# Aravind Kumaraguru

Research Assistant @ USC RESL · Software Engineer · Robotics Enthusiast

akumarag@usc.edu | akumaraguru.github.io | akumaraguru | aravindkumaraguru

*Full-stack roboticist looking for a entry level position in robotics development.*

## Education

**University of Southern California** — *Los Angeles, CA*

M.S. in Computer Science (GPA: 3.94) — *Aug 2018 - May 2020 (Intended)*

**University of California, Berkeley** — *Berkeley, CA*

B.S. in Electrical Engineering and Computer Science (GPA: 3.75) — *Aug 2013 - May 2017*

## Experience

**USC Robotics Embedded Systems Laboratory** — *Los Angeles, CA*

Research Assistant — *Aug 2018 - Current*

- Worked in aquatic robotics research with a specialization in state estimation and path planning for efficient coverage of large search spaces.
- Collaborated with a team of biologists to autonomously monitor harmful algal blooms in Clearlake, CA.

**Cisco Meraki** — *San Francisco, CA*

Software Engineer — *Aug 2017 - Aug 2018*

- Worked as a platforms engineer to bring up Z3C mobile teleworker gateway with integrated LTE and WiFi.
- Tasks included bootloader configuration, implementing hardware-verified secureboot, database migrations, and adding new UI features.
- Worked with hardware and production teams in Meraki, as well as eng. teams from the JDM and LTE modem vendor.

**Pioneers in Engineering** — *Berkeley, CA*

Engineering Director — *June 2016 - May 2017*

- Led engineering teams of a nonprofit that promotes STEM education in underprivileged high schools with a robotics competition.
- Responsible for coordinating multiple eng. teams, negotiating design specifications, and managing the budget for parts, equipment, and assembly.

**Google** — *Mountain View, CA*

Software Engineering Intern — *June 2016 - Aug 2016*

- Worked with the GCam group (computer vision team in Google Brain) on a DSP system for precise 3D localization.
- Developed firmware to detect and process high-speed (~10MHz) data packets in real time on a Beaglebone Black with a PRUDAQ.

## Projects

**BlueQuilt** — *Los Angeles, CA*

USC Robotics Embedded Systems Laboratory — *Aug 2019 - Current*

- Developed a framework for orthomosaicing aerial imagery over water, considered impossible for state-of-the-art stitching algorithms.
- Floating April tags instrumented with GPS and IMU sensors are deployed in the water while a drone flies overhead.
- Factor-graph smoothing algorithm jointly estimates the pose of the drone and ground control points from GPS+IMU data of tags and drone.

**Kickstarting Meta-RL with Expert Demonstrations** — *Los Angeles, CA*

USC Robotics Embedded Systems Laboratory — *Aug 2018 - Jan 2019*

- Extension to meta-RL framework developed by Hausman et al. 2018 to initialize task embeddings with expert demonstrations.
- Developed an imitation learning framework in Tensorflow and built new environments and expert datasets for testing.

## Publications

Chris Denniston*, **Aravind Kumaraguru***, and Gaurav S. Sukhatme. "Comparison of Path Planning Approaches for Harmful Algal Bloom Monitoring." OCEANS 2019 MTS/IEEE SEATTLE. IEEE, 2019. (IEEE Xplore)

## Skills

**Technical Skills** State Estimation, Motion Planning, Full-Stack Development, Firmware, Hardware Bringup

**Languages** Python, C++, C, Ruby, Java

**Software** ROS, MuJoCo, Tensorflow, OpenCV, Ruby on Rails, Docker

**Licenses** FAA Part 107 Remote Pilot License, Ham Radio Operator (Technician)