Cailyn C. Smith

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Research Interests

Human-robot interaction, robotic manipulation, reinforcement learning, continual learning

Education

Carnegie Mellon University, *Pittsburgh, PA* **Starting Spring 2026**

Ph.D. Student in Robotics
NSF Graduate Research Fellow
Advisors: Dr. Henny Admoni and Dr. Zackory Erickson

Colorado School of Mines, *Golden, CO* **B.S. May 2025**

Major: Computer Science, track in Robotics & Intelligent Systems **GPA: 3.99 / 4.0**

Minor: Physics. **Area of Special Interest:** Space & Planetary Science & Engineering

Relevant Graduate-Level Courses: Robotic Mapping & Localization; Computer Vision; Human-Centered Robotics; Robot Mechanics: Kinematics, Dynamics, & Control; Numerical Optimization; Linear Optimization; Advanced ML

Research Experience

Mines Interactive Robotics Research Lab, *Undergraduate Researcher* **Jun 2020 - May 2025**

- Developed reinforcement learning algorithms to dynamically change a robot's autonomy during interactions
- Designed and conducted human-subjects experiments on level of autonomy and social norms in robotics

Mines Autonomy, Robotics, & Intell. Algo. Lab, *Undergraduate Researcher* **Dec 2023 - May 2025**

- Evaluated state-of-the-art SLAM algorithms on a novel benchmark dataset to characterize their robustness
- Contributed towards a journal paper in preparation for IEEE Transactions on Robotics (T-RO)

Caltech Autonomous Robotics and Control Lab, *WAVE Fellow* **Jun 2024 - Aug 2024**

- Fine-tuned spacecraft segmentation neural network models to utilize long-wave thermal space imagery
- Deployed and tested onboard training algorithms on satellite flight hardware using Docker and ROS2

Publications

- **Cailyn Smith**[1], Lara Bezerra[1], Rafael Sousa Silva, Mark Higger, and Tom Williams. "Evaluating an Adaptive Model of Robot Performative Autonomy for Human-Robot Collaboration." In preparation for publication. ([1] Authors Smith and Bezerra contributed equally to this work)
- Terran Mott[1], **Cailyn Smith**[1], Aaron Fanganello, Tom Williams. "We Don't Ask Such Things: A Mixed-Methods Reassessment of Bounded Proportionality in Robotic Norm Violation Response." Accepted at: *International Journal of Social Robotics*. ([1] Authors Mott and Smith contributed equally to this work)
- Rafael Sousa Silva, **Cailyn Smith**, Lara Bezerra, Tom Williams. "Evaluating Robotic Performative Autonomy In Latency-Sensitive Collaborative Contexts." In: *IEEE Int'l Conf. on Robotics and Automation (ICRA)*. 2025.
- **Cailyn Smith**, Terran Mott, and Tom Williams. "Robot, Take the Joystick: Understanding Space Robotics Experts' Views on Autonomy." In: *IEEE Int'l Symp. on Human-Robot Interactive Communication (RO-MAN)*. 2024.
- **Cailyn Smith**, Terran Mott, and Tom Williams. "Perspectives on Level of Autonomy Decisions in Space Robotics." In: *Companion Proc. of the ACM/IEEE Int'l Conf. on Human-Robot Interaction (HRI): Late Breaking Reports*. 2024.
- Rafael Sousa Silva, **Cailyn Smith**, Lara Bezerra, Tom Williams. "Toward RAPS: the Robot Autonomy Perception Scale." In: *Variable Autonomy for Human-Robot Teaming Workshop at the IEEE Int'l Symp. on Human-Robot Interactive Communication (RO-MAN)*. 2024.
- **Cailyn Smith**[1], Charlotte Gorgemans[1], Ruchen Wen, Saad Elbeleidy, Sayanti Roy, and Tom Williams. "Leveraging Intentional Factors and Task Context to Predict Linguistic Norm Adherence." In: *Annual Meeting of the Cognitive Science Society (CogSci).* 2022. ([1] Authors Smith and Gorgemans contributed equally to this work)

