JULIAN AWAD

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SUMMARY

Engineering Physics graduate with extensive experience in mechanical engineering, aerospace, and defense. Skilled in designing, analyzing, and testing mechanical systems, including spacecraft components and robotic arms. Proficient in SolidWorks, GD&T, LabVIEW, and Python, with a strong background in experimental physics and data analysis. Proven ability to improve manufacturability, reliability, and performance through innovative design solutions. Effective communicator and collaborator, experienced in managing cross-functional teams complex projects.

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
- Head of the Brazilian Jiu-Jitsu Club 2020-2024

EXPERIENCE

Rocket Lab (Sinclair Interplanetary) January 2023 - August 2023
Mechanical Engineering Intern

- Redesigned the entire mechanical assembly of a 1000Nms Reaction Wheel from initial design stages to production leading to significant improvements in manufacturability, ease of assembly, and performance.
- Collaborated closely with stakeholders, including engineers, technicians, and manufacturers, to gather and integrate their requirements into design decisions; implemented these into CAD models and created detailed engineering drawings using GD&T principles.
- Created a test to reliably characterize magnetic fields of different magnetic arrays using Arduino and hall sensors; wrote a test proposal, executed the test, analyzed the data to draw conclusions, and wrote a detailed test report.
- Assembled, inspected and tested several satellite components currently operating on orbit ensuring consistency, quality, and performance across hundreds of units.
- Designed and manufactured 7+ Ground Support Equipment to save time and improve workflow in various testing, manufacturing, inspection, and assembly scenarios.

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.
- Built a custom NI DAQ system using LabVIEW to be used in several testing scenarios, including up to 20 load cells, 10 LVDTs, and 8 thermocouples.
- Performed structural testing and analysis for Lunar Gateway Grapple Fixtures and End Effectors to characterize the stiffness of the latched assembly in all directions.
- Performed end-to-end control systems test campaigns for the CANADARM2 using HITL/SITL simulations.

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.

SKILLS

CAD Modelling/Drawing	SolidWorks, Solid Edge, GD&T, DFM & DFA, 3D Printing
Assembly, Integration & Test	Test Design, Helicoil Insertion, Quality Inspection, Infor LN
Experimental Physics	LabVIEW DAQ, Electronics, Experimental Design, Vacuum Systems
Data Analysis	Python, Pandas, Numerical Methods, Scientific Computing, MATLAB
Languages	English & French (Native Bilingual), Spanish

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 costing 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.
- 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, resulting in over a million units sold internationally
- Created and maintained a website and online shop resulting in $20,000 in sales of 16+ products over three years.

ABOUT ME

- Certified Advanced Open Water SCUBA diver, have been diving in Mexico and Malaysia so far (ask me for pictures!)
- Fought Muay Thai, Mixed Martial Arts, and Brazilian Jiu-Jitsu in Thailand for 7 weeks.
- Can solve a Rubik's Cube in under 20 seconds.
- Will pet any cat I see, even though I am slightly allergic.