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

Employment

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

2022 CMS TA Fellow
EAS Division award to support CMS department TAs in promoting inclusive learning
California Institute of Technology

2022 RSS Inclusion Fellow
Conference Award
Robotics: Science and Systems

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

Fall 2021 – present
Ranai Srivastav
Undergraduate Researcher (Iowa State)
Project: Object Detection in Duckietown and Experiments for Validating Object Detection Algorithms

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 2021 IEEE 60^{th} Conference on Decision and Control.
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

- IEEE International Conference on Robotics and Automation (ICRA) 2023
- 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