KARAN MAHESH

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EDUCATION

Massachusetts Institute of Technology & Woods Hole Oceanographic Institution　　**2025-Present**
PhD Student, Mechanical Engineering & Applied Ocean Science and Engineering
Advisor: Dr. Michael R. Benjamin

University of California, Berkeley　　**2018-2022**
Bachelor of Science, Major: Mechanical Engineering, Minor: Aerospace Engineering

RESEARCH EXPERIENCE

MIT Marine Autonomy Laboratory, Cambridge MA　　September 2025
Graduate Researcher

· Researching novel multi-agent planning and control algorithms in uncertain and dynamic environments

Aurora Flight Sciences, Cambridge MA　　August 2022 - July 2025
AI/ML Research Scientist

· Developed high-speed LIDAR processing and visualization algorithms for Wisk Aero's Landing Hazard Avoidance effort, concluding in successful flight tests with our algorithms onboard
· Secured $4.5 million grant from DARPA and US Navy NIWC to research introspective learning and control for safety-critical marine operations with MIT's Aerospace Controls Lab and Marine Autonomy Lab
· Awarded $1.5 million from the Air Force Research Laboratory to research multi-agent reachability and path-planning under uncertainty for autonomous aerial vehicles

High Performance Robotics Laboratory, UC Berkeley　　April 2021 - May 2022
Undergraduate Robotics Researcher

· Developed a Bayesian Optimization algorithm to optimize speed and sideslip for efficient trajectory generation
· Studied the effect of Gaussian Process hyperparameters on the algorithms ability to explore, exploit, and optimize an unknown battery consumption function

Computational Biology Group, University of Oxford　　June 2020 - December 2020
Undergraduate Machine Learning Researcher

· Studying the effect of ODE integrator inaccuracies on parameter inference biases for time-series models
· Analyzing the Johns Hopkins University COVID-19 dataset to assess the accuracy of current statistical and machine learning models in their prediction of the infectious nature of the coronavirus

Theoretical and Applied Fluid Dynamics Lab, UC Berkeley　　September 2019 - May 2020
Undergraduate Robotics Researcher

· Using model-free reinforcement learning to autonomously operate a swarm of underwater drones with the goal of improving high-speed communication in underwater applications
· Developed proficiency in electronics integration, signal theory, controls, dynamics, manufacturing, and fabrication to create the prototype and integrate it into the reinforcement learning workflow

WORK EXPERIENCE

Stealth Startups　　September 2023 - Present
Founder and Consultant

· Developing a model-reference adaptive control architecture for over-actuated inspection drone with a venture-backed company out of MIT and Harvard University
· Building secure and robust LLMs for rapid knowledge querying. Currently being used in MIT classrooms as a teaching aide and beta testing as a compliance tool for financial institutions

Intel Corporation, Internet of Things Group　　June 2021 - December 2021
Deep Learning Engineering Intern

· Developed a drone application of Intel's OpenVINO model optimizer
· Developed a vision-based UAV object tracking system based on a YOLOv2 object detection model

Intel Corporation, Artificial Intelligence Products Group   June 2019 - August 2019
Artificial Intelligence Intern

· Optimized various deep learning models with Intel's Neural Network Distiller, specifically designed to handle the workloads for image classification and natural language processing
· Developed a reinforcement learning framework to quantize models based on hardware feedback such as latency, memory used, and accuracy

TECHNICAL PRESENTATIONS

P1. Boeing Technical Excellence Conference, Virtual Presentation: Fast Adaptive Learning and Control Online (FALCON), May 2023.
P2. Advanced Visualization and Data Analytics Technologies Summit, Virtual Presentation: Fast Adaptation & Learning for Control Online for DARPA LINC, April 2024.
P3. Boeing Technical Excellence Conference, Virtual Presentation: Fast Adaptation & Learning for Control Online for DARPA LINC, May 2024.

PATENTS

Pilot Command Augmentation of Marine Vehicles for Safe Relative Station Keeping   Filed May 2025

Co-inventor, describes a control barrier function (CBF)-based augmentation of pilot commands to enable safe relative station keeping of marine vehicles.

PUBLICATIONS AND PREPRINTS

Conference Papers

C1. N. Rober*, **K. Mahesh***, T. M. Paine, M. L. Greene, S. Lee, S. T. Monteiro, M. R. Benjamin, and J. P. How. "Online Data-Driven Safety Certification for Systems with Uncertain Dynamics." *International Conference on Robotics and Automation (ICRA)*, Yokohama, Japan, May 2024.

Journal Articles

J1. **K. Mahesh***, T. M. Paine*, M. L. Greene, N. Rober, S. Lee, S. T. Monteiro, A. Annaswamy, M. R. Benjamin, and J. P. How. "Safe Autonomy for Uncrewed Surface Vehicles Using Adaptive Control and Reachability Analysis." *Accepted to IEEE Transactions on Control Systems Technology (TCST)*, 2025.

* indicates equal contribution

AWARDS AND HONORS

Boeing Meritorious Invention Award   Fall 2024

Recognition for development of novel simulation system for autonomous vehicle algorithm certification

Dean's List, UC Berkeley College of Engineering   Spring 2022

University of Oxford Summer Internship Grant   Summer 2020

Awarded competitive research grant for COVID-19 machine learning research due to its high applicability and novel research methods

Pi Tau Sigma Member   Fall 2019

Chosen as a member of the UC Berkeley chapter of the International Mechanical Engineering Honor Society due to high academic standing

H.U. Lee Memorial Foundation Scholarship   Fall 2018

Granted scholarship for high educational achievement and excellence in martial arts. Recognized for earning 3rd place at American Taekwondo Association World Championships