Presentations

Conference Presentations

- **Cailyn Smith**. "Robot, Take the Joystick: Understanding Space Robotics Experts' Views on Autonomy." Oral talk presented at: *IEEE Int'l Symp. on Human-Robot Interactive Communication (RO-MAN)*. 2024.
- **Cailyn Smith**. "Toward RAPS: the Robot Autonomy Perception Scale." Oral talk presented at: *Variable Autonomy for Human-Robot Teaming Workshop at the IEEE Int'l Symp. on Human-Robot Interactive Communication (RO-MAN)*. 2024.
- **Cailyn Smith**. "Perspectives on Level of Autonomy Decisions in Space Robotics." Poster session presented at: *19th Annual ACM/IEEE Int'l Conf. on Human-Robot Interaction (HRI)*. Boulder, Colorado. 2024.
- **Cailyn Smith** and Charlotte Gorgemans. "Leveraging Intentional Factors and Task Context to Predict Linguistic Norm Adherence." Poster session presented at: *44th Annual Meeting of the Cognitive Science Society*. Toronto, Canada. 2022.

Other Presentations

- **Cailyn Smith.** "Analyzing the Impact of Performative and Adaptive Autonomy on Collaborative Robots." Oral talk presented at: *Astronaut Scholarship Foundation Technical Conference*. Houston, Texas. 2024.
- **Cailyn Smith.** "On-Orbit Training of Spacecraft Detection and Segmentation Models using Thermal Imagery." Oral talk presented at: *Caltech WAVE Fellowship Seminar Day*. Pasadena, California. 2024.
- **Cailyn Smith**. "Evaluating the Effects of Performative Autonomy for Robots with Communication Latency." Second Place oral talk presented at: *Mines Undergraduate Research Symposium*. Golden, Colorado. 2024.

Industry Experience

Autonomous Solutions Inc., *Software Engineer* **Aug 2025 - Dec 2025**

- Developed multi-vehicle command & control software for autonomous construction and agriculture vehicles

United Launch Alliance, *Software Engineering Intern* **May 2023 - Aug 2023**

- Developed software in Python to perform statistical studies for a Monte Carlo rocket trajectory simulation
- Implemented code in C++ to emulate avionics and load parameters for a closed-loop trajectory simulation

Katalyst Space Technologies, *Software Engineering Intern* **May 2022 - Aug 2022**

- Designed space domain awareness algorithm architectures and behaviors for tracking Resident Space Objects
- Supported the development and review of two Air Force Research Laboratory SBIR/STTR proposals

Scholarships & Recognitions

NSF Graduate Research Fellow (2025): National fellowship for research in STEM fields
Astronaut Scholar (2023 & 24): Nationally competitive merit scholarship awarded to ~70 students nationwide
CRA Outstanding Undergraduate Researcher Runner-Up (2025): Nationally competitive research-based award
Florence Caldwell Full Tuition Scholar (2021-25): Awarded to 3 incoming female students at Mines for leadership

Selected Projects

6DoF Arm Manipulation, *MEGN 544: Robot Mechanics: Kinematics, Dynamics, and Control* **Aug 2024 – Dec 2024**

- Implemented code to perform inverse kinematics, trajectory planning, and control of a 6DoF manipulator

Autonomous Rover, *Robotics Team: NASA's Colorado Space Grant Robotics Challenge* **Aug 2021 – Dec 2023**

- Implemented object detection with ROS2 and Python using image segmentation on depth images

RL for Robot Navigation, *CSCI 573: Robotic Perception & Programming* **Jan 2023 - May 2023**

- Coded on- and off-policy reinforcement learning algorithms for LiDAR-based navigation with ROS

Skills

Coding: Proficient in Python, C++, C#, Java, MATLAB, JavaScript, CSS, HTML. Knowledge of C, R, Assembly, Bash.
Software: TensorFlow, PyTorch, ROS1 & ROS2, Docker, Linux, Arduino, Azure DevOps, Cameo Systems Modeler