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, Linear Systems, Flight Vehicle Stability & Control

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.