

# Cherie Ho

ROBOTICS PH.D. STUDENT

ROBOTICS INSTITUTE

SCHOOL OF COMPUTER SCIENCE, CARNEGIE MELLON UNIVERSITY

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## Education

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### Carnegie Mellon University (CMU)

PH.D. IN ROBOTICS

Advisor: Prof. Sebastian Scherer

2018 - 2025 (expected)

Pittsburgh, PA

### Harvey Mudd College (HMC)

B.S. IN ENGINEERING, CONCENTRATION: INTERNATIONAL RELATIONS

Advisor: Prof. Christopher Clark

2013 - 2017

Claremont, CA

## Research Experience

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### Ph.D. Student, AIR LAB, CARNEGIE MELLON UNIVERSITY

ROBUST ROBOT NAVIGATION IN UNSTRUCTURED ENVIRONMENTS

• Advisor: Prof. Sebastian Scherer

• Researching perception and planning algorithms to increase sensing horizon for multiple applications: offroad driving, search-and-rescue, and wheelchair navigation.

• Led a team of 8 to develop data-driven perception algorithms for high-speed off-road driving. [\[Link\]](#)

• Led a team of 4 to build a multi-drone planner for 3D actor reconstruction. Collaborated with three labs from CMU and UMN to build an autonomous outdoor MoCap for dense reconstruction. [\[Video\]](#)

• Developed planning and control algorithms that provide safety guarantees in the real world. [\[Video\]](#)

Fall 2018 - Present

Pittsburgh, PA

### Research Intern, AUTONOMOUS SYSTEMS RESEARCH GROUP, MICROSOFT AI

PRETRAINING FOR ROBOT SAFETY

• Mentors: Dr. Shuang Ma and Dr. Ashish Kapoor

• Developed a pretraining pipeline for safe vision-based navigation.

Summer 2021

Redmond, WA (remote)

### Undergraduate Researcher, LAIR LAB, HARVEY MUDD COLLEGE

SHARK AGGREGATION TRACKING WITH UNDERWATER ROBOTS

• Advisor: Prof. Christopher Clark

• Designed a decentralized, multi-robot controller to track shark aggregations in Catalina Island, CA. [\[Link\]](#)

Spring 2014 - Spring 2017

Claremont, CA

## Publications

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### PREPRINTS

#### 1. **MapEx: Indoor Structure Exploration with Probabilistic Information Gain from Global Map Predictions**

**Cherie Ho\***, Seungchan Kim\*, Brady Moon, Aditya Parandekar, Narek Harutyunyan, Chen Wang, Katia Sycara, Graeme Best, Sebastian Scherer

*In Submission, 2024*

[\[PDF\]](#)

2. **SALON: Self-supervised Adaptive Learning for Off-road Navigation**  
Matthew Sivaprakasam, Samuel Triest, **Cherie Ho**, Shubhra Aich, Jeric Lew, Isaiah Adu, Wenshan Wang, and Sebastian Scherer  
*In Submission, 2024*
3. **Deep Bayesian Future Fusion for Self-Supervised, High-Resolution, Off-Road Mapping**  
Shubhra Aich, Wenshan Wang, Parv Maheshwari, Matthew Sivaprakasam, Samuel Triest, **Cherie Ho**, Jason M Gregory, John G Rogers III, Sebastian Scherer  
*In Submission, 2024*  
[\[PDF\]](#)

