Spencer Kraisler

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Education

University of Washington, Ph.D. in Aerospace Engineering
Sept. 2021 – Dec. 2025 *expected*

University of Washington, B.S. in Mathematics
Sept. 2017 – June 2021
NASA Recipient Space Grant, 3x Dean's List

Technologies

Python, Matlab, C++, PyTorch, ROS, SQL, CVXPY, Simulink

Experience

Research Assistant, **RAIN Lab** – Seattle, WA
Sept. 2021 – Present

- Highly experienced with driving and executing research and development, specializing in applying complex math solutions to practical applications
- Collaborated with JPL, developed new 3D camera-based satellite pose estimation algo, published 2 papers
- Leadership: enable undergrads to integrate Kalman filter and test off-board PNT sensors
- Published 7 journal and conference papers, 3 as 1st author on pose estimation, policy optimization, Model Predictive Control (MPC)

Flight Software Intern, **SpaceX** – Redmond, WA
June 2022 – Sept. 2022

- Collaborated with senior devs, built pipeline using Python and SQL that pulls recent network topology and failure data for predictor verification
- Used pipeline to design and test several highly accurate network failure predictors
- 4 successful commit reviews for pipeline, failure predictors, and bug fixes

Software Intern, **Giving Tech Labs** – Seattle, WA
June 2020 – Sept. 2020

- Built and tested neural network and logistic regression models for emotion recognition from audio data using PyTorch – achieved 20% higher F1 metric score
- Committed emotion prediction models to production code base using Python, C++, and Swift

Projects

RAIN Lab Quadrotor Testbed
June 2024 - Present

- Designed custom quadrotor using open source PX4 autopilot software
- Using ROS, integrated Vicon motion capture system for quadrotor pose estimation
- Built digital twin and off-board motion planning system using Python with CVXPY and C++

Trajectory Optimization: Successive Convexification (SCvx), used for MPC
June 2024 - Present

- Using Python and CVXPY, built an augmentation of SCvx algo using *Riemannian optimization* techniques
- Convergence achieved in 50% less iterations on the constrained satellite pose control problem
- Collaborating with ACL lab at UW, writing paper on MPC and policy optimization

Additional Experience And Awards

RAIN Lab GitHub Organization Maintainer
Nov. 2023 - Present

ManOpt Contributor Contributes code to the ManOpt repo, a Matlab/Python package for Riemannian Optimization numerical computation
Jan. 2023

Third Prize, UW AA Research Showcase Awarded 3rd prize in a UW AA hosted research showcase competition on my satellite pose estimation project
Jan. 2021

Publications

Output-Feedback Synthesis Orbit Geometry: Quotient Manifolds and LQG Direct Policy Optimization *IEEE Control Systems Letters* **Spencer Kraisler**, Mehran Mesbahi	2024
Policy Optimization in Control: Geometry and Algorithmic Implications *Springer Encyclopedia of Systems and Control, in review* Shahriar Talebi, Yang Zheng, **Spencer Kraisler**, et al.	2024
Centralized and Distributed Strategies for Handover-Aware Task Allocation in Satellite Constellations *Journal of Guidance, Control, and Dynamics, in review* Josh Holder, **Spencer Kraisler**, Mehran Mesbahi	2024
Consensus on Lie Groups for the Riemannian Center of Mass *Conference on Decision and Control* **Spencer Kraisler**, Mehran Mesbahi	2023
Distributed Consensus on Manifolds using the Riemannian Center of Mass *Conference on Control Technology and Applications* **Spencer Kraisler**, Shahriar Talebi, Mehran Mesbahi	2023
Multi-Agent Passivity-based Control for Perception-based Guidance *AIAA SCITECH* Aditya Deole, Shahriar Talebi, **Spencer Kraisler**, et al.	2023
Vision-based Distributed Pose Estimation using a Spacecraft Constellation *AIAA SCITECH* Saptarshi Bandyopadhyay, Vinod P Gehlot, William Seto, Amir Rahmani, **Spencer Kraisler**, et al.	2023