Anushri Dixit

anushri.dixit@princeton.edu
41 Olden Street, Princeton, NJ, 08540
anushridixit.com
https://www.linkedin.com/in/anushri-dixit-675a40b7/

Education

2017 – 2023 **Ph.D., California Institute of Technology** in Control and Dynamical Systems,
Thesis title: *Risk-Aware Planning and Control in Extreme Environments*.

2013 – 2017 **B.Sc., Georgia Institute of Technology** in Electrical Engineering, Highest Honors,
Thesis title: *System Dynamics-Based Mapping for Closed Loop Control*.

Research Interests

Stochastic motion planning, robotics, control theory, safety-critical systems, probability theory.

Appointments

July 2024 – **Assistant Professor, University of California, Los Angeles**
Tenure-Track Faculty in the Department of Mechanical & Aerospace Engineering

March 2023 – May 2024 **Postdoctoral Researcher, Princeton University**

Research Publications (* indicates equal contribution)

Journal Articles

[J1] P. Akella, **A. Dixit**, M. Ahmadi, J. W. Burdick, and A. D. Ames, "Sample-based bounds for coherent risk measures: Applications to policy synthesis and verification," *Accepted to Artificaial Intelligence*, 2024. DOI: 10.48550/ARXIV.2204.09833. [Online]. Available: https://arxiv.org/abs/2204.09833.

[J2] **A. Dixit***, D. D. Fan*, K. Otsu, S. Dey, A.-A. Agha-Mohammadi, and J. W. Burdick, "STEP: Stochastic Traversability Evaluation and Planning for Risk-Aware Off-road Navigation; Results from the DARPA Subterranean Challenge," *Field Robotics*, vol. 4, no. 1, pp. 182–210, 2024, ISSN: 2771-3989. DOI: 10.55417/fr.2024006.

[J3] **A. Dixit**, M. Ahmadi, and J. W. Burdick, "Risk-averse receding horizon motion planning for obstacle avoidance using coherent risk measures," *Artificial Intelligence*, vol. 325, p. 104 018, 2023. DOI: 10.1016/j.artint.2023.104018.

[J4] A. Agha, K. Otsu, B. Morrell, *et al.*, "NeBula: TEAM CoSTAR's Robotic Autonomy Solution that Won Phase II of DARPA Subterranean Challenge," *Field Robotics*, vol. 2, pp. 1432–1506, Mar. 2022. DOI: 10.55417/fr.2022047.

[J5] **A. Dixit**, M. Ahmadi, and J. W. Burdick, "Distributionally robust model predictive control with total variation distance," *IEEE Control Systems Letters*, vol. 6, pp. 3325–3330, 2022. DOI: 10.1109/LCSYS.2022.3184921, Invited Paper at CDC 2022.

[J6] S. X. Wei*, **A. Dixit***, S. Tomar, and J. W. Burdick, "Moving obstacle avoidance: A data-driven risk-aware approach," *IEEE Control Systems Letters*, vol. 7, pp. 289–294, 2022. DOI: 10.1109/LCSYS.2022.3181191, Outstanding Student Paper Award at CDC 2022.

[J7] A. Agha, K. Otsu, B. Morrell, *et al.*, "NeBula: Quest for robotic autonomy in challenging environments; TEAM CoSTAR at the DARPA subterranean challenge," *Accepted to Journal of Field Robotics*, 2021. [Online]. Available: https://arxiv.org/abs/2103.11470.

Conference Proceedings

[C1] A. Z. Ren, **A. Dixit**, A. Bodrova, S. Singh, S. Tu, N. Brown, P. Xu, L. Takayama, F. Xia, J. Varley, Z. Xu, D. Sadigh, A. Zeng, and A. Majumdar, "Robots that ask for help: Uncertainty alignment for large language model planners," in *Conference on Robot Learning (CoRL)*, 2023. arXiv: 2307.01928 [cs.RO], Best Student Paper Award.

[C2] S. Dey, D. Fan, R. Schmid, **A. Dixit**, K. Otsu, T. Touma, A. F. Schilling, and A.-a. Agha-mohammadi, "PrePARE: predictive proprioception for agile failure event detection in robotic exploration of extreme terrains," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022.

[C3] **A. Dixit***, L. Lindemann*, S. Wei, M. Cleaveland, G. J. Pappas, and J. W. Burdick, "Adaptive conformal prediction for motion planning among dynamic agents," in *Learning for Dynamics and Control (L4DC) Conference*, 2022. [Online]. Available: https://arxiv.org/pdf/2212.00278.pdf.

[C4] M. Ahmadi, **A. Dixit**, J. W. Burdick, and A. D. Ames, "Risk-averse stochastic shortest path planning," in *Conference on Decision and Control*, 2021. [Online]. Available: https://arxiv.org/abs/2103.14727, Invited Paper at CDC 2021.

[C5] **A. Dixit**, M. Ahmadi, and J. W. Burdick, "Risk-Sensitive Motion Planning using Entropic Value-at-Risk," in *European Control Conference*, 2021. [Online]. Available: https://arxiv.org/abs/2011.11211.

[C6] D. D. Fan*, K. Otsu*, Y. Kubo, **A. Dixit**, J. Burdick, and A.-A. Agha-Mohammadi, "STEP: Stochastic traversability evaluation and planning for safe off-road navigation," in *Robotics: Science and Systems*, 2021. [Online]. Available: https://arxiv.org/abs/2103.02828.