#### PEER-REVIEWED CONFERENCES

4. **Map It Anywhere: Empowering BEV Map Prediction using Large-scale Public Datasets**  
**Cherie Ho\***, Jiaye Zou\*, Omar Alama\*, Sai Mitheran Jagadesh Kumar, Benjamin Chiang, Taneesh Gupta, Chen Wang, Nikhil Keetha, Katia Sycara, Sebastian Scherer  
*Neural Information Processing Systems (NeurIPS) Datasets and Benchmarks Track, 2024*  
[\[PDF\]](#) [\[Website\]](#)
5. **Learning-on-the-Drive: Self-supervised Adaptation of Visual Offroad Traversability Models**  
**Cherie Ho\***, Eric Chen\*, Mukhtar Maulimov, Chen Wang, Sebastian Scherer  
*International Conference on Intelligent Robots and Systems (IROS), 2024*  
[\[PDF\]](#)
6. **3D Human Reconstruction in the Wild with Collaborative Aerial Cameras**  
**Cherie Ho**, Andrew Jong, Harry Freeman, Rohan Rao, Rogerio Bonatti, Sebastian Scherer  
*International Conference on Intelligent Robots and Systems (IROS), 2021*  
[\[PDF\]](#) [\[Video\]](#)
7. **Towards a Robust Aerial Cinematography Platform: Localizing and Tracking Moving Targets in Unstructured Environments**  
Rogerio Bonatti, **Cherie Ho**, Wenshan Wang, Sanjiban Choudhury, Sebastian Scherer  
*International Conference on Intelligent Robots and Systems (IROS), 2019*  
[\[PDF\]](#) [\[Video\]](#)
8. **Predicting Coordinated Group Movements of Sharks with Limited Observations using Autonomous Underwater Vehicles (AUVs)**  
**Cherie Ho**, Kimberly Joly, Andrew P. Nosal, Christopher G. Lowe, Christopher M. Clark  
*Association for Computing Machinery Symposium on Applied Computing (SAC), 2017*  
[\[PDF\]](#)

#### JOURNALS

9. **Autonomous Aerial Cinematography Among Unstructured Environments With Learned Artistic Decision-Making**  
Rogerio Bonatti, Wenshan Wang, **Cherie Ho**, Aayush Ahuja, Mirko Gschwindt, Efe Camci, Erdal Kayacan, Sanjiban Choudhury, Sebastian Scherer  
*Journal of Field Robotics (JFR), 2019*  
[\[PDF\]](#) [\[Video\]](#)

#### WORKSHOPS AND TECH REPORTS

10. **Adaptive Safety Margin Estimation for Safe Real-Time Replanning under Time-Varying Disturbance**  
**Cherie Ho**, Jay Patrikar, Rogerio Bonatti, Sebastian Scherer  
*Arxiv, 2020. Also presented at RSS Robust Autonomy Workshop 2020.*  
[\[PDF\]](#) [\[Video\]](#)
11. **Provably Safe in the Wild: Control Barrier Functions on a Vision-Based Quadrotor in an Outdoor Environment**  
**Cherie Ho\***, Katherine Shih\*, Jaskaran Singh Grover, Changliu Liu, Sebastian Scherer  
*RSS Robust Autonomy Workshop, 2020*  
[\[PDF\]](#) [\[Video\]](#)
12. **Autonomous Aerial Cinematography Among Unstructured Environments With Learned Artistic Decision-Making**  
Rogerio Bonatti, Wenshan Wang, **Cherie Ho**, Aayush Ahuja, Mirko Gschwindt, Efe Camci, Erdal Kayacan, Sanjiban Choudhury, Sebastian Scherer  
*IROS Vision-based Drones Workshop, 2019*  
**(Best Paper Finalist)**  
[\[PDF\]](#)
13. **Learning Reactive Flight Control Policies: From LIDAR Measurements to Actions**  
Sam Zeng, Vaibhav Viswanathan, **Cherie Ho**, Sebastian Scherer  
*NeurIPS Imitation Learning and its Challenges in Robotics Workshop, 2018*  
**(Spotlight Talk)**

## Honors & Awards

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<b>Croucher Scholarship for Doctoral Study (Two-Year Full Scholarship, \$180K)</b>	<i>2019-2021</i>
<b>Microsoft Research PhD Fellowship Nomination, 1 out of 3 at CMU RI</b>	<i>2020</i>
<b>Best Paper Finalist, IROS Vision-based Drones Workshop</b>	<i>2019</i>
<b>Harvey Mudd Startup Incubator Inaugural Class (\$120K for 6% Equity)</b>	<i>2017</i>
<b>Harvey Mudd Excellence in Engineering Award for Entrepreneurship</b>	<i>2017</i>
<b>University of Southern California Wrigley Institute Summer Fellowship</b>	<i>2016</i>

