

# Darren Chiu

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## EDUCATION

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- University of Southern California (Los Angeles, CA)** Aug 2023 - Present  
*Doctor of Philosophy: Electrical and Computer Engineering*
- Princeton University (Princeton, NJ)** Aug. 2019 - May 2023  
*Bachelors of Science: Electrical and Computer Engineering*  
*Minors: Computer Science, Robotics and Intelligence Systems*

## RESEARCH INTERESTS

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My research interests are focused on the applications of multi robot systems towards space exploration. My recent work is pursuing novel hardware design with algorithmic approaches to better enable navigation in multi robot systems. These include previous works within multi robot surface inspection and self assembling origami robots. Currently, I am applying event based vision for resource constrained micro aerial vehicles for multi robot navigation.

## ACADEMIC PUBLICATIONS

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- [1] Darren Chiu, Radhika Nagpal, and Bahar Haghighat. Optimization and Evaluation of Multi Robot Surface Inspection Through Particle Swarm Optimization. 2023. arXiv: 2310.03172 [cs.RO], In review to ICRA 2024.

## RESEARCH EXPERIENCE

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- Robotic Embedded Systems Lab** (Los Angeles, CA) Sept. 2023 – Present
- Research assistant studying event based visual multi robot navigation advised by Professor Gaurav Sukhatme.
  - Conducted experiments to characterize localization for end to end reinforcement learning transfer
- Distributed Robotic Systems Lab** (Groningen, Netherlands) June 2023 – July 2023
- Visiting researcher under Professor Bahar Haghighat conducting experimental design of robotic swarm inspection for vibrating metallic surfaces.
- Computational Mechanics Research Lab** (Princeton, NJ) Dec. 2022 – Aug. 2023
- Research assistant studying self assembling miura-ori based robotic system advised by Professor Glaucio Paulino.
  - Designed hardware and developed firmware for motor controller and state estimation electronics.
- Self-Organizing Swarms and Robotics Lab** (Princeton, NJ) Jan. 2022 – Aug. 2023
- Research assistant studying topics involving robotic swarm inspection advised by Professor Radhika Nagpal.
  - Developed a simulation of a bayesian inspection algorithm on the Webots simulator for swarm robotics.
  - Designed and verified time of flight hardware in Altium to enable obstacle avoidance within robotic swarm.
  - Deployed Particle Swarm Optimization on AWS to achieve optimal inspection algorithm parameters.

## INDUSTRY EXPERIENCE

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- SpaceX** (Hawthorne, CA) | *Avionics Intern* May 2022 – Aug 2022
- Led radiation testing of NOR flash memory components by writing firmware and creating custom board designs.
  - Performed hardware design, characterization, and developed test plan for various power and logic components.
  - Designed and implemented Django backend that streamlines future radiation testing requests across all programs.
- Blue Origin** (Kent, WA) | *Avionics Intern* May 2021 – Feb. 2022
- Calculated and documented cross sections and space rates for Single Event Effects on heavy ion and proton data.
  - Developed signal processing script with GUI to detect Single Event Effects in digital and analog signals.
  - Travelled to proton beam facility for testing, setup, shielding, and analysis for card and component SEE testing.
- Percassist Corporation** (Santa Clara, CA) | *Research and Development Intern* May 2020 – Aug 2020
- Developed MATLAB evaluation tool to assess algorithm performance on raw data and creation of annotated data.
  - Designed embedded C to assess online implementation of algorithm to guarantee 100 percent conversion success.
  - Conducted analysis across front end boards to assess filtering capabilities with detection algorithm.