Kehan Long

Email: k3long@ucsd.edu | Website: https://kehanlong.github.io/ | Github | Linkedin

Education

• Ph.D., Computational Mathematics	2025 (expected)
University of California, San Diego	La Jolla, CA
• M.S., Mathematics	2022
University of California, San Diego	La Jolla, CA
• B.S., Applied Mathematics	2019
University of Illinois, Urbana-Champaign	Champaign, IL

Research Interests

Relevant Fields: Robotics, Deep Learning, Optimization and Control, Task and Motion Planning, Uncertainty Quantification, Reinforcement Learning

- Sensor-based motion planning and safe control for robots in unknown dynamic environments
- Model-based reinforcement learning with stability and safety guarantees for robot control systems
- Theoretical and practical aspects of distributionally robust optimization and control

EXPERIENCE

- Graduate Researcher University of California, San Diego 2020 - Present Advisors: Nikolay Atanasov, Jorge Cortes, and Melvin Leok Working on various aspects of robotics, including safe motion planning and control, learning-based control, optimization-based control, decision-making under uncertainty, distributionally robust optimization, etc. • Research Resident Toyota Research Institute of North America Advisors: Georgios Fainekos and Bardh Hoxha May - Sep 2024 Working on modeling the geometry and developing safe control strategies for continuum robots. Working on developing safe motion planning algorithms for tractor-trailer systems.
- Student Researcher 2018 - 2019 Advisor: Naira Hovakimyan Working on implementations of deep reinforcement learning algorithms.

Honors & Awards

• Robotics: Science and Systems (RSS) Pioneers Selected as one of the top early-career researchers in robotics worldwide [webpage]

PUBLICATIONS

* indicates equal contribution

Preprints

- P3. K. Long, J. Cortés, N. Atanasov, "Certifying Stability of Reinforcement Learning Policies using Generalized Lyapunov Functions," under review, 2025. [arxiv]
- P2. K. Long, K. M. B. Lee, N. Raicevic, N. Attasseri, M. Leok, N. Atanasov, "Neural Configuration-Space Barriers for Manipulation Planning and Control," under review, 2025. [arxiv] [website]
- P1. K. Long, H. Parwana, G. Fainekos, B. Hoxha, H. Okamoto, N. Atanasov, "Neural Configuration Distance Function for Continuum Robot Control," under review, 2025. [arxiv] [code]

Journals

J5. K. Long, Y. Yi, Z. Dai, S. Herbert, J. Cortés and N. Atanasov, "Sensor-Based Distributionally Robust Control for Safe Robot Navigation in Dynamic Environments," International Journal of Robotics Research (IJRR), to appear. [arxiv] [code] [website]

University of Illinois, Urbana-Champaign

RSS, 2025

- J4. K. Long, J. Cortés and N. Atanasov, "Distributionally Robust Policy and Lyapunov-Certificate Learning," IEEE Open Journal of Control Systems (OJ-CSYS), vol. 3, pp. 375-388, 2024. [arxiv] [code]
- J3. P. Mestres, **K. Long**, N. Atanasov and J. Cortés, "Feasibility and Regularity Analysis of Distributionally Robust Safe Stabilizing Controllers," IEEE Control Systems Letters (L-CSS), vol. 8, pp. 91-96, 2024.[arxiv]
- J2. K. Long, V. Dhiman, M. Leok, J. Cortés and N. Atanasov, "Safe Control Synthesis With Uncertain Dynamics and Constraints," IEEE Robotics and Automation Letters (RA-L), 7(3), pp. 7295-7302, 2022.[arxiv]
- J1. K. Long^{*}, C. Qian^{*}, J. Cortés and N. Atanasov, "Learning Barrier Functions With Memory for Robust Safe Navigation," IEEE Robotics and Automation Letters (RA-L), 6(3), pp. 4931-4938, 2021. [arxiv]

Conferences

- C5. P. Mestres, **K. Long**, M. Leok, N. Atanasov and J. Cortés, "Stabilization of Nonlinear Systems through Control Barrier Functions," IEEE Conference on Decision and Control (CDC), 2024. [arxiv] [code]
- C4. K. Long, K. Tran, M. Leok and N. Atanasov, "Safe Stabilizing Control for Polygonal Robots in Dynamic Elliptical Environments," American Control Conference (ACC), 2024. [arxiv]
- C3. K. Long, Y. Yi, J. Cortés and N. Atanasov, "Distributionally Robust Lyapunov Function Search Under Uncertainty," Learning for Dynamics and Control Conference (L4DC), 2023. [arxiv] [code]
- C2. K. Long^{*}, Y. Yi^{*}, J. Cortés and N. Atanasov, "Safe and Stable Control Synthesis for Uncertain System Models via Distributionally Robust Optimization," American Control Conference (ACC), 2023. [arxiv]
- C1. HJ. Yoon, H. Chen, K. Long, H. Zhang, A. Gahlawat, D. Lee and N. Hovakimyan, "Learning to Communicate: A Machine Learning Framework for Heterogeneous Multi-Agent Robotic Systems," AIAA Scitech Forums, 2019. [arxiv]

