

# Kavin M. Govindarajan

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## EXPERIENCE

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### 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

### 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

## EDUCATION

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### North Carolina State University

Aug. 2020 - Present (GPA: 3.93/4.0)

BS Aerospace Engineering, BS Applied Mathematics

*Awards/Honors* Park Scholar, Dean's List (All Semesters)

*Relevant Coursework* Dynamics and Multivariable Controls, Mechatronics, Aerospace Vehicle Performance, Engineering Dynamics, Aerodynamics I/II, Numerical Methods/Analysis, Real Analysis, Linear Algebra, Applied Differential Equations, Partial Differential Equations

## PUBLICATIONS

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Govindarajan, Kavin, Ben Haydon, Kirti Mishra, et al. (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](https://doi.org/10.23919/ACC53348.2022.9867746).

Govindarajan, Kavin et al. (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](https://doi.org/10.23919/ACC55779.2023.10156048).

## SKILLS

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*Programming/Software* C, C++, MATLAB, Simulink, Java, Python, Julia, Linux (Ubuntu, Raspbian), Git, JIRA, Confluence, Microsoft Office, L<sup>A</sup>T<sub>E</sub>X

*Computer-Aided Design* Solidworks, Siemens NX, Autodesk Fusion 360, OnShape, GrabCAD

## OTHER EXPERIENCE

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### 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

### NASA L'Space MCA | GNC & Power Systems Engineer

May 2021 - Aug 2021

- Developed lunar rover concept for the sampling of possible ice water reservoirs on lunar south pole
- Developed preliminary design review and presented concept to NASA engineers for review
- Designed GNC and power systems for lunar rover concept

*Technologies/Skills:* MATLAB, Simulink, Solidworks

## PROJECTS

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### 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

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### 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.