

# Michelle Ho

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## EDUCATION

### Stanford University- Stanford, CA

Sep 2023-present

Ph.D. Aeronautics and Astronautics

Advised by Prof. Mykel Kochenderfer

- Research interests in reliable control and safety validation in uncertain, dynamic environments

**Relevant coursework:** Machine Learning, Dynamics, Sequential Decision Making, Optimal & Learning-based Control, Convex Optimization, Validation of Safety Critical Systems, Engineering Design Optimization, Control Systems Design

### Princeton University- Princeton, NJ

Aug 2019-May 2023

B.S.E. Mechanical & Aerospace Engineering, Certificate (minor) in Robotics & Intelligence Systems

GPA: 3.70/4.00 Major GPA: 3.85/4.00

**Thesis:** Multi-Robot Exploration with Learning & Bayesian Decision Making, advised by Prof. Anirudha Majumdar

**Relevant coursework:** Probability & Stochastic Systems, Automatic Control Systems, Engineering & Mechanical Design, Interplanetary Mission Design, Spacecraft System Design, Introduction to Robotics, Intelligent Robotic Systems, Safety-Critical Robotic Systems, Probabilistic Models of Cognition

## HONORS & AWARDS

Stanford HAI (Human-Centered Intelligence) Fellowship

Awarded Sep. 2025

NSF Graduate Fellowship Honorable Mention

Awarded Apr. 2025

Graduated Cum Laude from Princeton Mechanical & Aerospace Engineering Dept.

Awarded May 2023

Sigma Xi Research Honor Society

Inducted May 2023

## PUBLICATIONS

**M. Ho**, M. F., Ginting, I. R. Ward, A. Reinke, M. J., Kochenderfer, A. Agha-Mohammadi, S. Omidshafiei (under review). "World Model Failure Classification and Anomaly Detection for Autonomous Inspection," *IEEE International Conference on Robotics and Automation (ICRA)*, 2026.

I. R. Ward\*, **M. Ho\***, H. Liu, A. Feldman, J. Vincent, L. Kruse, S. Cheong, D. Eddy, M. J. Kochenderfer, M. Schwager (under review). *IEEE International Conference on Robotics and Automation (ICRA)*, 2026.

**M. Ho**, A. Jamgochian, M. J. Kochenderfer (in press). "System Identification and Adaptive Control with  $\rho$ -POMDP Planning," *Conference on Control, Decision, and Information Technologies (CoDIT)*, 2025.

D. Eddy, **M. Ho**, M. J. Kochenderfer. "Optimal Ground Station Selection for Low-Earth Orbiting Satellites." *IEEE Aerospace Conference*, 2025. <https://doi.org/10.1109/AERO63441.2025.11068558>

**M. Ho\***, A. Farid\*, A. Majumdar. "Towards a Framework for Comparing the Complexity of Robotic Tasks," *Proceedings of the Workshop on the Algorithmic Foundations of Robotics (WAFR)*, 2022. [https://doi.org/10.1007/978-3-031-21090-7\\_17](https://doi.org/10.1007/978-3-031-21090-7_17)

## PRESENTATIONS

*Conference on Control, Decision and Information Technologies*, Conference presentation

Jul 2023

*Bay Area Robotics Symposium*, Lightning talk, Poster

Oct 2024

*Princeton Mechanical & Aerospace Thesis Presentation*, Poster

May 2023

*Workshop on Algorithmic Foundations of Robotics (WAFR)*, Contributed talk

Jun 2022

*Stanford Undergraduate Research Fellowship Program*, Contributed talk, Poster

Aug 2022

## RESEARCH EXPERIENCE

### Field AI (M. Fadhil Ginting, Andrzej Reinke, Shayegan Omidshafiei)

Mission Viejo, CA

Product Insight Research Intern

Jun-Sep. 2024

- Using Python and ROS, developed an algorithm for classifying and reacting to failures for autonomous gauge inspection on Boston Dynamics Spot, for office and industrial sites
- Used world foundational model backbone and conformal prediction thresholding, submitted paper to ICRA

### NASA Ames (Dr. Edward Balaban)

Mountainview, CA

SHERPA Team Member

May 2024-present

- Revamping implementation for science station rover trajectory planning for the System Health-Enabled Realtime Planning Advisor (SHERPA) using Julia for POMDP (Partially Observable Markov Decision Process) planning
- Developing a large language model (LLM) explainability method for SHERPA to interpret tree-search decisions under uncertainty, enabling human-understandable reasoning

### Stanford Intelligent Systems Laboratory (SISL) (Prof. Mykel Kochenderfer)

Stanford, CA

Summer Undergraduate Research Fellowship (SURF) Scholar

Mar-Aug 2022

- Improved multi-modal informative path planning method for lunar rovers to reduce uncertainty in thermal models of polar lunar ice stability regions with finite sampling
- Using Julia, accounted for position and traversability uncertainty in POMDP model with rewards dependent on Gaussian process beliefs

#### **Beeson Research Group (Prof. Ryne Beeson)**

*Undergraduate Researcher, Princeton University*

**Princeton, NJ**

*Jan-May 2022*

- Optimized low-thrust cis-lunar trajectories using astrodynamics, optimal control, and mission design knowledge
- Implemented feedback received from NASA Goddard Space and Flight Center Mission Design on using pydylan to account for thrust, weight, and date constraints of CubeSAT Lunar IceCube as a case study to determine strategies for streamlining the trajectory redesign process

