Samuel Mankoff

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Education

University of California,Berkeley Berkeley, CA

Master of Science in Mechanical Engineering (Control of Robotic and Autonomous Systems) *Expected May 2026*

Bachelor of Science in Mechanical Engineering; Minor in Aerospace Engineering | GPA: 3.7 *May 2025*

Relevant Coursework: Advanced Control Design and Systems, Feedback Control of Legged Robots, Digital-Twins

Skills

Robotics & Control: ROS 2, MuJoCo, Pyomo, MPC, Reinforcement Learning, MoveIt, CVXPY, IPOPT, OpenCV
Software & Tools: Python, MATLAB, Simulink, C++, Linux, Git, LABView, JavaScript, ABAQUS
Hardware: Universal Robots (UR7e), TurtleBot3, Intel RealSense, Bitcraze Crazyflie, ESP32
Design & Manufacturing: SolidWorks, Autodesk Inventor, 3D Printing, Laser Cutting, Waterjet, Welding

Experience

Formula Electric at Berkeley | *Vehicle Dynamics Engineer* Jan 2023 – May 2025

- Led the SolidWorks design of the steering assembly, reducing weight by $\sim$ 25% and play in the system by 3°while ensuring manufacturability (DFM) for CNC machining and 3D printing
- Fabricated and assembled the physical steering system, handling soldering of custom wiring harnesses for rotary sensors and validating signal integrity with a multimeter
- Integrated high-resolution sensors into the vehicle architecture, validating data acquisition precision (0.2°) to support the vehicle's dynamic control model.

Taylormade Golf | *RDE Ball Intern* May - Aug 2024

- Implemented an autonomous image acquisition system to capture high resolution images of golf balls under low light conditions improving testing efficiency by 35%
- Researched and developed performance criterion to improve the consistency and performance of the golf ball
- Built a GUI and image-processing algorithm that classified pass/fail outcomes with $\sim$95% accuracy, and accurately identified the mode of failure, helping engineers directly correlate results with testing and manufacturing performance data

Projects

Remote Teleoperation | *ROS 2, Python, UR7e* Aug – Dec 2025

- Architected a real-time teleoperation interface (<100ms latency) bridging a Meta Quest 3 and UR7e robot arm via ROS 2, implementing an algorithm to translate VR controller inputs into safe, singularity-free kinematic trajectories
- Developed a custom Python recording pipeline to log synchronized joint states at 2Hz for imitation learning, replacing capital-intensive motion capture labs with consumer VR hardware to solve training data scarcity
- Integrated an Intel RealSense vision module using HSV color filtering to trigger conditional autonomy, enabling the robot to dynamically queue and replay specific manipulation tasks based on real-time object detection

Autonomous Quadcopter Landing on Moving Platforms | *Python, Pyomo, IPOPT, CVXP* Aug – Dec 2025

- Designed a Model Predictive Control (MPC) framework to autonomously dock a quadcopter on a moving delivery truck, formulating the task as a Constrained Finite Time Optimal Control (CFTOC) problem
- Implemented a Nonlinear MPC using Pyomo and IPOPT that successfully rejected severe wind disturbances through aggressive maneuvering (up to 45° pitch), outperforming a baseline Linear MPC (CVXPY/OSQP) which saturated under constraints
- Engineered a hierarchical control architecture with a Finite State Machine (FSM) to segment flight phases (Approach, Sync, Land), ensuring precise trajectory tracking of the moving target while satisfying strict actuator bounds

Seismic Stability Control for Bipedal Robots | *MuJoCo, Python, Reinforcement Learning* Aug – Dec 2025

- Trained a reinforcement learning policy for a Unitree G1 humanoid to maintain upright stability during simulated earthquake events, successfully rejecting random ground velocity surges up to 5 m/s
- Designed a custom reward function in mjlab that penalized knee collapse and foot slip while incentivizing posture alignment, inducing emergent recovery behaviors such as arm counterbalancing and corrective stepping
- Validated controller robustness through extensive stress testing, demonstrating the robot's ability to recover from randomized external impact forces of $\pm$150N without termination