Junheng Li

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Education

2022-present	◇	**Ph.D., University of Southern California** in Mechanical Engineering. Advisor: Prof. Quan Nguyen Thesis: *Hierarchical-optimization-based Control for Dynamic Humanoid Loco-manipulation*
2020-2021	◇	**M.S., University of Southern California** in Mechanical Engineering.
2016-2020	◇	**B.S., Loyola Marymount University** in Mechanical Engineering.

Employment History

2020-present	◇	**Research Assistant,** Dynamics Robotics and Control Lab, University of Southern California.
Aug 2023-present	◇	**Teaching Assistant,** Aerospace and Mechanical Engineering, University of Southern California.

- AME 451: Linear Control Systems I (*Fall 2023, Spring 2024, and Spring 2025*)

- AME 556: Robot Dynamics and Control (*Fall 2024 - Invited Project Advisor*)

Research Publications

Preprint

P1   Z. Gu, J. Li, W. Shen, *et al.*, *Humanoid locomotion and manipulation: Current progress and challenges in control, planning, and learning*, 2025.

P2   L. Krishna, S. Cheng, J. Li, Q. Chen, N. Hovakimyan, and Q. Nguyen, *Diffcotune: Differentiable co-tuning for enhanced cross-domain robot control*, 2025.

P3   J. Li, Z. Duan, J. Ma, and Q. Nguyen, *Gait-net-augmented implicit kino-dynamic mpc for dynamic variable-frequency humanoid locomotion over discrete terrains*, 2025.

P4   Q. Chen, J. Li, S. Cheng, N. Hovakimyan, and Q. Nguyen, *Autotuning bipedal locomotion mpc with grfm-net for efficient sim-to-real transfer*, 2024.

P5   J. Li, O. Kolt, and Q. Nguyen, *Continous dynamic bipedal jumping via adaptive-model optimization*, 2024.

P6   J. Li, J. Ma, O. Kolt, M. Shah, and Q. Nguyen, *Dynamic loco-manipulation on hector: Humanoid for enhanced control and open-source research*, 2023.

Journal Articles

J1   J. Li and Q. Nguyen, "Dynamic walking of bipedal robots on uneven stepping stones via adaptive-frequency mpc," *IEEE Control Systems Letters*, vol. 7, pp. 1279–1284, 2023.

Conference Proceedings

C1   A.-C. He, J. Li, J. Park, *et al.*, "A novel telelocomotion framework with com estimation for scalable locomotion on humanoid robots," in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, 2025, accepted and to appear.

C2 J. Li, Z. Le, J. Ma, and Q. Nguyen, "Adapting gait frequency for posture-regulating humanoid push-recovery via hierarchical model predictive control," in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, 2025, accepted and to appear.

C3 J. Li and Q. Nguyen, "Kinodynamic pose optimization for humanoid loco-manipulation," in *2023 IEEE-RAS 22nd International Conference on Humanoid Robots (Humanoids)*, 2023, pp. 1–8.

C4 J. Li and Q. Nguyen, "Multi-contact mpc for dynamic loco-manipulation on humanoid robots," in *2023 American Control Conference (ACC)*, 2023.

C5 J. Li, J. Ma, and Q. Nguyen, "Balancing control and pose optimization for wheel-legged robots navigating high obstacles," in *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2022, pp. 8835–8841.

C6 J. Li and Q. Nguyen, "Force-and-moment-based model predictive control for achieving highly dynamic locomotion on bipedal robots," in *2021 60th IEEE Conference on Decision and Control (CDC)*, IEEE, 2021, pp. 1024–1030.

Services

2025	◇ *Registration Coordinator* of Robotics: Science and Systems Conference (RSS)
2024-2025	◇ *Reviewer* of IEEE Robotics and Automation Letters (RA-L)
2024	◇ *Reviewer* of IEEE Control System Letters (L-CSS)
	◇ *Reviewer* of International Journal of Robotics and Automation
2023-2024	◇ *Reviewer* of Robotics and Autonomous Systems (RAS)
2022	◇ *Reviewer* of IEEE/ASME Transactions on Mechatronics (TMECH)
	◇ *Reviewer* of Autonomous Robots (AURO)
2022-2025	◇ *Reviewer* of IEEE International Conference on Robotics and Automation (ICRA)
	◇ *Reviewer* of IEEE International Conference on Intelligent Robots and Systems (IROS)
2021-2024	◇ *Reviewer* of IEEE Conference on Decision and Control (CDC)