#### **Princeton Intelligent Robot Motion (IRoM) Lab (Prof Anirudha Majumdar)**

*Undergraduate Researcher, Princeton University*

**Princeton, NJ**

*May 2020-Feb 2021*

- Developed a theoretical framework to compare robotic task complexity, based on computational complexity theory (Jan 2021-Feb 2022)
  - Demonstrated framework's properties with reinforcement learning examples using OpenAI Gym and PyTorch and concepts from general adversarial networks (GANs) and imitation learning
  - Accepted to 2022 Workshop on Algorithmic Foundations of Robotics as co-first author
- Designed and prototyped quadrotor arm to change lightbulbs, using PTC Creo and Raspberry Pi (May-Dec 2020)

## **TEACHING & MENTORING EXPERIENCE**

#### **Stanford University School of Engineering**

*Head Course Assistant*

**Stanford, CA**

*Sep. 2024-present*

- 20-hr per week commitment, helping students as course assistant for graduate-level decision making under uncertainty class in Fall 2024 and as head course assistant for Engineering Design Optimization in Spring 2025
- Responsibilities include distributing TA responsibilities, holding office hours, evaluating quizzes, answering online discussion questions, and overseeing final project grading and peer reviews

#### **Princeton Writing Center**

*Writing Fellow and Committee of Research & Pedagogy Member*

**Princeton, NJ**

*Aug 2020 – Aug 2023*

- Provide guidance in all areas of writing to undergraduate and graduate students, including class essays, research papers, cover letters, graduate school and fellowship applications
- Plan professional development workshops and research conferences, interview and train new fellows and faculty

#### **Princeton School of Engineering and Applied Sciences**

*BSE Interactor*

**Princeton, NJ**

*Aug 2021-May 2023*

- Advised incoming first year engineering students on course schedules, major selection, and academic anxieties

## **CLASS & EXTRACURRICULAR PROJECTS**

#### **Classes:**

- **Validation of Safety Critical Systems:** Preliminary design of a framework for LLM explainability of a trajectory designed with Monte Carlo Tree Search for lunar rover applications, later continued with NASA Ames
- **Optimal and Learning-based Control:** Designed a method to control the detumbling of an unstable satellite
- **Engineering Design Optimization:** Optimized the selection of satellite placement for maximal Earth coverage
- **Problems in Aero/Astro:** Research rotation with Prof. Marco Pavone, project in improving transformer robustness to state estimation noise for spacecraft rendezvous through retraining and DAGGER integration
- **Mechanical Design:** Designed and manufactured fully autonomous search and rescue robot to navigate obstacle course using PTC Creo and Teesduino
- **Spacecraft System Design:** Designed mission to explore lunar south pole radiation due to albedo neutrons, designed the optimal mission trajectory with pydylan and led GNC-ADCS sub-team, part of team of 20
- **Interplanetary Mission Design:** Designed and modeled robotic on-orbit servicing mission for rendezvous of Northrop's MEV-2 with decommissioned Intel satellite using AGI Systems Tool Kit
- **Introduction to Robotics:** Programmed autonomous drone navigation for randomized obstacle course with Crazyflie drone in Python using neural network for image classification, rapidly exploring random trees (RRT) algorithm, and optical flow from camera feed
- **Intelligent Robotic Systems:** Modeled safe navigation of autonomous trucks with POMDPs, model predictive control, dynamic programming, and ZED camera object recognition API with Robot Operating System (ROS)
- **Safety-Critical Robotic Systems:** Extended framework that guaranteed recursive feasibility for safe planning to a time improved multi-agent approach using WeBots simulator

## Extracurriculars:

- **Stanford Women in Aeronautics & Astronautics (2023-present)**, *President, Executive Board, (previously Professional Development Chair)*
  - Organize member socials and career building events including company visits, networking mixers and lunches, visit day events for new members, and K-12 and local community outreach
- **Stanford AeroAstro Student Advisory Committee (2024-present)**, *CA Liaison*
  - Act as primary contact between AeroAstro and Center for Teaching and Learning
  - Explore ways to improve course assistant processes and training within the department
- **Stanford AIAA (American Institute of Aeronautics and Astronautics) (2025-present)**, *Treasurer*
  - Manage departmental budget for social events including company visits, happy hours, and formals
- **Stanford Intelligent Systems Laboratory (2025-present)**, *Chief of Real Estate, Co-Chief of Fun*
  - Manage student seating assignments and lab access
  - Arrange various social events for the lab, including organizing the annual lab retreat
- **Princeton Women of Aeronautics and Astronautics (2020-2023)**, *Co-Founder and Co-President:*
  - Connected gender minorities interested in aerospace from all majors
  - Met with other university chapters and shared workshop and post-grad career opportunities
- **Princeton Robotics Club (2019-2022)**, *Technology/Training Officer and Droid Mechanical Sub-lead:*
  - Led manufacturing and 3D printing of BB8 droid skeleton, to create life-size, functional replica
- **Princeton Council of Science and Technology (CST) (2019-2022)**, *Student Advisory Board Member:*
  - Acted as liaison between STEM students and CST to relay student workshop and class ideas

## SKILLS

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- **Software:** Python (Gymnasium, PyTorch), Julia, MATLAB, Java, Bash, Git, C++, LaTeX, PTC Creo for CAD, AGI Systems Tool Kit, HTML, CSS, XML, Adobe Bridge, Adobe Photoshop, Adobe InDesign, ROS
- **Hardware:** 3D printing, machine shop fabrication tools (including lathe, mill, bandsaw, drill press, grinder, CNC), TIG welding, laser cutting, microcontrollers, soldering, Raspberry Pi, Crazyflie drones