

Anushri Dixit

✉ anushri.dixit@princeton.edu
🔗 anushridixit.com

🏠 41 Olden Street, Princeton, NJ, 08540
🌐 <https://www.linkedin.com/in/anushri-dixit-675a40b7/>

Education

- 2017 – 2023 **Ph.D., California Institute of Technology** in Computing and Mathematical Sciences,
Option: 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.

Research/Work Experience

- 2023 – **Postdoctoral Researcher, Intelligent Robot Motion Laboratory**
Mentor: Prof. Anirudha Majumdar
Proposed uncertainty quantification techniques for motion planning in unstructured environments and with language instructions.
- 2017 – 2023 **Graduate Research Assistant (RA)**
Mentor: Prof. Joel W. Burdick
Developed a novel risk-aware model predictive control (MPC) framework through the use of coherent risk measures that allow a continuous transition between being averse or neutral to risk and provide distributional robustness based on the risk-level chosen.
Deployed this framework in extreme, unstructured environments for search and rescue operations.
JPL collaboration: Worked on motion planning over extreme terrain as a member of Team CoSTAR (Collaborative SubTerranean Autonomous Resilient Robots) participating in the DARPA Subterranean Challenge.
- 2015 – 2017 **Undergraduate RA, Intelligent Vision and Automation Laboratory**
Mentor: Prof. Patricio Vela
Studied the control and planning of legged locomotion in quadrupedal robots.
Received President's Undergraduate Research Award in Summer 2015 for the design and implementation of a quadruped.
- 2016 **Summer Intern, DELL**
Analyzed and drove recommendations for contextual awareness using sensors.
Tested ambient light sensors and human proximity sensors so that they could be integrated with the Intel Sensor Hub.

Teaching Experience

- 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 featured in <https://www.caltech.edu/about/news/caltech-undergrads-build-robot-darpa-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.

Relevant Coursework

- 📌 **Robotics and Control:** Robotics, Nonlinear Control, Optimal Control and Estimation, Computational Computer Vision, Introduction to AI, Data Structures and Algorithms,
- 📌 **Applied Math:** Mathematical Optimization, Linear Analysis, Probability in High Dimensions, Probability Theory and Stochastic Processes,

Relevant Coursework (continued)

- Machine Learning: Predictive Control and Neural Network Theory, Machine Learning and Data Mining, Data-Driven Modeling of Dynamical Systems.

Awards and Fellowships

- 2022
 - Outstanding Service as a Reviewer for IEEE Control System Letters
 - Outstanding Student Paper Award at IEEE Conference on Decision and Control
 - 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

- August 2023
 - University of Washington, Seattle, Control-X Seminar
- March 2023
 - University of California, Los Angeles, Mechanical & Aerospace Engineering Department Seminar
 - University of Michigan, Ann Arbor, Robotics Department Seminar
 - University of Pennsylvania, Electrical & Systems Engineering Department Seminar
- February 2023
 - University of Texas, Austin, Aerospace Engineering & Engineering Mechanics Department Seminar
- November 2022
 - University of Chicago, Data Science Institute
- September 2022
 - University of California, Los Angeles, Southern California Robotics Symposium
- August 2022
 - Princeton University, Intelligent Robot Motion Lab Seminar

Service

- 2019 – Present
 - Reviewer (Journals): Automatica, Field Robotics, IEEE Control Systems Letters (L-CSS), Journal of Aerospace Information Systems.
 - 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).
- 2023
 - Organizer of the Princeton Robotics Seminar.
 - Organizer of 2023 Workshop on Out-of-Distribution Generalization in Robotics at the Conference on Robot Learning (CoRL).

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.

