Kavin M. Govindarajan

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EXPERIENCE

CORE LAB | Undergraduate Research Assistant   Jun 2019 - Present

Renewably-Powered Robotics
– Developing persistent planning algorithms for renewably-powered vehicles in spatiotemporally-varying environments
– Conducting 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

EDUCATION

North Carolina State University   Aug. 2020 - Present (GPA: 3.96/4.0)

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, Real Analysis, Linear Algebra, Applied Differential Equations, Partial Differential Equations

PUBLICATIONS

Fine, Jacob, Peter Newell, **Govindarajan, Kavin**, et al. (2024). "Analysis and Experimental Validation of a Low-Complexity Enhanced Orientation-Based Controller for Tethered Energy-Harvesting Systems". In: *(In Press) IEEE Transactions on Control Systems Technology (TCST)*.

Govindarajan, Kavin, Devansh Agrawal, Dimitra Panagou, and Chris Vermillion (2024). "Fusion of Indirect Methods and Iterative Learning for Persistent Velocity Trajectory Optimization of a Sustainably Powered Autonomous Surface Vessel". In: *(Under Review) 2024 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

Other Experience

Liquid Rocketry Lab | CFO & Structures Engineer　　　　　　　　　　Sep 2020 - Present

– Managing financial and legal responsibilities for the organization

– Developing dynamic model to derive optimal design parameters and design flight control system

– Designing 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

RoboBoat

Designing and building an autonomous robotic surface vehicle to compete in the RoboBoat competition. Heading development of software/controls tech stack using ROS and Ardupilot software integrated with PixHawk hardware. Additionally, currently designing the hull using CAD software. This hull will then be manufactured using composite construction techniques.

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.