whole-body motion planning framework for agile and versatile legged locomotion.
- Achieved reliable jumping motions on Mini-Cheetah.

· Simultaneous Trajectory and Force Optimization for Soft Manipulation

- Developed framework for simultaneous trajectory optimization and force control considering interaction between manipulator and soft environments.
- Implemented an online model predictive controller and verified our algorithm on KUKA Robotic Arm.

· Model-Enhanced Residual Learning for Humanoid Loco-Manipulation

- Studied approaches combining model-based planner or controller with reinforcement learning to enhance robustness
- Achieved reliable loco-manipulation tasks and stable end-effector tracking on diverse humanoid platforms including Digit and Booster T1.

AlphaZ AI   *May. 2025 - Aug.2025*
Research Intern

· Door Opening and Traversal with Mobile Manipulator

- Developed teleoperation and data collection pipeline
- Trained diffusion policy to enable autonomous door opening and traversal

Mitsubishi Electric Research Laboratories (MERL)   *Jan. 2024 - May.2024*
Research Intern

- Contact Detection and Force Estimation for Dynamic Quadrupedal Locomotion
  - Proposed a simultaneous contact detection and force estimation approach without force sensor
  - Designed reflex motion during collision for robust locomotion

SkyMul *Sep. 2022 - Dec. 2023*
Student Researcher & Lead Motion Planning and Control Engineer

- Safe Gait Planning and Motion Control for Quadruped Robots on Construction Sites
  - Developed reactive and safe gait planning framework combining mixed-integer convex programming and temporal logic-based method.
  - Worked on whole-body model predictive controller to allow traversing cluttered environments.
  - Achieved robust loco-manipulation performance for rebar tying tasks; showcased the result on World of Concrete 2023.

UBTECH Robotics North America *Jun. 2021 - Aug. 2021*
Research Intern

- Heterogeneous Multi-Robot Task Allocation and Planning
  - Devised simultaneous task allocation and planning algorithm for a robot team including quadrupeds and wheeled robots in a hospital scenario.
  - Achieved reactive strategies to complete navigation tasks considering the instability of legged robots.

PUBLICATIONS

(*Equally contributed) You can also find my articles on [my Google scholar profile.](#)
Manuscript Preprint:

[1] **Ziyi Zhou**, Pengyuan Shu, Ruize Cao, Yuntian Zhao, and Ye Zhao "ACLM: ADMM-Based Distributed Model Predictive Control for Collaborative Loco-Manipulation", (submitted)

[2] **Ziyi Zhou**, Qian Meng, Hadas Kress-Gazit, and Ye Zhao "Physically-Feasible Reactive Synthesis for Terrain-Adaptive Locomotion", (submitted)

Conferences:

[3] Jaehwi Jang, Zhuoheng Wang, **Ziyi Zhou**, Feiyang Wu, and Ye Zhao "SEEC: Stable End-Effector Control with Model-Enhanced Residual Learning for Humanoid Loco-Manipulation", *IEEE International Conference on Robotics and Automation (ICRA), 2026*

[4] **Ziyi Zhou**, Qian Meng, Hadas Kress-Gazit, and Ye Zhao "Physically-Feasible Reactive Synthesis for Terrain-Adaptive Locomotion via Trajectory Optimization and Symbolic Repair", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2025*

[5] **Ziyi Zhou**, Stefano Di Cairano, Yebin Wang, Karl Berntorp. "Simultaneous Collision Detection and Force Estimation for Dynamic Quadrupedal Locomotion", *IEEE International Conference on Robotics and Automation (ICRA), 2025*

[6] Max Asselmeier, Jane Ivanova, **Ziyi Zhou**, Patricio A. Vela, and Ye Zhao. "Hierarchical Experience-informed Navigation for Multi-modal Quadrupedal Rebar Grid Traversal", *IEEE International Conference on Robotics and Automation (ICRA), 2024*

[7] Shiyu Feng, **Ziyi Zhou**, Justin S. Smith, Max Asselmeier, Ye Zhao, and Patricio A. Vela. "GPF-BG: A Hierarchical Vision-Based Planning Framework for Safe Quadrupedal Navigation", *IEEE International Conference on Robotics and Automation (ICRA), 2023*

[8] **Ziyi Zhou**, Dong Jae Lee, Yuki Yoshinaga, Dejun Guo, and Ye Zhao. "Reactive Task Allocation and Planning for Quadrupedal and Wheeled Robot Teaming", *IEEE International Conference on Automation Science and Engineering (CASE), 2022*

