Cherie Ho

ROBOTICS PH.D. STUDENT ROBOTICS INSTITUTE

SCHOOL OF COMPUTER SCIENCE, CARNEGIE MELLON UNIVERSITY

Education

Carnegie Mellon University (CMU)

2018 - 2025 (expected)

Ph.D. IN ROBOTICS (COMPUTER VISION, MACHINE LEARNING, FIELD ROBOTICS)

Pittsburgh, PA

Advisor: Prof. Sebastian Scherer

Harvey Mudd College (HMC)

2013 - 2017

B.S. IN ENGINEERING, CONCENTRATION: INTERNATIONAL RELATIONS

Claremont, CA

Advisor: Prof. Christopher Clark

Research Experience _____

Ph.D. Student, Air Lab, Carnegie Mellon University

PREDICTIVE PERCEPTION FOR ROBOT NAVIGATION

Fall 2018 - Present

Pittsburgh, PA

Advisor: Prof. Sebastian Scherer

- · Researching computer vision and learning algorithms to increase sensing horizon and deployment envelope for multiple applications: offroad driving, search-and-rescue, and wheelchair navigation.
- · Researching generalizable, uncertainty-aware perception for autonomous wheelchairs using LLM and Foundation Models (Funded by Japan AIST). [Link]
- Researching ways to communicate robotics capabilities to the public and policymakers (Collab. with OECD).
- Led a team of 8 to develop perception systems for high-speed off-road driving (Funded by DARPA). [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 (Funded by NSF). [Video]

Research Intern, Autonomous Systems Research Group, Microsoft Al

Summer 2021

PRETRAINING FOR ROBOT SAFETY

Redmond, WA (remote)

- Mentors: Dr. Shuang Ma and Dr. Ashish Kapoor
- Developed a pretraining pipeline for safe vision-based navigation.

Undergraduate Researcher, LAIR LAB, HARVEY MUDD COLLEGE

Spring 2014 - Spring 2017

SHARK AGGREGATION TRACKING WITH UNDERWATER ROBOTS

Claremont, CA

- Advisor: Prof. Christopher Clark
- Designed a decentralized, multi-robot controller to track shark aggregations in Catalina Island, CA. [Link]

Publications _____

PREPRINTS

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

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

In Submission, 2024

[PDF]

2. MapExRL: Learning Efficient Indoor Mapping and Exploration using Predicted Global Map Context Narek Harutyunyan*, Brady Moon*, Seungchan Kim, Adam Hung, Cherie Ho, Sebastian Scherer In Submission, 2024

3. 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

4. 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

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]

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][Video]

7. 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]

8. 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]

9. 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

10. 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

11. 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]

12. 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]

13. 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]

14. 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 _____

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

Industry Experience _____

Zenith Robotics

Spring 2017 - Summer 2018

CO-FOUNDER AND CTO

San Francisco, CA

- Part of the inaugural class of HMCINQ, a Harvey Mudd startup incubator (Awarded \$120K for 6% equity).
- Developed machine learning algorithms and Robot Systems for sports analytics.

Google Summer 2015

ENGINEERING PRACTICUM INTERN

Mountain View, CA

• Developed an internal tool for Google Analytics for trend monitoring and anomaly detection in BigTable usage.