## Industry Experience

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<b>Zenith Robotics</b>	<i>Spring 2017 - Summer 2018</i>
CO-FOUNDER AND CTO	<i>San Francisco, CA</i>
<ul style="list-style-type: none"> <li>• Part of the inaugural class of HMCINQ, a Harvey Mudd startup incubator.</li> </ul>	
<b>Google</b>	<i>Summer 2015</i>
ENGINEERING PRACTICUM INTERN	<i>Mountain View, CA</i>
<ul style="list-style-type: none"> <li>• Developed an internal tool for Google Analytics for trend monitoring and anomaly detection in BigTable usage.</li> </ul>	

## Teaching Experience

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<b>Teaching Assistant</b> , CMU 16-720: Computer Vision	2021
<b>Teaching Assistant</b> , CMU 16-833: Robot Localization and Mapping	2020
<b>AI/Robotics Mentor</b> , Chinese International School Technology Summer School	2017
<b>Head Tutor and Grader</b> , HMC E84: Electronic and Magnetic Circuits/Devices	2017
<b>Lab Proctor</b> , HMC E80: Experimental Engineering	2017
<b>Lab Proctor</b> , HMC E79: Introduction to Engineering Systems and Signals	2016
<b>Tutor</b> , HMC CS60: Principles of Computer Science	2015
<b>Tutor</b> , HMC CS5: Introduction to Computer Science	2015
<b>Machine Shop Proctor</b> , HMC E4: Introduction to Engineering Design	2014

## Academic and Professional Talks

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<b>CMU R-PAD Lab</b> , Invited Talk	2022
<b>Third Wave Automation</b> , Invited Talk	2021
<b>IROS 2021</b> , Contributed Talk	2021
<b>Apple</b> , Invited Talk	2021
<b>Lehigh University</b> , Invited Talk	2021
<b>NSF Multidrone Symposium</b> , Invited Short Talk	2020
<b>16-833: Robot Localization and Mapping</b> , Guest Lecture	2020
<b>University of Illinois at Urbana-Champaign</b> , Invited Short Talk	2020
<b>Air Lab Summer School</b> , Lecture	2020
<b>RSS 2020 Workshop on Robust Autonomy</b> , Contributed Talk	2020
<b>Chinese International School Hong Kong</b> , Invited Talk	2018

## Service and Outreach

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### Conference and Journal Reviewing:

AURO, RA-L, ICRA, NeurIPS	2021
ICRA, SSRR, ISER, IROS	2020
CHI	2019
ICRA	2018

### CMU Masters Thesis / PhD Qualifier Committees:

<b>Nikhil Keetha (PhD)</b> , High-fidelity Reconstruction with Gaussian Splatting	2024
<b>Aditya Rauniyar (Masters)</b> , Planning for 3D and 4D Reconstruction	2024
<b>Conner Pulling (Masters)</b> , Stereo Vision and Tactical Reinforcement Learning	2024
<b>Emily Kim (PhD)</b> , 3D Human Pose Estimation	2023
<b>Dominic Guri (PhD)</b> , Force-Torque Sensors for Agriculture	2023
<b>Seungchan Kim (PhD)</b> , Incorporating Interestingness for Object Detection	2023
<b>Sam Triest (PhD)</b> , Learning for Offroad Driving	2023
<b>Tushar Kusunur (Masters)</b> , Multi-robot Viewpoint Planning	2023
<b>Saumya Saxena (PhD)</b> , Graph Neural Networks for Manipulator Control	2022
<b>Ruohai Ge (Masters)</b> , Indoor Localization with 360° Images	2022
<b>Sourish Ghosh (Masters)</b> , Detect-and-Avoid for Aircrafts	2022
<b>Jay Patrikar (PhD)</b> , Socially-aware Motion Planning for Aircrafts	2021

### University Activities:

**Climate Committee**, CMU Robotics Institute 2022-2023  
**PhD Admissions Committee**, CMU Robotics Institute 2020-2022  
**Media Chair**, CMU Robotics Institute Student Government 2018-2020

**Outreach:**

**Organizer**, Special Meeting on Assessing Robotics Capabilities (ARC) [\[Link\]](#) 2023  
**Session Co-Leader**, CMU Creative Technology Nights for Girls [\[Video\]](#) 2021  
**Mentor**, Society of Women Engineers 2016-2017