[9] **Ziyi Zhou**, and Ye Zhao. "Accelerated ADMM based Trajectory Optimization for Legged Locomotion with Coupled Rigid Body Dynamics", *American Control Conference (ACC), 2020*

[10] Lasitha Wijayarathne, Qie Sima, **Ziyi Zhou**, Ye Zhao and Frank Hammond III. "Simultaneous Trajectory Optimization and Force Control with Soft Contact Mechanics", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020*

Journals:

[11] Fukang Liu, Zhaoyuan Gu, Yilin Cai, **Ziyi Zhou**, Shijie Zhao, Hyunyoung Jung, Sehoon Ha, Yue Chen, Danfei Xu, and Ye Zhao "Opt2Skill: Imitating Dynamically-feasible Whole-Body Trajectories for Versatile Humanoid Loco-Manipulation", *IEEE Robotics and Automation Letters (RA-L), 2025*

[12] Zhigen Zhao, Shuo Cheng, Yan Ding, **Ziyi Zhou**, Shiqi Zhang, Danfei Xu, and Ye Zhao. "A Survey of Optimization-based Task and Motion Planning: From Classical To Learning Approaches", *IEEE/ASME Transactions on Mechatronics, 2024*

[13] *Lasitha Wijayarathne, ***Ziyi Zhou**, Ye Zhao, and Frank L. Hammond III. "Real-Time Deformable-Contact-Aware Model Predictive Control for Force-Modulated Manipulation", *IEEE Transactions in Robotics (TRO), 2023*

[14] ***Ziyi Zhou**, *Bruce Wingo, Nathan Boyd, Seth Hutchinson, and Ye Zhao. "Momentum-Aware Trajectory Optimization and Control for Agile Quadrupedal Locomotion", *IEEE Robotics and Automation Letters (RA-L), 2022*

[15] *Zhigen Zhao, ***Ziyi Zhou**, Michael Park, Ye Zhao, "SyDeBO: Symbolic-Decision-Embedded Bilevel Optimization for Long-Horizon Manipulation in Dynamic Environments", *IEEE Access, 2021*

[16] Hongwu Zhu, Dong Wang, Nathan Boyd, **Ziyi Zhou**, Lecheng Ruan, Aidong Zhang, Ning Ding, Ye Zhao, and Jianwen Luo. "Terrain-perception-free Quadrupedal Spinning Locomotion on Versatile Terrains: Modeling, Analysis, and Experimental Validation", *Frontiers in Robotics and AI, 2021*

Abstracts and Workshops:

[17] **Ziyi Zhou**, Bruce Wingo, Nathan Boyd, Seth Hutchinson, and Ye Zhao. "Momentum-Aware Planning Synthesis for Dynamic Legged Locomotion", *Proceedings of Dynamic Walking, 2021*

ACADEMIC SERVICE

Reviewer, IEEE Transactions on Robotics (TRO)	2023, 2024
Reviewer, IEEE Robotics and Automation Letters (RA-L)	2019 - 2025
Reviewer, Autonomous Robots	2023, 2024
Reviewer, IEEE International Conference on Robotics and Automation (ICRA)	2022 - 2025
Reviewer, IEEE International Conference on Intelligent Robots and Systems (IROS)	2022 - 2025
Reviewer, IEEE Conference on Decision and Control(CDC)	2022, 2023
Reviewer, IEEE-RAS International Conference on Humanoid Robots (Humanoids)	2022, 2023, 2024
Reviewer, IEEE Transactions on Control of Network Systems (TCNS)	2020

HONORS

Thank a Teacher Certificate (Georgia Tech)	2022
American Control Conference (ACC) Student Travel Award	2020
Liaoning Province Outstanding Graduate (top 3%)	2018

Excellence Award (top 10%), Siemens PLC Competition   2017

Meritorious Winner (top 10%), U.S Mathematical Contest in Modeling, COMAP   2016

Model Student of Academic Records (top 10%), NEU   2015, 2016, 2017, 2018

TECHNICAL SKILLS

Programming Languages	C/C++, Python, MATLAB, HTML
Robotics Softwares & Tools	ROS/ROS2, Drake, OCS2, Pinocchio, Crocoddyl
Simulation Tools	IsaacSim/IsaacGym, Mujoco, Gazebo
Optimization Tools	IPOPT, SNOPT, Gurobi, OSQP, CasADi