Workshops

W1. David Minkwan Kim, K. M. Brian Lee, Yong Hyeok Seo, Nikola Raicevic, Runfa Blark Li, Kehan Long, Chan Seon Yoon, Dong Min Kang, Byeong Jo Lim, Young Pyoung Kim, Nikolay Atanasov, Truong Nguyen, Se Woong Jun, Young Wook Kim, "A Shared-Autonomy Construction Robotic System for Overhead Works," workshop on Future of Construction at ICRA 2025. [video]

Seminars & Talks

- T3. "Sensor-Based Distributionally Robust Control Barrier Function for Safe Robot Navigation," 44th Southern California Control Workshop, USC, Los Angeles, CA, Nov. 2024.
- T2. "Introduction to Control Lyapunov Functions and Control Barrier Functions and its Applications," MAE 207 Guest Lectures, UC San Diego, La Jolla, CA, Nov. 2021.
- T1. "Safe and Stable Controller Synthesis for Robotic Systems with Errors in Measurements and System Dynamics," 38th Southern California Control Workshop, UC Irvine, Irvine, CA, Oct. 2021.

PROFESSIONAL ACTIVITIES

- Journal Reviewer: IEEE Transactions on Robotics, International Journal of Robotics Research, IEEE Robotics and Automation Letter, IEEE Transactions on Automatic Control, IEEE/ASME Transactions on Mechatronics, IEEE Open Journal of Control Systems, IEEE Control System Letters, Advanced Robotics, Elsevier Mathematics and Computers in Simulation.
- Conference Reviewer: Robotics: Science and Systems (RSS) (2023, 2025), IEEE International Conference on Robotics and Automation (ICRA) (2021 - present), Conference on Robot Learning (CoRL) (2025), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (2021 - present), IEEE International Conference on Decision and Control (CDC) (2022 - present), American Control Conference

(ACC) (2022 - present), IEEE Conference on Control Technology and Application (CCTA) (2025 - present), ACM International Conference on Hybrid Systems: Computation and Control (HSCC) (2023).

- Session Chair: IEEE International Conference on Robotics and Automation (ICRA) 2021.
- Society Membership: IEEE Student Membership (2021 present), IEEE Robotics and Automation Society (2023 present), IEEE Control Systems Society (2024 present).

TEACHING EXPERIENCE

• Teaching Assistant, MATH 171B: Intro Numerical Optimization: Nonlinear Programming	Spring 2022
• Teaching Assistant, MATH 171A: Intro Numerical Optimization: Linear Programming	Winter 2022
• Teaching Assistant, MATH 20E: Vector Calculus	Fall 2021
• Teaching Assistant, MATH 193A: Actuarial Mathematics	Summer 2021
• Teaching Assistant, MATH 170A: Intro Numerical Analysis: Linear Algebra	Fall 2020
• Teaching Assistant, MATH 20D: Introduction to Differential Equations	Summer 2020
• Teaching Assistant, MATH 18: Linear Algebra	Spring 2020
• Teaching Assistant, MATH 20B: Calculus for Science and Engineering	Winter 2020
• Teaching Assistant, MATH 20A: Calculus for Science and Engineering	Fall 2019
Mentoring	
• Ph.D. Student:	
Nikola Raicevic (UCSD)	2024
M.S. Student:	
Viswesh Nagaswamy Rajesh (UCSD)	2025
Niyas Attasseri (UCSD)	2024-2025
Kevin Shih (UCSD)	2024
Fengrui Zhang (UCSD)	2023
Yinzhuang Yi (UCSD)	2022 - 2023
Undergraduate Student:	
Kushagra Mishra (UCSD)	2025
Darren Ng (UCSD)	2025
Xuezhou Xu (National University of Singapore)	Summer 2023

TECHNICAL SKILLS

• Programming Languages: Python, C++, MATLAB

• Machine Learning and Robotics: PyTorch, JAX, ROS, ROS2, CasADi, Gazebo, PyBullet

• Tools: Linux, LATEX, Git