Invited Talks, Presentations, and Demonstrations

2024/11	◇ *"HECTOR: A Novel Mini-humanoid Platform for Accessible and Accelerated Research and Development"* Invited talk, USC Robotics Seminar
2024/06	◇ *"Demonstration of Dynamic Loco-manipulation on HECTOR: Humanoid for Enhanced ConTrol and Open-source Research"* Demonstration, IEEE International Conference on Robotics and Automation (ICRA)
2023/12	◇ *"Kinodynamic Pose Optimization for Humanoid Loco-manipulation"* Poster, IEEE International Conference on Humanoid Robots (Humanoids)
2023/11	◇ *"Toward Dynamic Locomotion and Loco-manipulation on Humanoid Robots via Model Predictive Control with Linear Dynamics Models"* Invited talk, LMU Department of Mechanical Engineering
2023/10	◇ *"Toward Dynamic Locomotion and Loco-manipulation on Humanoid Robots via Model Predictive Control with Linear Dynamics Models"* Invited talk, 42nd Southern California Control Workshop
	◇ *"Demonstration of Dynamic Locomotion on Bipedal Robots via Force-and-moment-based Model Predictive Control"* Demonstration, IEEE International Conference on Intelligent Robots and Systems (IROS)

2023/05	◇	*"Multi-contact Mpc for Dynamic Loco-manipulation on Humanoid Robots"* Oral Presentation, American Control Conference (ACC)
	◇	*"Dynamic Walking of Bipedal Robots on Uneven Stepping Stones via Adaptive-frequency MPC"* Oral Presentation, American Control Conference (ACC)
2023/02	◇	*"Toward Dynamic Locomotion and Loco-manipulation on Humanoid Robots via Model Predictive Control"* Invited talk, USC Robotics Seminar
2022/10	◇	*"Balancing Control and Pose Optimization for Wheel-legged Robots Navigating High Obstacles"* Oral Presentation, IEEE International Conference on Intelligent Robots and Systems (IROS)
2021/11	◇	*"Force-and-moment-based Model Predictive Control for Achieving Highly Dynamic Locomotion on Bipedal Robots"* Oral Presentation, IEEE Conference on Decision and Control (CDC)

Mentoring

Graduate Students:

2024-2025	◇	Dakota Mercer, M.S. in Mechanical Engineering, USC Project: *Hierarchical-Optimization-based Control for Dynamic Stair Climbing on Bipedal Robots*
	◇	Ziwei Duan, M.S. in Computer Science, USC Project: *Gait-frequency Net: A Data-driven Approach to Enhance Bipedal Locomotion Control*
2023-2024	◇	Zhanhao Le, M.S. in Mechanical Engineering, USC Project: *Bipedal Robot Push Recovery via Hierarchical-MPC* Now: Prospective Ph.D. student
	◇	Omar Kolt, M.S. in Mechanical Engineering, USC. Project: *Control and Software Infrastructure of HECTOR Humanoid* Now: Software Engineer at Tesla, Optimus Team
	◇	Omar Berra, M.S. in Mechanical Engineering, USC Project: *Design and Whole-body Control of Bipedal Wheel-legged Robot* Now: Testing Engineer at the Boring Company
2022-2023	◇	Han Gong, M.S. in Mechanical Engineering, USC Project: *Terrain-aware Bipedal Robot Control and Simulation Design* Now: Ph.D. student at UMass Amherst
2021-2022	◇	Xinyu Zhu, M.S. in Mechanical Engineering, USC Project: *Uneven Terrain Locomotion of Wheel-legged Robots via Whole-body Control* Now: Engineer at Xiaomi Robotics Lab
	◇	Tiansheng Wu, M.S. in Mechanical Engineering, USC Project: *Terrain-aware Trajectory Optimization and Control on Bipedal Robots*

Undergraduate Students:

2024-2025	◇	Rodrigo Andrade, B.S. in Mechanical Engineering, USC Project: *Design-control Co-optimization of Mid-size Humanoid Robot*
	◇	Nathan Chun, B.S. in Mechanical Engineering, USC Project: *Optimal Control of High-degree-of-freedom Mechanical Systems*
	◇	Bill Ouyang, B.S. in Mechanical Engineering, USC

2022-2024	◇ Mana Shah, B.S. in Mechanical Engineering, USC
	Project: *Design of a Mini Humanoid Robot Platform*

High School Students:

Summer 2024	◇ Chinmay Ramamurthy, Ethan Le, Ian Chen, Perceiver Summer Research
	Project: *Modeling and Control of Series Elastic Actuators for Knee Exoskeletons*
	◇ Jonathan Li, Ted Han, Sophia Fu, Perceiver Summer Research
	Project: *Package Transferring with UAV and Passive Manipulation Mechanism*
Summer 2022	◇ Dylan Dharwadkar, USC SHINE Program
	Project: *Swing Trajectory Design and Control in Bipedal Robot Walking*