Kavin M. Govindarajan

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Education

University of Michigan Aug. 2024 - Present
PhD Robotics, MS Robotics
Awards/Honors NSF Graduate Research Fellow, 2024 ASME JDSMC Reviewer of the Year
Relevant Coursework Data-Driven Controls, Autonomous Vehicles, Probability & Random Processes

North Carolina State University Aug. 2020 - May 2024
BS Aerospace Engineering, BS Applied Mathematics
Awards/Honors Park Scholar, Dean's List (All Semesters)
Relevant Coursework Optimal Controls, Dynamic Systems & Multivariable Controls, Mechatronics, Flight Stability & Controls, Numerical Methods, Finite Element Analysis

Publications

Fine, Jacob B., Peter Newell, **Govindarajan, Kavin**, et al. (2025). "Analysis and Experimental Validation of a Low-Complexity Enhanced Orientation-Based Controller for Tethered Energy-Harvesting Systems". In: *IEEE Transactions on Control Systems Technology*, pp. 1–14. DOI: 10.1109/TCST.2025.3558870.

Govindarajan, Kavin, Devansh Agrawal, Dimitra Panagou, and Chris Vermillion (2025). "Fusion of Indirect Methods and Iterative Learning for Persistent Velocity Trajectory Optimization of a Sustainably Powered Autonomous Surface Vessel". In: *(Accepted) 2025 Conference on Control Technology and Applications (CCTA)*.

Govindarajan, Kavin M., Kaleb Ben Naveed, David Li, et al. (2025). "Experimental Validation of a Combined Velocity Trajectory Optimization and Ergodic Path Planner for Persistent Scientific Observation". In: *(In Preparation) IEEE Transactions on Control Systems Technology (TCST)*.

Li, David, **Govindarajan, Kavin**, and Chris Vermillion (2025). "Clarity-Driven Ergodic Control for Persistent Tip-and-Cue Missions with Synchronized Rendezvous". In: *(Accepted) 2025 Conference on Decision and Control (CDC)*.

Govindarajan, Kavin, Ben Haydon, and Chris Vermillion (2023). "Predictive Velocity Trajectory Control for a Persistently Operating Solar-Powered Autonomous Surface Vessel". In: *2023 American Control Conference (ACC)*, pp. 2077–2083. DOI: 10.23919/ACC55779.2023.10156048.

Govindarajan, Kavin, Ben Haydon, Kirti Mishra, and Chris Vermillion (2022). "Coverage-Maximizing Solar-Powered Autonomous Surface Vehicle Control for Persistent Gulf Stream Observation". In: *2022 American Control Conference (ACC)*, pp. 3675–3681. DOI: 10.23919/ACC53348.2022.9867746.

Skills

Programming/Software C, C++, MATLAB, Simulink, Java, Python, Julia, Linux (Ubuntu, Raspbian), Git, JIRA, Confluence, Microsoft Office, LaTeX
Computer-Aided Design Solidworks, Siemens NX, Autodesk Fusion 360, OnShape, GrabCAD, ANSYS

Experience

CORE LAB | Undergraduate Research Assistant Jun 2019 - August 2024

Renewably-Powered Robotics
- Developed persistent planning algorithms for renewably-powered vehicles in spatiotemporally-varying environments
- Conducted field-test campaign to validate planning and control algorithms on a solar-powered autonomous surface vessel
- Designed and built composite control surfaces and electronics modules for an autonomous sailing drone

Technologies/Skills: MATLAB, Simulink, Julia, ROS, Solidworks, Git

DARPA Manta Ray
- Developed and implemented control system software for underwater energy-harvesting kite
- Conducted field-test campaign to validate performance of energy-harvesting kite

Technologies/Skills: C, C++, Python, ROS, Linux (Ubuntu), Git

Liquid Rocketry Lab | CFO & Structures Engineer Sep 2020 - May 2024
- Managed financial and legal responsibilities for the organization
- Developed dynamic model to derive optimal design parameters and design flight control system
- Designed components for guidance, navigation, and control (GNC) of rocket

Technologies/Skills: MATLAB, Java, Siemens NX, JIRA, Confluence, Git

InspireNC | Director Jul 2018 - Present
- Managing operations and community impact of the InspireNC non-profit organization
- Organized multiple community development events and skills-training workshops
- Established working relationships with corporate partners to fund and expand community impact

Projects

Information-Based Path-Planning Link to More Info

Implemented a persistent path-planning algorithm using a preliminary metric of coverage. This served as the initial step for my research work.

Technologies/Skills: MATLAB, Simulink, Solidworks

Computer-Vision Aided Robotics Link to More Info

Developed computer vision systems for autonomous target identification and control of a ball launching mechanism on FRC 6908's 2020 Robot: Cookie Monster.

Technologies/Skills: Java, Python, Computer Vision

Activities

FIRST Robotics Competition Mentor

Mentoring FRC 6908: Infuzed. Served as team lead during high school. Currently focused on guiding students with the engineering design process and implementation of higher-level autonomous control systems for a competition robot.