Joshua O'Reilly

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Education

Master of Science in Robotics, Systems and Control *2021 – 2024*
ETH Zürich

- Path planning and Decision Making, Vision Algorithms for Mobile Robots, Robot Dynamics, Dynamic Programming and Optimal Control, Intro to Machine Learning, High Performance Computing

BASc in Mechanical Engineering and BSc in Computing Technology *2015 – 2020*
University of Ottawa

Experience

Research Assistant/Masters Thesis | *Zürich, Switzerland* *Feb 2023 – Present*
ETH Zürich | Computer Vision and Geometry Group

- Building the first large-scale human-robot co-localization benchmark for future mixed-reality applications
- Developed scalable pipeline to integrate robot data into benchmark; corrected systemic odometry measurement drift by detecting loop closures and performing bundle adjustment using Python, C++, ROS, Docker, and Maplab
- Selected and installed sensors on robot using C++, Python and ROS, wrote tooling for recording and managing data using Bash and Python, and recorded robot dataset

Semester Project | *Zürich, Switzerland* *Feb 2022 – Jun 2022*
ETH Zürich | Robotic Systems Lab

- Taught quadruped robot to walk over stepping stone terrain using Principal Policy Algorithm in Isaac Gym environment; added additional rewards to incentivize locomotion and modified terrain curriculum to avoid early catastrophic failure using PyTorch, CuPy and OpenCV

Research Assistant | *Ottawa, Canada* *Jan 2019 – Sep 2020*
University of Ottawa

- Deployed autopilot stack to Pixhawk 4 and Raspberry Pi using Simulink Embedded Coder, allowed serial communication between devices over UART using C++ and Python
- Automated gain selection for airship dynamic model by parallelizing simulation execution and selecting gains based on simulation results using MATLAB

Software/Mechanical Engineering Intern | *Ottawa, Canada* *Fall 2018*
Romaeris Corporation

- Re-wrote multi-threaded aircraft monitoring system with Python and OpenCV, allowing for an arbitrary number of concurrent onboard cameras, and improved frame rate processing speed by 50%

Robotics Intern | *Saarbrücken, Germany* *Spring 2018*
Zentrum für Mechatronik und Automatisierungstechnik

- Used surface laser scans to align end effector of 6-DoF robotic arm with riveting surface using ROS and Python
- Improved read and write speeds of data collector by factor of 30 using Python and Pandas

Tools

C/C++ Python Bash MATLAB PyTorch OpenCV CUDA SSE/AVX OpenMP Docker ROS Git Linux SolidWorks Fusion360