

DEREK CHIBUZOR

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EDUCATION

University of Southern California

Los Angeles, CA

Master of Science in Mechanical Engineering

August 2025-May 2026

* GPA: NA/4.00 | Mechatronic Systems, Robot Dynamics & Control, Extreme Environment Autonomy, Robotic Mobility

Bachelor of Science in Aerospace Engineering

August 2021-May 2025

* GPA: 3.62/4.00 | Computer-aided Design, Dynamic Systems, Linear Control, Computational Methods, Flight Mechanics

WORK EXPERIENCE

Dynamic Robotics and Control Laboratory

Los Angeles, CA

Robotics Software Engineer

January 2025-Present

- * Developed IK joint-space PD controller for 16-DOF robot, enabling leg trajectory data generation for system identification tasks.
- * Engineered system identification framework for improved Sim2Real transfer via gradient- and sampling-based hybrid optimization.
- * Trained residual physics networks to capture unmodeled actuator dynamics for 24-DOF robot, reducing state trajectory error by 78%.
- * Deployed evolutionary algorithms (CMA-ES) for parameter search, optimizing actuator parameters (e.g., damping, armature) by 67%.
- * Used latent space visualization and clustering algorithms (t-SNE, HDBSCAN) to assess coverage of PD control gains in hardware data.
- * Built and conducted hardware testing for Intel RealSense T265 ROS2 package to publish pose, velocity, and acceleration data.
- * Constructed diffusion model framework for generating full-body loco-manipulation trajectories from Unitree G1 motion capture data.

Lawrence Livermore National Laboratory

Livermore, CA

Computational Engineer Intern

June 2025-August 2025

- * Developed joint-space and task-space controllers for 6-DOF UR3e arm, enabling simulated manipulation of laboratory hardware.
- * Wrote IK task-space PD controller, saving 5+ hours of manual path programming while achieving sub-0.1 mm tracking error.
- * Trained imitation learning (BC, GAIL, AIRL) and reinforcement learning policies (SAC, DDPG) for pick and place tasks.
- * Architected transformer-encoder feature extractor to encode temporal state history, improving mean episode length by 20%.
- * Utilized implicit and explicit structural dynamics codes to conduct modal analysis of Brake-Reuss beam subject to broadband excitation.
- * Conducted FEA simulations to characterize nonlinear response of hyperelastic elastomer models under variable preload conditions.

Northrop Grumman

Roy, UT

Mechanical Engineer Intern

June 2023-August 2024

- * Constructed 2-DOF reduced-order Simulink model of shock-isolated structure, saving 240 hours of full-scale FEA computation.
- * Wrote post-processing scripts to characterize transient responses of 5 subterranean structures subject to 11 seismic excitations.
- * Designed and performed FEA on 2 access door CAD assemblies in accordance with MIL-STD-1472G human engineering criteria.
- * Evaluated CAD model of elastomeric isolator designed for seismic shock and vibration attenuation within subterranean structures.
- * Surveyed metal dichalcogenide lubricants to reduce shock isolator friction by 50% while retaining durometer and compressive modulus.

Amazon & Information Sciences Institute

Los Angeles, CA

Robotics Software Engineer Intern

June 2022-August 2022

- * Developed vision-based localization algorithm for “CLINGERS”, enabling 3-DOF pose estimation onboard NASA’s Astrobee robots.
- * Achieved sub-160 ms latency sensing, tracking of 12 infrared LED keypoints up to 2.50 m from Raspberry Pi NoIR camera.
- * Implemented adaptive tuning of LED detection parameters (e.g., circularity, inertia, area) to ensure far- to near-field tracking continuity.

SKILLS & CREDENTIALS

- * **Engineering:** Siemens NX, Simulink, LabVIEW, Abaqus, DYNA3D
- * **Other:** PyTorch, MuJoCo, JAX, OpenCV, Gymnasium, Stable-Baselines3, ROS2, CasADi
- * **Programming:** Python, C++, MATLAB, Java, JavaScript
- * **Skills:** Robotics, Dynamics, Control, GNC, Optimal Control, Trajectory Optimization, System Identification, CAD, GD&T, FEA

PROJECTS

- * **Multi-Agent MPC:** Distributed and decentralized model predictive control (DMPC) for 6-DOF multi-agent systems.
- * **Bipedal Robot:** Extended Kalman filter (EKF) and various controllers (e.g., LQR, MPC, I/O linearization) for 10-DOF bipedal robot.
- * **Dual-Axis Control System:** Sun-seeking, multithreaded, 2-DOF electromechanical solar array articulation module for 3U CubeSat.