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: 3.90/4.00 | 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 **Sim2Real** transfer via gradient- and sampling-based **hybrid optimization**.
* Trained **evolutionary algorithms** and residual physics networks to model actuator dynamics for 24-DOF robot, reducing error by 78%.
* Constructed **diffusion model** framework for generating full-body loco-manipulation trajectories from Unitree G1 motion capture data.
* Built and performed hardware testing for Intel RealSense T265 **ROS2** package to publish pose, velocity, and acceleration data.
* Led **systems integration**, testing, and **hardware deployment** of Sim2Real workflow for 18-DOF robot locomotion controller.

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 **reinforcement learning** policies for pick and place tasks, reducing episode length by 20% with transformer feature extractor.
* Utilized implicit and explicit **structural dynamics** codes to perform **modal analysis** of jointed 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

GNC Engineer Intern June 2022-August 2022

* Developed **vision-based navigation** software, enabling **pose estimation** for 3-DOF rendezvous, proximity operations (**RPO**).
* Achieved sub-160 ms latency localization and tracking of 12 infrared LED targets 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 DMPC**: Distributed and decentralized model predictive control (DMPC) for arbitrary-DOF multi-agent systems.

*** Bipedal Robot Control:** Extended Kalman filter (EKF) and various controllers (e.g., QP, PD, MPC) for 7-DOF bipedal robot.

*** Dual-Axis Control System**: Sun-seeking, multithreaded, 2-DOF electromechanical solar array articulation module for 3U CubeSat.