

Ryan Kazuo Cosner

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APPOINTMENTS

Tufts University

Glenn R. Stevens Assistant Professor, Mechanical Engineering

2026– Present

Visiting Assistant Professor, Mechanical Engineering

2025–2026

EDUCATION

California Institute of Technology

PhD, Mechanical Engineering

2019–2025

Dissertation:

Dynamic Safety Under Uncertainty: A Control Barrier Function Approach.

MS, Mechanical Engineering

2019–2021

University of California, Berkeley

BS, Mechanical Engineering

2015–2019

PAST POSITIONS

Nvidia Corporation

Research Intern, Advisor: Prof. Marco Pavone

Summer 2022

Squishy Robotics

Mechatronics Intern, Advisor: Prof. Alice Agogino

Summer 2019

Ford Motor Company

Vehicle Evaluation and Verification Intern

Summer 2018

ACADEMIC PUBLICATIONS

* indicates equal contribution

Journal Articles

- [1] **Ryan K. Cosner**, Preston Culbertson, Aaron D. Ames. *Bounding Stochastic Safety: Leveraging Freedman's Inequality with Discrete-Time Control Barrier Functions*. IEEE, Control Systems Letters (CSL), 2024. ([pdf](#))
- [2] Max H. Cohen, **Ryan K. Cosner**, Aaron D. Ames. *Constructive Safety-Critical Control: Synthesizing Control Barrier Functions for Partially Feedback Linearizable Systems*. IEEE Control Systems Letters, 2024. ([pdf](#))

- [3] Devansh R. Agrawal*, Hardik Parwana*, **Ryan K Cosner***, Ugo Rosolia, Aaron D. Ames, Dimitra Panagou. *A Constructive Method for Designing Safe Multirate Control for Differentially-Flat Systems*. IEEE Control Systems Letters (CSL), 2021. ([pdf](#))
- [4] Tamas G. Molnar, **Ryan K. Cosner**, Andrew W. Singletary, Wyatt Ubellacker, Aaron D. Ames. *Model-Free Safety-Critical Control for Robotic Systems*. IEEE Robotics and Automation Letters (RAL), 2021. ([pdf](#))
- [5] Kunal Garg, **Ryan K. Cosner**, Ugo Rosolia, Aaron D. Ames, Dimitra Panagou. *Multi-rate Control Design under Input Constraints via Fixed-Time Barrier Functions*. IEEE Control Systems Letters (CSL), 2021. ([pdf](#))

Conference Papers

- [1] Gilbert Bahati, Ryan M. Bena, Meg Wilkinson, Pol Mestres, **Ryan K. Cosner**, Aaron D. Ames. *Risk-Aware Safety Filters with Poisson Safety Functions and Laplace Guidance Fields*. American Control Conference (ACC), 2026. ([pdf](#))
- [2] Pol Mestres, Blake Werner, **Ryan K. Cosner**, Aaron D. Ames. *Probabilistic Control Barrier Functions: Safety in Probability for Discrete-Time Stochastic Systems*. American Control Conference (ACC), 2026. ([pdf](#))
- [3] Gilbert Bahati, **Ryan K. Cosner**, Max H. Cosner, Ryan M. Bena, Aaron D. Ames. *Control Barrier Function Synthesis for Nonlinear Systems with Dual Relative Degree*. Conference on Decision and Control (CDC), 2025. ([pdf](#))
- [4] Ryan M. Bena, Gilbert Bahati, Blake Werner, **Ryan K. Cosner**, Lizhi Yang, Aaron D. Ames. *Geometry-Aware Predictive Safety Filters on Humanoids: From Poisson Safety Functions to CBF Constrained MPC*. International Conference on Humanoid Robots (Humanoids), 2025. ([pdf](#))
- [5] Alexandre Capone, **Ryan K. Cosner**, Aaron D. Ames, Sandra Hirche. *Learning Safe Control via On-the-Fly Bandit Exploration*. International Conference on Machine Learning (ICML), 2025. ([pdf](#))
- [6] Lizhi Yang*, Blake Werner*, **Ryan K. Cosner**, David Fridoviech-Keil, Preston Culbertson, Aaron D. Ames. *SHIELD: Safety on Humanoids via CBFs in Expectation on Learned Dynamics*. International Conference on Intelligent Robots and Systems (IROS), 2025. ([pdf](#))
- [7] **Ryan K. Cosner**, Igor Sadalski, Jana K. Woo, Preston Culbertson, Aaron D. Ames. *Generative Modeling of Residuals for Real-Time Risk-Sensitive Safety with Discrete-Time Control Barrier Functions*. International Conference on Robotics and Automation (ICRA), 2024. ([pdf](#))
- [8] Preston Culbertson, **Ryan K. Cosner**, Maegan Tucker, Aaron D. Ames. *Input-to-State Stability in Probability*. Conference on Decision and Control (CDC), 2024. ([pdf](#))

