

Anushri Dixit

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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 Artificial 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. 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*, 2023. 🌐 [Online]. Available: <https://arxiv.org/pdf/2212.00278.pdf>.
- [C2] 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**.
- [C3] 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.
- [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. [\[Online\]](https://arxiv.org/abs/2011.11211). 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. [\[Online\]](https://arxiv.org/abs/2103.02828). 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.R0].
- [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.R0].
- [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.R0].
- [P4] **A. Dixit** and J. W. Burdick, *The Kinematics of Tracked Vehicles via the Power Dissipation Method*, 2020. [\[Online\]](https://arxiv.org/abs/2004.05176). 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) [C2]**
- 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

- March 2024 **Robot Safety and Generalization in the Era of Foundation Models**
University of Maryland, *Microsoft Future Leaders in Robotics and AI Seminar Series*
- March 2024 **Perceive with Confidence: Statistical Safety Assurances for Vision-Based Navigation**
Talking Robotics
- February 2024 **Planning with Confidence: Uncertainty Quantification for Safety-Critical Tasks**
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, <i>Guest Lecture - Inference in Action: Probabilistic Topics in Reinforcement Learning</i> Risk-Aware Control and Planning in Unstructured Environments
August 2023	University of Washington, Seattle, <i>Control-X Seminar</i>
November 2022	University of Chicago, <i>Rising Stars in Data Science</i>
September 2022	University of California, Los Angeles, <i>Southern California Robotics Symposium</i> Distributionally Robust Model Predictive Control With Total Variation Distance
December 2022	Conference on Decision and Control, <i>Invited Session</i> Risk-Averse Stochastic Shortest Path Planning
December 2021	Conference on Decision and Control, <i>Invited Session</i> 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). 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

Summer 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.