

KARAN MAHESH

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EDUCATION

University of California, Berkeley

2018-2022

Bachelor of Science, Major: Mechanical Engineering, Minor: Aerospace Engineering

Relevant Coursework: Linear Algebra and Differential Equations, Dynamic Systems and Feedback, Introduction to Machine Learning, Control of Unmanned Aerial Vehicles, Model Predictive Control, Stochastic Estimation and Control, Engineering Aerodynamics, Introduction to Analysis, Nonlinear Control

RESEARCH EXPERIENCE

Aurora Flight Sciences, Cambridge MA

August 2022 - Present

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
- Researching and testing an introspective learning and control framework in a combined effort with MIT's Aerospace Controls Lab and Marine Autonomy Lab, with funding from DARPA
- Secured \$4.5 million grant from DARPA and US Navy NIWC to research safety-critical autonomous marine operations
- Awarded \$500,000 in funding from the Air Force Research Laboratory to research multi-agent reachability and path-planning under uncertainty

High Performance Robotics Lab, 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 by MIT professors as a teaching aide and beta testing as a compliance tool for financial institutions

- 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

- 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.

PUBLICATIONS AND MANUSCRIPTS IN PROGRESS

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." *Submitted to IEEE Transactions on Control Systems Technology (TCST)*, 2024.

* indicates equal contribution

AWARDS AND HONORS

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