Grant Stagg

970-787-0060 | grastagg33@gmail.com | linkedin.com/in/grant-stagg | https://orcid.org/0009-0006-9899-8551

Education

Brigham Young University Sep. 2021 – Present

Ph.D. in Electrical Engineering *Provo, UT*

- GPA: 4.0/4.0
- Utah NASA Space Grant Consortium Fellowship - Precision Mapping and Strategic Path Planning for UAV Navigation in Adverse Conditions
- **Relevant coursework**: Linear System Theory, Nonlinear System Theory, Robotic Localization and Mapping, Multi-agent Systems, Robotic Vision, Stochastic Processes, High Performance Computing, Theory of Predictive Modeling, Autonomous Vehicles

Brigham Young University Sep. 2017 – Apr. 2021

BS in Electrical Engineering *Provo, UT*

- *magna cum laude,* GPA: 4.0/4.0

Research Experience

Graduate Research Assistant Apr. 2021 – Present

BYU Multiple Agent Intelligent Coordination and Control (MAGICC) Lab *Provo, UT*

- Developed a linearized probabilistic engagement zone (PEZ) framework by extending past work in engagement zones (EZs) to account for uncertainty in pursuit-evasion differential games. This approach involved linearizing the EZ equations to estimate uncertainty in EZ regions while preserving computational efficiency.
- Employed the linearized PEZ method to create an efficient path planning algorithm that provides safety constraints for agents navigating around uncertain engagement zones.
- Designed a cooperative multi-agent UAV navigation framework for contested environments with enemy radar threats, integrating decentralized optimization for radar localization and safe path planning. Designed deterministic and probabilistic path planning methods. The probabilistic approach accounts for uncertainty in radar parameters using Voronoi diagrams and probabilistic constraints. Optimized UAV trajectories while considering kinematic constraints and radar detection probabilities. Demonstrated effectiveness through numerical simulations.
- Created a decentralized multi-agent path planning algorithm for level set estimation and environmental monitoring, leveraged B-spline parameterization and a novel objective function to balance exploration and exploitation.
- Ensured kinematically feasible paths and enabled multi-agent exploration by applying the differential flatness property of the unicycle model and implementing a block coordinate ascent algorithm, demonstrating effectiveness in both simulation and hardware experiments with mobile ground robots.
- Developed a decentralized sparse Gaussian process regression model with event-triggered, adaptive inducing points to improve real-time estimation of vector fields using multiple autonomous agents. Addressed key challenges in decentralized frameworks, including high computational costs, bandwidth limitations, and data fusion integrity, ensuring scalability and robustness in multi-agent systems.

Undergraduate Research Assistant Jan. 2018 – Apr. 2021

BYU Nanofluidics Research Group *Provo, UT*

- Fabricated nanofluidic pumps in the BYU Integrated Microfabrication Lab using photolithography, deposition (furnace, E-beam evaporator, and plasma enhanced chemical), and etching (plasma and chemical).
- Developed and designed new nanofluidic devices, including photolithography masks using Cadence software, and devised techniques for depositing nanofilms.
- Tested devices using a Raspberry Pi and custom circuitry.

BYU Cleanroom Machine Manager - E-beam evaporator May 2019 – Apr. 2021

BYU Integrated Microfabrication Lab *Provo, UT*

- Performed needed maintenance and troubleshooting for the e-beam evaporator, ensuring optimal performance and minimizing downtime.
- Trained 22 new operators on proper use of the machine including safety protocols, and best practices for the deposition process.

Leadership Experience

Student Coordinator June 2018 – Aug. 2020

BYU Chip Camp *Provo, UT*

- Coordinated six three-day STEM camps, engaging over 500 7th and 8th grade students in hands-on science activities designed to inspire interest in engineering.
- Managed and trained a team of 62 volunteers, preparing them as counselors to mentor students and lead all camp activities.
- Provided real-time support during the camps, ensuring a smooth and efficient experience for all involved.

Publications

- Grant Stagg and Cameron K. Peterson. Probabilistic weapon engagement zones, 2025. Accepted for presentation at the *2025 American Control Conference (ACC)*
- Grant Stagg and Cameron K. Peterson. Multi-agent path planning for level set estimation using B-splines and differential flatness. *IEEE Robotics and Automation Letters*, 2024
- Tanner Norton, Grant Stagg, Derek Ward, and Cameron K. Peterson. Decentralized sparse gaussian process regression with event-triggered adaptive inducing points. *Journal of Intelligent & Robotic Systems*, 108(4):72, 2023

Technical Skills

Languages: Python, C, C++, Matlab, CUDA

Computing: CUDA, High-Performance Computing

Robotics and Control: Multi-Agent Systems, Optimization, Path Planning, Trajectory Optimization