Spencer Kraisler

spencerkraisler@gmail.com | 360-558-2527 | linkedin.com/in/spencer-kraisler | spencerkraisler.github.io

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, C++, PyTorch, CVXPY, SQL

Experience

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

- Highly experienced with driving and executing research and development, applying complex math solutions to practical applications
- Developed novel optimizer for solving LQG minimization problem, obtained linear convergence rate guarantee, improved from sub-linear rate of gradient descent; award winning paper
- Leadership: enable undergrads to integrate state estimator on ground robot testbed; organize weekly lab meetings and reading groups for TrajOpt and Lie Theory

Starlink 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

- Designed and tested neural network and logistic regression models for emotion recognition from audio data using PyTorch and sklearn – 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, CVXPY, and C++

Trajectory Optimization: Successive Convexification (SCvx) — June 2024 - Present

- Using Python and CVXPY, built an augmentation of SCvx algorithm 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

Best Student Paper Award for 2024 Conference on Decision and Control	Dec. 2024
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   2024
IEEE Control Systems Letters
Best Student Paper Award
Outstanding Student Paper Award
Spencer Kraisler, Mehran Mesbahi

Policy Optimization in Control: Geometry and Algorithmic Implications   2024
Springer Encyclopedia of Systems and Control, in review
Shahriar Talebi, Yang Zheng, **Spencer Kraisler**, et al.

Centralized and Distributed Strategies for Handover-Aware Task Allocation in Satellite Constellations   2024
Journal of Guidance, Control, and Dynamics, in review
Josh Holder, **Spencer Kraisler**, Mehran Mesbahi

Consensus on Lie Groups for the Riemannian Center of Mass   2023
Conference on Decision and Control
Spencer Kraisler, Mehran Mesbahi

Distributed Consensus on Manifolds using the Riemannian Center of Mass   2023
Conference on Control Technology and Applications
Spencer Kraisler, Shahriar Talebi, Mehran Mesbahi

Multi-Agent Passivity-based Control for Perception-based Guidance   2023
AIAA SCITECH
Aditya Deole, Shahriar Talebi, **Spencer Kraisler**, et al.

Vision-based Distributed Pose Estimation using a Spacecraft Constellation   2023
AIAA SCITECH
Saptarshi Bandyopadhyay, Vinod P Gehlot, William Seto, Amir Rahmani, **Spencer Kraisler**, et al.