Doncey Albin

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Education

University of Colorado, Boulder **Boulder, CO**

Ph.D. Candidate, Computer Science 2021–Present

Advisor/Lab: Christoffer Heckman, Autonomous Robotics and Perception Group (ARPG)

Areas of Focus: Distributed multi-robot mapping and exploration.

Colorado State University **Fort Collins, CO**

Mechanical Engineering B.S. 2017–2021

Activities: ASME, NASA DemoSAT, NSF Research Experience for Undergraduates (REU) recipient

Awards

Won third place for CSU's 2021 senior capstone showcase May 2021

Publications

Doncey Albin, Daniel McGann, Miles Mena, Annika Thomas, Harel Biggie, Xuefei Sun, Steve McGuire, Jonathan P. How, and Christoffer Heckman (2025). *CU-Multi: A Dataset for Multi-Robot Collaborative Perception*. arXiv: 2509.19463 [cs.RO]. URL: https://arxiv.org/abs/2509.19463.

Doncey Albin, Miles Mena, Annika Thomas, Harel Biggie, Xuefei Sun, Dusty Woods, Steve McGuire, and Christoffer Heckman (2025). "CU-Multi: A Dataset for Multi-Robot Data Association". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA) - Field Robotics Workshop*. Workshop Paper. URL: https://arpg.github.io/cumulti.

Harlow, Kyle, **Albin, Doncey**, Kristen Such, et al. (2025). *ColoRadar+: An extension of the dense millimeter-wave radar dataset ColoRadar*.

Sun, Xuefei, **Doncey Albin**, Cecilia Mauceri, Dusty Woods, and Christoffer Heckman (2025). "Spatial-LLaVA: Enhancing Large Language Models with Spatial Referring Expressions for Visual Understanding". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA) - Human-Centered Robot Learning Workshop*.

Biggie, Harel, Patrick Cooper, **Doncey Albin**, Kristen Such, and Christoffer Heckman (2024). *CogExplore: Contextual Exploration with Language-Encoded Environment Representations*. arXiv: 2406.17180 [cs.RO]. URL: https://arxiv.org/abs/2406.17180.

Reed, Alec, **Albin, Doncey**, Anuh Pasricha, et al. (2024). *Transformer-based Learning Models of Dynamical Systems for Robotic State Prediction*. URL: https://doi.org/10.21203/rs.3.rs-3919154/v1.

Reed, Alec, Brendan Crowe, Doncey Albin, Lorin Achey, Bradley Hayes, and Christoffer Heckman (2024). *SceneSense: Diffusion Models for 3D Occupancy Synthesis from Partial Observation*. arXiv: 2403.11985 [cs.RO].

Doncey Albin and Steve Simske (2021). *Design, Implementation, and Evaluation of a Semi-Autonomous, Vision-based, Modular Unmanned Ground Vehicle Prototype*. DOI: 10.2352/ISSN.2470-1173.2021.17.AVM-214. URL: https://doi.org/10.2352/ISSN.2470-1173.2021.17.AVM-214.

Projects

Household Fire Elimination System (See here) Aug 2020–May 2021

- Designed and developed a household fire tracking, following, and elimination system for my senior research practicum. This project ultimately won 3rd place for the Engineering Days showcase.
- This project incorporated mechanical design (SolidWorks), 3D printing, computer vision using TensorFlow lite, USB communication protocol implementation (i2c, SPI), and PID-based visual servoing.

Automated Beer-Pong Machine (Beirut) (See here) Dec 2021

- Worked with three other students to design and fabricate an automatic beer-pong machine named Beirut. We were awarded as a top team and had the opportunity to present the final project to our class. This project was a ton of fun and seriously inspired me to do more robotics.

Teaching

Guest Lecturer **Boulder, CO**

Advanced Robotics Fall 2024, Spring 2024, Fall 2025

– For the last year, I have been serving as a guest lecturer for three lectures on 1) GraphSLAM, 2) Optimization, and 3) Multi-Robot Collaborative SLAM (C-SLAM).

Graduate Teaching Assistant **Boulder, CO**

Advanced Robotics Aug 2024–Dec 2024

– Served as the sole teaching assistant for Professor Jack Daniel in the Fall 2024 Advanced Robotics course.
– Gave multiple lectures on GraphSLAM and supported students in preparing for the semester's robotics competition.
– Assisted in preparing and grading homework, held weekly office hours, and provided hands-on support for student projects.

Dynamics Jan 2022–May 2022

– Assisted Professor Rong Long with instructional responsibilities for two sections of dynamics, including conducting review sessions, holding office hours, proctoring, and grading.

System Dynamics (SysD) Aug 2021–Dec 2021

– Collaborated with Professor Shalom Ruben to facilitate learning in two system dynamics sections. Responsibilities included attending lectures, completing and grading assignments, conducting office hours, and leading exam prep sessions.

Research Experience

Army Research Laboratory (ARL) **Boulder, CO**

Graduate Robotics Research Fellow Summer 2025

– Led hardware and software integration for the Distributed and Collaborative Intelligent Systems and Technology (DCIST) Collaborative Research Alliance (CRA).
– Developed a pipeline for distributed multi-robot map merging, enabling robust performance even under sporadic and opportunistic communication constraints.

Medtronic **Boulder, CO**

Graduate Student Researcher Jan 2022–Aug 2023

– Worked as the lead researcher on the development of an autonomous surgical system, marking the first time a graduate student-based project at Medtronic transitioned to production. Specifically, I led the development of the perception and motion planning algorithms.

Industry/Consulting Experience

Foxglove **Remote**

Robotics Consultant March 2024–Present

– Transform large robotics datasets into MCAP visualizations for integration with Foxglove Studio software. Enhanced the usability and effectiveness of data visualization, aiding in better analysis and decision-making for robotic systems.
– Create comprehensive written tutorials and instructional videos to support users in leveraging Foxglove's MCAP writer and Schemas full capabilities. Facilitated improved user understanding and engagement with the software, contributing to the overall user experience and satisfaction.

Lightning E-Motors **Loveland, CO**

Controls and Data Analytics Engineering Intern Summer 2021

– Developed testing protocols for a Linux-based vehicle driver interface to identify and troubleshoot software issues in CAN bus data retrieval. Acquired proficiency in Python, Linux OS, HTML, PHP, and network/device management, contributing to the enhancement of driver interface functionality.