Preprints

[P1] P. Akella*, **A. Dixit***, M. Ahmadi, L. Lindemann, M. P. Chapman, G. J. Pappas, A. D. Ames, and J. W. Burdick, *Risk-aware robotics: Tail risk measures in planning, control, and verification*, 2024. arXiv: 2403.18972 [cs.RO].

[P2] **A. Dixit**, Z. Mei, M. Booker, M. Storey-Matsutani, A. Z. Ren, and A. Majumdar, *Perceive with confidence: Statistical safety assurances for navigation with learning-based perception*, 2024. arXiv: 2403.08185 [cs.RO].

[P3] A. Z. Ren, J. Clark, **A. Dixit**, M. Itkina, A. Majumdar, and D. Sadigh, *Explore until confident: Efficient exploration for embodied question answering*, 2024. arXiv: 2403.15941 [cs.RO].

[P4] **A. Dixit** and J. W. Burdick, *The Kinematics of Tracked Vehicles via the Power Dissipation Method*, 2020. [Online]. Available: https://arxiv.org/abs/2004.05176.

Teaching Experience

2024	**Guest Lecture (MAE 248, UC San Diego)**. Gave a tutorial on Conformal Prediction and its use for uncertainty-aware safe planning for the class on *Safety for Autonomous Systems*.
2023	**Guest Lecture (COS 597R, Princeton University)**. Gave a short guest lecture on uncertainty alignment for LLM-based planners for the class *Inference in Action: Probabilistic Topics in Reinforcement Learning*.
2021-2022	**Graduate Teaching Assistant, Advanced Robotics (ME 234a and ME 243b)**. Helped design part of the course and taught 3 weeks (9+ hours) of lectures on MPC. Held laboratory sessions and office hours for students and graded assignments.
2019	**Summer Undergraduate Research Fellowships (SURF) program Mentor**. Mentored undergraduate students to build an autonomous RC car for the DARPA Subterranean Challenge.
2018 – 2019	**Graduate Teaching Assistant, Robotics (ME 133a and ME 134b)**. Held laboratory sessions and office hours for 30+ students and graded assignments.
2015 – 2017	**Undergraduate Teaching Assistant, Differential Equations (MATH 2552)**. Held recitation sessions for 30+ students and received positive feedback from students and lecturer. Proctored and graded quizzes as well as exams.

Awards and Fellowships

2023	**Best Student Paper Award at the Conference on Robot Learning (as a co-author) [C1]**
2022	**Outstanding Service as a Reviewer for IEEE Control System Letters**
	Outstanding Student Paper Award at IEEE Conference on Decision and Control (with Skylar Wei) [J6]
	University of Chicago Rising Star in Data Science
	Southern California Robotics Symposium Rising Star
2021	**DE Shaw Zenith Fellowship**
2015	**President's Undergraduate Research Award**
2013 - 2014	**Faculty Honors, Georgia Tech**

Invited Talks

	Robot Safety and Generalization in the Era of Foundation Models
March 2024	University of Maryland, *Microsoft Future Leaders in Robotics and AI Seminar Series*
	Perceive with Confidence: Statistical Safety Assurances for Vision-Based Navigation
March 2024	*Talking Robotics*
	Planning with Confidence: Uncertainty Quantification for Safety-Critical Tasks
February 2024	University of California, San Diego, *Guest Lecture - Safety for Autonomous Systems*
	Robots that Ask for Help: Uncertainty Alignment for LLM Planners

Invited Talks (continued)

November 2023	Princeton University, *Guest Lecture - Inference in Action: Probabilistic Topics in Reinforcement Learning*
	Risk-Aware Control and Planning in Unstructured Environments
August 2023	University of Washington, Seattle, *Control-X Seminar*
November 2022	University of Chicago, *Rising Stars in Data Science*
September 2022	University of California, Los Angeles, *Southern California Robotics Symposium*
	Distributionally Robust Model Predictive Control With Total Variation Distance
December 2022	Conference on Decision and Control, *Invited Session*
	Risk-Averse Stochastic Shortest Path Planning
December 2021	Conference on Decision and Control, *Invited Session*
	Risk-Sensitive Motion Planning using Entropic Value-at-Risk
June 2021	European Control Conference

Service

2023	Co-organizer of the Princeton Robotics Seminar.
	Co-organizer of 2023 Workshop on Out-of-Distribution Generalization in Robotics at the Conference on Robot Learning (CoRL).
2019 – Present	**Reviewer (Journals):** Automatica, Field Robotics, IEEE Control Systems Letters (L-CSS), Journal of Aerospace Information Systems, IEEE Transactions on Robotics (T-RO), IEEE Transactions on Automatic Control (TAC).
	Reviewer (Conferences): Conference on Decision and Control (CDC), American Control Conference (ACC), IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Learning for Dynamics & Control Conference (L4DC), Robotics: Science and Systems (RSS).
	Reviewer (Workshops): Bridging the Lab-to-Real Gap (ICRA 2023), Out-of-Distribution Generalization in Robotics (CoRL 2023).

Outreach

2023	**Mentor, Asian American Academy of Science and Engineering (AAASE) Summer Academy** Mentored five high-school students for a project on search and rescue robotics.
2019 – 2021	**Visiting Scientist, Caltech Center for Teaching, Learning, and Outreach** Provided hands-on science lessons at a elementary school in Pasadena as a part of a teaching program called Visiting Scientists.
2015 – 2016	**Chief Technical Officer, Robogals Global** Oversaw the maintenance and development of the myRobogals portal, Robogals Global website while managing a software team of 4-5 engineers.