

CAPPRIN BASS

Robotician, Boston, MA
(720)278-8213 \diamond capprin@gmail.com

EDUCATION

Oregon State University - Corvallis, Oregon M.S. Robotics Thesis: Geometric Optimization Methods for Mobile Systems	Sept. 2020 - July 2022 3.78 GPA
Colorado School of Mines - Golden, Colorado B.S. Computational and Applied Mathematics Biomechanical Engineering Minor	Aug. 2016 - May 2020 3.54 GPA

WORK EXPERIENCE

Boston Dynamics AI Institute <i>Robotician</i> <ul style="list-style-type: none">• Research and development on generational robotics problems• Modeling and control (stability, model-based, and adaptive) for a custom bimanual manipulator• Geometric mechanics of in-hand manipulation and the nature of nonholonomic constraint	October 2023 - Present
MITRE Labs <i>Robotics and Autonomous Systems Engineer</i> <ul style="list-style-type: none">• Research and on-hardware implementation of control barrier functions for safety-critical autonomy• Designed optimal control with respect to constraints on safety, actuators, dynamics, and mission• Support for the DoD TRMC Testing & Evaluation program in Autonomy and Artificial Intelligence	December 2022 - September 2023
Laboratory for Robotics and Applied Mechanics <i>Graduate Research Assistant</i> <ul style="list-style-type: none">• Applied geometric mechanics as a generalized framework for modeling of robot locomotion• Used differential geometry to map dynamics between robot shape, position, and other spaces of interest• Abstract-algebraic formulation makes methods invariant to coordinate choice or parametrization	October 2020 - July 2022

PROJECTS

3D Rotational Coordinate Optimization <ul style="list-style-type: none">• Derived and programmed finite-element optimization of rotational frame for kinematic, drag-dominated, and inertia-dominated mobile robot systems, using robot dynamics as an objective function• Chosen frame minimizes perturbation of orientation under changes in robot configuration
Optimally Constrained Shape Space Manifold <ul style="list-style-type: none">• Generated lower-dimensional choice of robot shape space by joining optimal closed motion plans

TECHNICAL STRENGTHS

Languages	MATLAB, Python, C++, R, Java, SQL, PHP, JavaScript, Node, Bash
Mathematics	Abstract Algebra, Differential Geometry, Finite Element Analysis, Optimization, Multivariate Analysis, Stochastic Models, Statistical Analysis
Mechanics	Lagrangian and Newtonian Mechanics, Optimal Control, Kinematics, Dynamics
Technologies	ROS, OpenCV, PyTorch, TensorFlow, Docker, Kubernetes, boto3, Neo4j