Research Publications (* indicates equal contribution)

Journal Articles

- Dixit, A., Ahmadi, M., & Burdick, J. W. (2023). Risk-averse receding horizon motion planning for obstacle avoidance using coherent risk measures. *Accepted to Artificial Intelligence Journal*.
- Dixit*, A., Fan*, D. D., Otsu, K., Dey, S., Agha-Mohammadi, A.-A., & Burdick, J. W. (2023). STEP: Stochastic Traversability Evaluation and Planning for Risk-Aware Off-road Navigation; Results from the DARPA Subterranean Challenge. *Accepted to Field Robotics*.
- Dixit, A., Ahmadi, M., & Burdick, J. W. (2022). Distributionally robust model predictive control with total variation distance. *IEEE Control Systems Letters*, 6, 3325–3330. doi:10.1109/LCSYS.2022.3184921. (Invited Paper at CDC 2022)

- 4 Wei*, S. X., **Dixit***, A., Tomar, S., & Burdick, J. W. (2022). Moving obstacle avoidance: A data-driven risk-aware approach. *IEEE Control Systems Letters*, 7, 289–294. doi:10.1109/LCSYS.2022.3181191. (Outstanding Student Paper Award at CDC 2022)
- 5 Agha, A., Otsu, K., Morrell, B., Fan, D. D., Thakker, R., Santamaria-Navarro, A., ... Burdick, J. (2021). NeBula: Quest for robotic autonomy in challenging environments; TEAM CoSTAR at the DARPA subterranean challenge. *Journal Field Robotics*. Retrieved from <https://arxiv.org/abs/2103.11470>

Journal Articles under review

- 1 Akella, P., **Dixit**, A., Ahmadi, M., Burdick, J. W., & Ames, A. D. (2022). *Sample-based bounds for coherent risk measures: Applications to policy synthesis and verification*. doi:10.48550/ARXIV.2204.09833

Conference Proceedings

- 1 Ren, A. Z., **Dixit**, A., Bodrova, A., Singh, S., Tu, S., Brown, N., ... Majumdar, A. (2023). Robots that ask for help: Uncertainty alignment for large language model planners. In *Conference on Robot Learning (CoRL)*. arXiv: 2307.01928 [cs.RO]. (Oral Presentation)
- 2 Dey, S., Fan, D., Schmid, R., **Dixit**, A., Otsu, K., Touma, T., ... Agha-mohammadi, A.-a. (2022). 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)*.
- 3 **Dixit***, A., Lindemann*, L., Wei, S., Cleaveland, M., Pappas, G. J., & Burdick, J. W. (2022). Adaptive conformal prediction for motion planning among dynamic agents. In *Learning for Dynamics and Control (L4DC) Conference*. Retrieved from <https://arxiv.org/pdf/2212.00278.pdf>
- 4 Ahmadi, M., **Dixit**, A., Burdick, J. W., & Ames, A. D. (2021). Risk-averse stochastic shortest path planning. In *Conference on Decision and Control*. Retrieved from <https://arxiv.org/abs/2103.14727>. (Invited Paper at CDC 2021)
- 5 **Dixit**, A., Ahmadi, M., & Burdick, J. W. (2021). Risk-Sensitive Motion Planning using Entropic Value-at-Risk. In *European control conference*. Retrieved from <https://arxiv.org/abs/2011.11211>
- 6 Fan*, D. D., Otsu*, K., Kubo, Y., **Dixit**, A., Burdick, J., & Agha-Mohammadi, A.-A. (2021). STEP: Stochastic traversability evaluation and planning for safe off-road navigation. In *Robotics: Science and Systems*. Retrieved from <https://arxiv.org/abs/2103.02828>

Preprints and Working Papers

- 1 **Dixit***, A., Akella*, P., Ahmadi, M., Lindemann, L., Chapman, M., Pappas, G. J., ... Ames, A. (2022). Risk-Aware Planning, Control, and Verification: A Review of Tail Risk Measures in Robotics.
- 2 **Dixit**, A., & Burdick, J. W. (2020). The Kinematics of Tracked Vehicles via the Power Dissipation Method. Retrieved from <https://arxiv.org/abs/2004.05176>