# Seamus Johnston

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## EXPERIENCE

### Software Engineer - Controls
Mountain View, CA

*Nuro*
*Apr 2022 – Nov 2022*

- Responsible for controller analysis infrastructure/tooling and safety critical software development
- Developed a safety critical controller/driver state machine in C
- Decomposed technical safety requirements into software requirements and wrote unit tests for validation
- Developed and maintained an automated large scale analysis tool for on-road/simulated controller analysis in C++/Python

### Controls Engineer
Mountain View, CA

*Wisk Aero*
*July 2020 – Mar 2022*

- Responsible for controller design and analysis for an autonomous eVTOL aircraft
- Designed controllers/mixers/filters for a subscale aircraft in Simulink and analyzed flight test data to assess performance and robustness
- Performed system identification to determine model properties, which enabled more accurate simulation and better controller design/tuning
- Engaged in trade studies to compare various control architectures and vehicle configurations
- Created tools for linear controller analysis and flight data analysis in MATLAB and Simulink

### Flight Controls Intern
Mountain View, CA

*Kitty Hawk*
*May 2019 – Aug 2019*

- Responsible for controller/modeling work for an autonomous eVTOL aircraft
- Implemented and analyzed a thermal motor model in C and MATLAB
- Modified deceleration trajectory planning to greatly simplify landing behaviour

### Vehicle Dynamic Controls Intern
Santa Clara, CA

*NVIDIA - Autonomous Vehicles Group*
*Sept 2018 - Dec 2018*

- Responsible for filter and controller design/optimization for an autonomous car
- Designed a control system latency monitor and analyzed controller performance
- Analyzed and designed different methods for state filtering (Kalman, etc.) in C++ which reduced measurement noise and jerk, resulting in improved ride quality

## PROJECTS

### Co-Founder/Software Lead | *UW Sailbot - University of Waterloo*
May 2016 – Sept 2019

- Created an autonomous sailboat to compete in the International Robot Sailing Regatta
- Developed a velocity optimized GPS path planning algorithm in Python
- Designed the complete ROS architecture for autonomy on an NVIDIA Jetson TX1
- Wrote an OpenGL simulator for ROS navigation development/simulation and data visualization

### Path Planning/Controls Lead | *Caravel - University of Waterloo*
Sept 2019 – Dec 2019

- Responsible for planner/controller design for an autonomous Toyota Corolla
- Designed steering PI controller to maintain heading and reduce cross track error
- Designed an iLQR path planner in C++ using a bicycle model to create trajectories based on a reference spline, while minimizing control action

## EDUCATION

### University of Waterloo
Waterloo, ON

*Bachelor of Applied Science in Mechatronics Engineering*
*Sept 2015 – May 2020*

## SKILLS

**Languages**: C/C++, Python, MATLAB, Bash, Arduino, SQL, XML
**Frameworks**: Eigen, ROS, Gazebo, ADRL Control Toolbox, MATLAB Control Toolbox, Simulink, Pandas, BigQuery, Bazel, CMake
**Hardware**: Arduino, Raspberry Pi, NVIDIA Jetson, ARM, 3D Printing, Laser Cutting