- [9] **Ryan K. Cosner**, Preston Culbertson, Andrew J. Taylor, Aaron D. Ames. *Robust Safety under Stochastic Uncertainty with Discrete-Time Control Barrier Functions*. Robotics: Science and Systems (RSS), 2023. ([pdf](#))
- [10] **Ryan K. Cosner**, Yuxiao Chen, Karen Leung, Marco Pavone. *Learning Responsibility Allocations for Safe Human-Robot Interaction with Applications to Autonomous Driving*. International Conference on Robotics and Automation (ICRA), 2023. ([pdf](#))
- [11] Shushant Veer, Karen Leung, **Ryan K. Cosner**, Yuxiao Chen, Marco Pavone. *Receding Horizon Planning with Rule Hierarchies for Autonomous Vehicles*. International Conference on Robotics and Automation (ICRA), 2023. ([pdf](#))
- [12] **Ryan K. Cosner**, Yisong Yue, Aaron D. Ames. *End-to-End Imitation Learning with Safety Guarantees using Control Barrier Functions*. Conference on Decision and Control (CDC), 2022. ([pdf](#))
- [13] Andrew J. Taylor*, Victor D. Dorobantu*, **Ryan K. Cosner***, Yisong Yue, Aaron D. Ames. *Safety of Sampled-Data Systems with Control Barrier Functions via Approximate Discrete Time Models*. Conference on Decision and Control (CDC), 2022. ([pdf](#))
- [14] **Ryan K. Cosner**, Maegan Tucker, Andrew J. Taylor, Kejun Li, Tamas G. Molnar, Anil Alan, Gabor Orosz, Yisong Yue, Aaron D. Ames. *Safety-Aware Preference-Based Learning for Safety-Critical Control*. Learning for Dynamics and Control Conference (L4DC), 2022. ([pdf](#))
- [15] **Ryan K. Cosner***, Ivan D. Jimenez Rodriguez*, Tamas G. Molnar, Wyatt Ubellacker, Yisong Yue, Aaron D. Ames, Katherine L. Bouman. *Self-Supervised Online Learning for Safety-Critical Control using Stereo Vision*. International Conference on Robotics and Automation (ICRA), 2022. ([pdf](#))
- [16] **Ryan K. Cosner**, Andrew W. Singletary, Andrew J. Taylor, Tamas G. Molnar, Aaron D. Ames. *Measurement-Robust Control Barrier Functions: Certainty in Safety with Uncertainty in State*. International Conference on Intelligent Robots and Systems (IROS), 2021. ([pdf](#))
- [17] Noel Csomay-Shanklin*, **Ryan K. Cosner***, Min Dai*, Andrew J. Taylor, Aaron D. Ames. *Episodic Learning for Safe Bipedal Locomotion with Control Barrier Functions and Projection-to-State Safety*. Learning for Dynamics and Control Conference (L4DC), 2021. ([pdf](#))
- [18] Sarah Dean, Andrew J. Taylor, **Ryan K. Cosner**, Benjamin Recht, and Aaron D. Ames. *Guaranteeing Safety of Learned Perception Modules via Measurement-Robust Control Barrier Functions*. Conference on Robotic Learning (CoRL), 2020. ([pdf](#))
Best Student Paper Finalist.

Patents

- [1] **Ryan K. Cosner**, Yuxiao Chen, Karen Leung, Marco Pavone. *Allocating responsibility for autonomous and semi-autonomous machine interactions and applications*. Pub. No.: US 2024/0160913 A1, 2024.
- [2] Shushant Veer, Karen Leung, **Ryan K. Cosner**, Yuxiao Chen, Marco Pavone. *Ego trajectory planning with rule hierarchies for autonomous vehicles*. Pub. No.: US 2024/0199074 A1. 2024.

