Apurva Badithela

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abadithela.github.io

Education

2018–Expected 2024 — PhD in Control and Dynamical Systems — California Institute of Technology
Thesis: Formal Methods for Test and Evaluation, and Verification and Validation of Autonomy
Advisor: Richard M. Murray
Committee: Richard M. Murray, Soon-Jo Chung, Aaron D. Ames, Adam Wierman, Eric Mazumdar

2014–2018 — B.S. in Aerospace Engineering and Mechanics — University of Minnesota, Twin-Cities
summa cum laude
Advisor: Peter J. Seiler

Internships

2021 — Autonomy Research Intern in Behavior Planning and Prediction — Motional, Boston
Host: Eric Wolff
Project: Counterexample Guided Repair of Inverse Reinforcement Learning Planner

2017 — ICES Moncrief Summer Research Fellow — University of Texas, Austin
Host: Ufuk Topcu
Mentor: Ivan Papusha
Project: Sparse Matrix Methods for Fast Real-time Model Predictive Control

2016 — Summer Undergraduate Research Fellowship — Purdue University, West-Lafayette
Host: Neera Jain
Mentor: Austin L. Nash
Project: Dynamic Modeling and Validation of micro-CHP systems

Publications

Journal articles

2017 — Austin Nash, Apurva Badithela, and Neera Jain.
Dynamic Modeling of a Sensible Thermal Energy Storage Tank with an Immersed Coil Heat Exchanger under Three Operation Modes.
Journal of Applied Energy.

Conference Papers

2022 Josefine Graebener*, Apurva Badithela*, and Richard M. Murray.
Towards Better Test Coverage: Merging Unit Tests for Autonomous Systems.
14^{th} *NASA Formal Method Symposium, 2022. To appear.*
(* denotes equal contribution.)

2021 Apurva Badithela, Tichakorn Wongpiromsarn, and Richard M. Murray.
Leveraging Classification Metrics for Quantitative System-level Analysis of Temporal Logic Specifications.
60^{th} *IEEE Conference on Decision and Control.*

2019 Apurva Badithela and Peter Seiler.
Analysis of the Heavy-ball Algorithm using Integral Quadratic Constraints.
American Control Conference.

Pre-Prints

2020 Apurva Badithela and Richard M. Murray.
Synthesis of Static Test Environments for Generating Sequence-like Behaviors in Autonomous Systems. *Submitted to* 13^{th} *NASA Formal Methods Symposium, 2021.*

Honors and Awards

2018 AIAA Guidance, Navigation and Control Undergraduate Conference Experience Award.
American Institute of Aeronautics and Astronautics.

2016-2018 Robert and John McCollum Scholarship.
Departmental Award
University of Minnesota

2014-2018 Gold Global Excellence Scholarship.
University-wide Award
University of Minnesota

Teaching

Caltech

Spring'22 Optimal Control (CDS 112 / Ae 103a).
Fall'20 Linear Systems Theory (CDS 131).

Mentoring

Summer 2022 Andy Dimnaku
SURF Fellow
Project: Optimization of Autonomous Vehicles Testing through Symmetry Mapping

Summer 2022 — Edward Zhang, Frida Moreno, Gerard Decker
FSRI Fellows
Project: Setting up Duckietown as a Hardware Platform for Testing Autonomous Vehicles

Summer 2020 — Berlin Del Aguila
WAVE Fellow
Project: Synthesis of Static Test Environments for Autonomy

Talks

Oct 2022 — US-Japan Seminar on Autonomy, AI, Robotics, and Informatics.
Jul 2022 — Workshop on Envisioning an Infrastructure for Multi-Robot and Collaborate Autonomy Testing and Evaluation, Robotics: Science and Systems
May 2022 — NASA Formal Methods
Mar 2022 — University of California, Berkeley.
Dec 2020 — University of California, Berkeley.

Service

Diversity and Inclusion

2020– — Member of the Computing and Mathematical Sciences (CMS) Diversity, Equity and Inclusion (DEI) Steering Committee. Engage in bi-weekly discussions on creating initiatives to foster inclusion in the department.

- Created and organized the CMS Climate Survey on graduate student experience. Organized a department town hall to communicate survey results and solicit feedback from the community.
- Organized a diversity town hall for CMS students and postdocs, and compiled a written document of recommendations to CMS faculty.

2020–2021 — Helped organize two workshops on Building Effective Research Collaborations for graduate students.

2022– — Helped organize two workshops on Building Effective Research Collaborations for graduate students.

Review Activities

- Transactions on Automatic Control (TAC) 2022
- IEEE International Conference on Robotics and Automation (ICRA) 2022
- 60^{th} IEEE Conference on Decision and Control (CDC) 2021