Teaching Experience	
Lectures:	
Visual SLAM, Guest Lecture for CMU 16-833: Robot Localization and Mapping	2021
Deconstructing Robots , Outreach: Creative Tech Nights for Girls [Video]	2021
Ensuring Safety in the Real World , Air Lab Summer School [Video][Code]	2020
Course TA / Mentors:	
Teaching Assistant, CMU 16-720: Computer Vision	2021
Teaching Assistant, CMU 16-833: Robot Localization and Mapping	2020
Al/Robotics Mentor, Chinese International School Tech Summer School	2017
Head Tutor and Grader, HMC E84: Electronic and Magnetic Circuits/Devices	2017
Lab Proctor, HMC E80: Experimental Engineering	2017
Lab Proctor , HMC E79: Introduction to Engineering Systems and Signals	2016
Tutor , HMC CS60: Principles of Computer Science	2015
Tutor , HMC CS5: Introduction to Computer Science	2015
Machine Shop Proctor, HMC E4: Introduction to Engineering Design	2014
Academic and Professional Talks	
IROS 2024, Contributed Talk	2024
Perception for High-Speed Offroad Driving, Thesis Proposal	2022
CMU R-PAD Lab, Invited Talk	2022
Third Wave Automation, Invited Talk	2021
IROS 2021, Contributed Talk	2021
Apple, Invited Talk	2021
Lehigh University, Invited Talk	2021
NSF Multidrone Symposium, Invited Short Talk	2020
University of Illinois at Urbana-Champaign, Invited Short Talk	2020
RSS 2020 Workshop on Robust Autonomy, Contributed Talk	2020
Chinese International School Hong Kong, Invited Talk	2018
Mentoring	
Research Mentoring:	
Yifei Liu (Master's), Currently at CMU	2024
Nithya Sampath (Undergrad), Currently at CMU	2024
Jiaye Zou (Undergrad), Currently at CMU	2024
Ben Chiang (Master's), Currently at CMU	2024
Bangjie Xue (Master's), Currently at CMU	2024
Nathan Litzinger (Master's), Currently at CMU	2024
Haoyang He (Master's), Currently at CMU	2024
Omar Alama (Master's), Now: EE PhD at CMU	2023
Sai Mitheran (Master's), Now: ML at Latent Al	2023
Eric Chen (Undergrad) , Now: CS Master's at Stanford	2023
Rupanjali Kukal (Master's), Now: Data Scientist at Microsoft	2023
Rohan Rao (Master's), Now: ML Engineer at NVIDIA	2021
Harry Freeman (Master's), Now: Robotics PhD at CMU	2021
Andrew Jong (Master's), Now: Robotics PhD at CMU	2021

Master's Capstone Project Mentoring:

Autonomous Urban Wheelchair, Chaol Tuan, Chiawen Liao, Haoyang He, Sonic Kuo, Thomas Chan	2024-2025
CMU Masters Thesis / PhD Qualifier Committees:	
Nikhil Keetha (PhD), High-fidelity Reconstruction with Gaussian Splatting	2024
Aditya Rauniyar (Masters), Planning for 3D and 4D Reconstruction	2024
Conner Pulling (Masters), Stereo Vision and Tactical Reinforcement Learning	2024
Emily Kim (PhD), 3D Human Pose Estimation	2023
Dominic Guri (PhD) , Force-Torque Sensors for Agriculture	2023
Seungchan Kim (PhD), Incorporating Interestingness for Object Detection	2023
Sam Triest (PhD), Learning for Offroad Driving	2023
Tushar Kusnur (Masters), Multi-robot Viewpoint Planning	2023
Saumya Saxena (PhD), Graph Neural Networks for Manipulator Control	2022
Ruohai Ge (Masters), Indoor Localization with 360° Images	2022
Sourish Ghosh (Masters), Detect-and-Avoid for Aircrafts	2022
Jay Patrikar (PhD), Socially-aware Motion Planning for Aircrafts	2021
Service and Outreach	
Interdisciplinary Activities:	
Organizer, CMU Workshop on Assessment of Robotics Capabilities	2024
In collaboration with OECD, hosted an interactive workshops for robotics	
students to debate and formulate a framework for evaluating robotics progress.	
Results are in preparation as a chapter in an upcoming OECD whitepaper.	
Organizer , Special Meeting on Assessing Robotics Capabilities [Link]	2023
In collaboration with OECD, hosted a meeting with robotics leaders to discuss	
proposed measures of robotics capabilities for policy makers	
Committees and Outreach:	2020
Creator, Meta-Resources on Graduate School and Research [Link]	2020-
Organizer, ICRA 2024 Workshop on Resilient Off-road Autonomy [Link]	2024
Climate Committee, CMU Robotics Institute	2022-2023
Action committee for systemic issues in RI. Led efforts to better align	
advisor-advisee expectations. Contributed to webinars on grad school admissions. Robotics PhD Admissions Committee, CMU Robotics Institute	2020-2022
Session Co-Leader, CMU Creative Tech Nights for Girls [Video]	2020-2022
STEM outreach program targeting middle-school female students	2021
Mentor, Society of Women Engineers	2016-2017
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Conference and Journal Reviewing:	

ICRA, IROS, RA-L, AURO, NeurIPS, ISER, CHI, JFR, SSRR