

Brian Lui

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EXPERIENCE

Amazon Project Kuiper, Redmond, Washington

Guidance, Navigation, & Controls Engineer

Jan 2021 – Mar. 2023

- Implemented algorithms to improve model fidelity in C++ for both simulation and flight software
- Worked with cross functional teams to deliver the coarse sun sensor through functional testing
- Derived and implemented equations of motion and flex dynamics from first principals in simulation

Amazon Prime Air, Seattle, Washington

Hardware Development Engineer

Mar. 2020 – Jan 2021

- Conduct material level testing as per ASTM standards and RTCA DO-160G to enable development, qualification, and compliance with requirements and regulations for carbon fiber, adhesives, and core material used in drone development
- Performed trade studies of adhesives for composite repair and foam core material for improved drone robustness
- Supported manufacturing and production challenges through failure analysis and root cause corrective actions

Product Design Engineer Intern

Jun. 2019 – Aug. 2019

- Investigated the root cause of carbon fiber porosity on the trailing edge of the wings of the drone
- Improved manufacturing and material selection to solve porosity problem and reduce foam weight by 38%
- Automated data parsing of experimental data from materials testing using Python scripts

Teaching Assistant, Cornell University, NY

Aug. 2018 – Dec. 2019

Mechatronics (Fall '18, Fall '19)

- Led a weekly 30 student lab section about circuits and programming Arduino UNOs to eventually build an autonomous robot for collecting wooden blocks
- Held office hours and review sessions; answered questions on Piazza; graded lab reports and homework

Biorobotics and Locomotion Laboratory, Cornell University, NY

Jun. 2017 – May 2018

Undergraduate Researcher under Professor Andy Ruina

- Designed molds using SolidWorks to create the curved feet and shoes of a biped walking robot
- Manufactured the feet of the biped walking robot using wet carbon fiber, foams, and 3D printed molds
- Created a flexible PCB using Eagle that allowed pressure sensors to fit inside the feet of the robot

PROJECTS

Autonomous Mobile Robots

- Programmed an iRobot Create to handle localization and sensor fusion using an extended Kalman filter and particle filter for a known map and using SLAM for an unknown map; autonomously traversed to waypoints using a rapidly-exploring random tree and feedback linearization on a known map

Applied Dynamics

- Solved for periodic trajectories for a particle subjected to a central force using trajectory optimization (single shooting, multiple shooting, collocation) through a nonlinear optimization in MATLAB

Embedded Operating Systems

- Analyzed the dynamics of a Furuta pendulum in MATLAB, then designed, machined, and controlled it using a Raspberry Pi, IMU, and stepper motor in real time in Python

EDUCATION

Cornell University, Ithaca, NY

Aug. 2015 – Dec. 2019

- Masters of Engineering in Mechanical Engineering
- Bachelors of Science in Mechanical Engineering
- *Relevant Coursework*: Intermediate Dynamics, Nonlinear Dynamics, Vibrations, Feedback Control Systems, Mechatronics, Autonomous Mobile Robots, Machine Learning, Embedded Operating Systems, Statics and Mechanics of Engineering Materials

SKILLS

Programming Languages: C++, MATLAB, Python, Java

Computer Programs: Git, Simulink, CAD (CATIA, NX, SolidWorks, Autodesk Fusion 360), ANSYS, Autodesk EAGLE, Linux

Fabrication Skills: Metal machining (lathes and mills), 3D Printing, Laser Cutting, Soldering