

Hunter Leon Brown

PhD Candidate, Robotics · Oregon State University

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Research Statement

I develop learning-based controllers that treat force as a first-class signal for contact-rich manipulation. My work integrates classical force and impedance control into reinforcement learning, producing policies that are precise, robust to uncertainty, and safe, with applications to manipulation on land and underwater.

Education

PhD, Robotics, Oregon State University 2023 – 2027 (expected)

- Advisors: Stefan Lee and Geoffrey Hollinger
- Thesis work on action spaces for in-contact manipulation in underwater environments

BS/MS Mechanical Engineering (Cum Laude), Robotics Track, University of Utah 2014 – 2018

- Advisor: Tucker Hermans
- Thesis: "Using geometric primitives to unify perception and action for object-based manipulation"

Utah Tech University (formerly Dixie State University), Mathematics Department 2012 – 2014

- Coursework in Mathematics and Engineering

Publications

[1] **H. L. Brown**, G. Hollinger, and S. Lee, "Learning hybrid-control policies for high-precision in-contact manipulation under uncertainty," in Proc. IEEE/RSJ Int. Conf. Intelligent Robots and Systems (IROS), 2026. (To appear)

[2] C. Jain, **H. L. Brown**, and H. Knight, "DRAWBOT: Making everyday objects interactive," in Companion of the 2024 ACM/IEEE Int. Conf. Human-Robot Interaction (HRI '24), Boulder, CO, USA, Mar. 2024, pp. 554-558. (Late-Breaking Report)

[3] R. Challa, **H. L. Brown**, C. Jain, Z. Speiser, and H. Knight, "'Scrape that barnacle': Commanding underwater robot in-contact manipulation tasks with intuitive spatial-temporal-force features," in 1st InterAI Workshop: Interactive AI for Human-Centered Robotics, IEEE Int. Conf. Robot and Human Interactive Communication (RO-MAN), 2024. (Workshop)

[4] **H. L. Brown**, "Using geometric primitives to unify perception and action for object-based manipulation," M.S. thesis, Dept. Mech. Eng., Univ. of Utah, Salt Lake City, UT, USA, 2018.

Research Experience

PhD Thesis, Oregon State University, Corvallis, Oregon 2023 – Present

Advisors: Stefan Lee, Geoffrey Hollinger

- Developed MATCH (Mode-Aware Training for Contact Handling), an RL method for learning hybrid force-position policies that select force or position control per axis; accepted at IROS 2026 [1]
- Improved success rate by 35% over pose-control baselines while applying 30% less contact force than VICES on fragile peg-in-hole tasks under localization uncertainty
- Evaluated across 1,600 real-robot trials

- Platforms: Reach Bravo 7, Franka Research 3 (FR3), Pioneer 3-DX

Master's Thesis, University of Utah, Salt Lake City, Utah

2016 – 2018

Advisor: Tucker Hermans

- Developed an end-to-end pipeline unifying perception and manipulation around geometric primitives for object-based grasping and manipulation
- Built multisensory perception tools (RGB-D segmentation, BioTac haptic features, audio features) adopted by the LL4MA lab
- Platforms: KUKA iiwa, Baxter, Allegro Hand, ReFlex TakkTile

Ergonomics and Safety Lab, University of Utah, Salt Lake City, Utah

2016 – 2018

Advisor/Lab Director: Andrew Merryweather

- Developed prototype Assistive Robotic Arm designed to hold a computer with Tobii eye tracking system for use by quadriplegic patients
- Implemented face-pose tracking from RGB images as a hands-free control input
- Designed arm mechanism that is compliant regardless of power state for safe use in medical settings

Professional Experience

LT, U.S. Navy Civil Engineer Corps - NAS Whidbey Island, WA

2020 – 2023

Assistant Public Works Officer

Sept 2021 – July 2023

- Directed facilities maintenance for NAS Whidbey Island; supervised 12 staff and \$25M annual budget

Construction Manager

Oct 2020 – Oct 2021

- Managed 15 construction contracts valued at \$17M, overseeing schedule, quality assurance, and contractor safety

ENS, U.S. Navy Nuclear Power Training Command - Goose Creek, SC

2018 – 2020

Command Investigating Officer

June 2019 – Sept 2020

- Conducted over 30 formal command investigations; gathered evidence, interviewed personnel, and delivered findings and recommendations to senior leadership

Officer Candidate School and follow-on training

May 2018 – June 2019

- Naval officer and technical training

Previously held TS/SCI clearance (inactive since 2023)

Teaching & Mentoring

Undergraduate Project Mentor

Feb 2025 – June 2025

- Mentored a team of 4 undergraduates through design, build, and testing of an automated disc golf system enabling a child with mobility impairments to play independently
- Guided mechanical design, embedded control, and user testing; delivered robot to family

Tutorial, "Reinforcement Learning from Bellman to SAC," OSU Robotics

Mar 2026

- Designed and delivered tutorial for first- and second-year PhD students covering reinforcement learning basic concepts and their application in robotics

Service

Organizer, Learning in Robotics Research Group April 2025 – Present

- Founded and run a weekly group for robotics graduate students to present work, troubleshoot problems, and share related work across several robotics learning sub-areas; ~6 regular participants

Faculty Liaison, Robotics Graduate Student Association Sept 2024 – Aug 2025

- Served as liaison between robotics graduate students and faculty, representing student concerns and maintaining working relationships during a period of labor negotiations

Technical Skills

Control: Hybrid force-position control, impedance/admittance control, operational-space control

Learning: Reinforcement learning (PPO, SAC, TD3, SERL), PyTorch, TensorFlow, skrl, sim-to-real transfer, domain randomization

Simulation: Isaac Lab, Isaac Gym, ManiSkill

Hardware: Franka Research 3, Reach Bravo 7, KUKA iiwa, Baxter, Allegro Hand, BioTac, force/torque sensors

Software & Compute: Python, C++, ROS/ROS 2, Git, Linux, Weights & Biases, GPU training on HPC clusters (Slurm)

Honors & Awards

Navy and Marine Corps Achievement Medal 2023

Dean's List (6 semesters) 2014 – 2018

Thomas & Linda Howell Alumni Scholar 2015 – 2017

References

Stefan Lee

Associate Professor; Brent and Elaine Leback Professor in Engineering

School of Electrical Engineering and Computer Science, Oregon State University

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Geoffrey Hollinger

Professor; Director, Robotics Graduate Program

School of Mechanical, Industrial, and Manufacturing Engineering, Oregon State University

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Tucker Hermans

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Senior Research Scientist, NVIDIA

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