Invited Presentations

- [1] Conference on Decision and Control (CDC) workshop: “Data-Driven Control of Autonomous Systems with Provable Guarantees”, 2025.
- [2] University of California, Riverside Electrical Engineering Seminar Series, 2025.
- [3] Tufts University Mechanical Engineering Seminar Series, 2025.
- [4] Southern California Controls Workshop, 2024.
- [5] Conference on Decision and Control (CDC) workshop: “Control Barrier Functions: Recent developments and future directions”, 2023.

Workshops Organized

- [1] Workshop: Glen Chou, Shushant Veer, Heng Yang, **Ryan K. Cosner**, Marco Pavone. *Workshop on Safe and Robust Learning for Perception-based Control*. American Controls Conference (ACC), 2023. ([website](#))

TEACHING

2026: Instructor, Mechanics II (ME21), Tufts University

Course Description: *Equilibrium of particles and rigid bodies in two and three dimensions. Kinematics and kinetics of particles and of rigid bodies in plane motion. Mass moments of inertia of solid bodies. Momentum and impulse methods. Energy methods. Single degree of freedom vibrations. Derivation and solution of differential equations of motion.*

2024: TA for Mobile Robotics: Applications, Prof. Günter Niemeyer, Caltech

2024: TA for Mobile Robotics: Theory & Algorithms, Prof. Günter Niemeyer, Caltech

2023: TA for Nonlinear Control, Prof. Aaron D. Ames, Caltech

2023: TA for Nonlinear Dynamics, Prof. Aaron D. Ames, Caltech

RESEARCH ADVISING

1. Xianmai Liang (Computer Science MS student, Tufts, 2026)
2. Andry Navarro-Brenes (Mechanical Engineering BS student, Tufts, 2026)
3. Codrin Crismariu (Mechanical Engineering BS student, Tufts, 2026)
4. Jakov Marohnic (Computer Science BS student, Tufts, 2026)
5. Gilbert Bahati (Mechanical Engineering PhD student, Caltech, 2024)
6. Igor Sadalski (Summer Undergraduate Research Fellow, Caltech, 2023)
Now at Somite Therapeutics.
7. Jana K. Woo (Summer Undergraduate Research Fellow, Caltech, 2023)

ACADEMIC ADVISING

- 2 Masters students, Tufts University
- 6 Undergraduate students, Tufts University

SERVICE AND OUTREACH

1. **Academic Peer Reviewer:** ACC, L4DC, CDC, MECC, NeuRips, ICRA, IROS, CDC, TAC, Automatica, L-CSS, RAL, TCST, RSS.
2. **Program Committee Member**, *Workshop on the Algorithmic Foundations of Robotics* (WAFR), 2026.
3. **Tufts University School of Engineering Curriculum Committee**, Representative for the Mechanical Engineering Department, 2026-Present.
4. **Caltech Center for Teaching, Learning, and Outreach**, Tour Guide. Provided lab tours for middle and high school students. 2021-2025.
5. **Caltech Triathlon**, President. Organized 3 weekly workouts and 15 team races, 2021-2024.
6. **Science Olympiad**, Test Writer and Event Supervisor. Wrote exams and supervised events for the Southern California State-Level Science Olympiad Competition, 2023.
7. **Caltech Rise**, Volunteer Tutor. Tutored public school students struggling in math and science, 2019-2021.
8. **UC Berkeley**, Campus Ambassador. Gave tours of UC Berkeley, 2016-2019.
9. **United Technologies for Kids**, Volunteer Teacher. Taught engineering to middle and high school students in English and Spanish in Peru, Summer 2017.

AWARDS

1. **Outstanding Teaching Assistant Award**, *Mechanical and Civil Engineering Department, Caltech*, 2024.
2. **Best Student Paper Finalist**, *Conference on Robotic Learning*, 2020.
3. **Graduate Student Fellowship**, *Rose Hills Foundation*, 2020.
4. **High Honors at Graduation**, *UC Berkeley*, 2019.
5. **Alexander and Ethel Levens Mechanical Engineering Award**, *UC Berkeley*, 2017.
6. **Regents' and Chancellor's Scholar**, *UC Berkeley*, 2015–2019.
7. **Chevron Academic Scholar**, *Chevron, El Segundo*, 2015.