JULIAN AWAD

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EDUCATION

Bachelor of Engineering Physics, Mechanical Stream September 2019 - May 2024

- Faculty of Engineering at Queen's University, Kingston ON
- Dean's List with Honours - GPA of 3.77/4.3

EXPERIENCE

Rocket Lab (Sinclair Interplanetary) January 2023 - August 2023

Mechanical Engineering Intern

- Redesigned and prototyped the entire mechanical assembly of the 1000Nms reaction wheel, leading to significant improvements in manufacturability, ease of assembly, and performance.
- Analysed and characterized the magnetic field two different rotor magnetic arrays to determine optimal placement of hall sensors, resulting in an increase in measurement reliability.
- Assembled, inspected and tested to the highest available industry standards several satellite components currently operating on orbit.
- Designed and manufactured 7+ Ground Support Equipment to aid in testing, manufacturing, inspection, and assembly across all departments.

MDA May 2022 - December 2022

Mechanical Engineering Intern

- Automated the entire end-to-end testing infrastructure for the CANADARM2 using Python, Pandas, and NumPy for efficient parsing, analysis and visualization of test data, leading to 10x time savings.
- Building a custom DAQ system using LabVIEW to be used in several testing scenarios, including up to 20 load cells, 10 LVDTs, and 8 thermocouples.
- Performing structural testing and analysis for Lunar Gateway Grapple Fixtures and End Effectors to characterize the stiffness of the latched assembly in all directions.
- Performing end-to-end control systems test campaigns for the CANADARM2 using HITL/SITL simulations.
- Defining system requirements for the GERS project (Lunar Gateway/CANADARM3) using PTC Windchill.

Lockheed Martin May 2021 - August 2021

Hardware Engineering Intern

- Performed detailed SolidWorks FEA analysis to validate equipment to Military Standard 901D
- Created an Excel VBA tool to generate shock response spectra from an impulse function for shock & vibe testing, allowing for rapid simulation and validation of equipment to industry standards
- Accomplished overall 2x cost reduction and 4x time savings by performing detailed make-vs-buy analysis on electronics enclosures and presenting to senior engineers

Department of National Defense May 2020 - August 2020

Engineering Intern

- Documented and presented key specifications on armored patrol vehicles for 411 vehicles in 69 variants
- Reworked procurement documents based on technical requirements from multiple military bases
- Proofread english-to-french translations of contracts to ensure correctness

PROJECTS & PUBLICATIONS

Undergraduate Thesis September 2023 - April 2024

Modelling a Relativistic Spacecraft Mission to Detect a Distant Primordial Black Hole Orbiting Our Sun

- Conducted an 8-month research project on modeling a relativistic spacecraft mission to detect a primordial black hole (PBH) hypothesized to orbit our sun.
- Synthesized the current literature on the Planet 9 hypothesis and constraints on its location and orbital parameters.
- Developed a comprehensive model of thermal emissions from accreted matter around the hypothesized Planet 9 PBH, incorporating Bondi's spherical accretion theory.
- Optimized mission parameters for cost-efficiency and speed using the Breakthrough Starshot initiative framework, aiming to propel spacecraft to relativistic speeds of up to 0.2c.
- Estimated the number of spacecraft required for a conclusive search for Planet 9 by calculating the effective search radius and subdividing the probable location in the sky.
- Analyzed the economic feasibility of the mission, including capital expenditure for ground stations and per-mission energy costs.

Undergraduate Publication September 2021 - December 2021

An Investigation of Magnetic Radiation Shields for Human Space Habitats *Awad et al.*

- Designed and conducted an experiment over 6 weeks to measure the viability of a superconducting magnet as an active shield from radiation, GCRs, and lunar regolith for lightweight space travel applications.
- Manufactured a vacuum chamber with a cooling tube configuration, wire feed-through, and a beta particle detector capable of maintaining a vacuum of 0.1 Pa to minimize particle stopping power and reduce condensation.
- Designed superconducting magnet configurations made of superconducting YBCO tape with a vacuum-tight cooling system to maintain critical temperatures of 77K.
- Created a Python program to perform in-depth analysis of the raw data, including noise filtering, curve fitting, and extrapolation to demonstrate clear trends.

Co-Founder, PolyTwist Designs November 2015 - Present

www.polytwist.xyz

- Co-founded a small business designing and manufacturing original Rubik's-Cube-style puzzles with unique mechanisms, challenges, and solutions using FDM 3D Printing and SolidWorks.
- Designed and manufactured several novel products end-to-end resulting in 16+ original designs.
- Created and maintained a website and online shop resulting in $20,000 in sales of 16+ products over three years.
- Negotiated a partnership with Rubik's Brand Ltd. to mass-produce a product, involving the design stages to manufacturing through injection molding and packaging design.

SKILLS

Mechanical Engineering	SolidWorks, Solid Edge, DFM & DFA, AIT, 3D Printing
Experimental Physics	DAQ with LabVIEW, Electronics, Experimental Design, Vaccuum Systems
Data Analysis	Python/Jupyter, Numerical Methods, Scientific Computing, MATLAB
Languages	English, French (Native Bilingual), Spanish