Matteo Aiello

Mechanical Engineering Student

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EDUCATION

University of Victoria — **Victoria, BC**

Bachelor of Engineering (BEng): Mechanical Engineering – GPA: 3.8/4.0 — 2017-Present

WORK EXPERIENCE

Mechanical Engineering Co-op – General Fusion Inc.

May – September 2021 | Burnaby, BC

- Worked on testing and optimizing the team's primary compression test bed: the Cylindrical Water Compressor (CWC). The CWC simulates shaped collapses for plasma compression in a nuclear fusion reactor using pneumatics.
- CWC-related tasks included pneumatic design/assembly, 3D modelling, Python scripting for pressure analysis, automation in LabVIEW, 3D printing (SLA), diagnostic equipment calibration, development, and assembly.
- Underwent thorough design of a custom calibration device to mitigate error in image-recognition algorithms. Conducted design reviews of 3D models, machined custom parts, and assembled the apparatus.
- Operated a high-pressure vessel with high-powered, red/infrared, collimated lasers from an integrated control panel.
- Created various test jigs for simulation of certain events/behaviors related to optics and pneumatics.

Mechanical Engineering Co-op – Ergonomyx Technologies Canada Inc.

May – September 2020 | Victoria, BC

- Acted as one of two mechanical engineers in a small start-up company, yielding experience with increased responsibility, independence, and communications.
- Underwent extensive design, prototyping, assembly, and iteration of mechanical systems with challenging constraints. Employed practices like 3D printing, modelling, soldering, machining, circuitry.
- Developed a quiet, efficient energy harvesting solution with brushless DC motors – using pulley systems and hardware electronics – that was implemented in stationary bikes.

Systems Engineering Co-op – Corvus Energy Inc.

January – May 2019 | Richmond, BC

- Assembled and utilized a thermocycling test jig to simulate strain/stress on lithium-ion battery modules due to thermal expansion differentials.
- Developed python scripts to plot/evaluate resistance data from a welded-tab battery jig DAQ in MATLAB.
- Modelled and evaluated various battery module testing jigs using Solidworks. Finite Element Analysis was used to understand stress cracks and other failure modes on prototype laser welds.
- Designed a new method of vibration testing to mimic operational fatigue of electrical components and analyze integrity.

Sustainable Energy Engineering Co-op – Crescent Point Energy Corp. (CPG)

May – September 2018 | Calgary, AB

- Assisted with and provided research for multiple projects with aim to reduce company carbon intensity (emissions/production). Focused primarily on solar, wind energy and power reduction.
- Performed economic modelling, emission projections, power savings, and CAD layouts to help assess the feasibility of new projects. Worked with PFDs, P&IDs, and other schematics.
- Utilized the laws of fluid mechanics and thermodynamics to make calculated projections for heat exchangers.

PROJECT EXPERIENCE

Optical Calibration Device (OCD) – General Fusion Inc.

Designed and assembled a device for optical calibration of diagnostic equipment on a compression test bed called the Cylindrical Water Compressor (CWC). The apparatus can translate to precise locations within an enclosure and provide spring-actuated fiducial arms for high-speed cameras.

Tidal Turbine Gearbox – University of Victoria

Designed a custom 1500 kW tidal turbine gearbox using various calculations and a supplemental Solidworks CAD package. Acted as the co-leader of the team's communications, design, documentation, and workflow.

Laser Weld Integrity Testing – Corvus Energy Inc.

Designed and executed a comprehensive test plan to assess prototype weld designs on thermocycling jigs, simulating strain/stress of regular operation. The jigs were operated using a microcontroller-based system with sensors and a DAQ.

Energy-Harvesting Stationary Bicycle – Ergonomyx Technologies Inc.

Helped design an energy-harvesting solution for stationary bicycles using Fusion 360, 3D-printing, electrical hardware, and machining to conceive a DC motor-to-pulley mechanism capable of generating 5V at 30rpm.

Vibration Testing Model – Corvus Energy Inc.

Established a method of accelerated-life testing for vibrational fatigue of shipboard batteries with LabView and MATLAB.

Mechatronic Sorting System – University of Victoria

Programmed a sorting system for differing materials using an MCU, various sensors, stepper motors, and electrical hardware.

TECHNICAL SKILLS

- **Design** – skilled at designing spreadsheets and engineering drawings with GD&T. Experienced in Solidworks, AutoCAD, Fusion360, Siemens NX12, Microsoft Vizio, PFDs, P&IDs, LabVIEW.
- **Testing** – able to produce and evaluate smart test cases/scripts to in python with MATLAB/LabVIEW integration. Experienced in Finite Element Analysis (FEA): ANSYS and Solidworks Simulation.
- **Software**– fundamental programming competency in C, MATLAB, Java, and Python. Proficient in Microsoft Office. Familiar with various software development environments/practices (i.e., GitHub Team Repository Control, MySQL).
- **Mechanical** – hands-on experience with electrical hardware, circuitry, pneumatics, 3D printing (SLA/FDM), and machining.

VOLUNTEERISM

- **Community Leader/Athlete** – Served as a member of the community playing for the local hockey team in Fort McMurray (semi-professional), participating in charity events, making speeches, and raising money towards a community rebuild following the traumatic fires in 2016.
- **Rider** – Participating in an annual cycling challenge to raise money for cancer through the SickKids Foundation by pledging to ride at least 500km throughout the month of august. Last year's individual efforts raised over $3300.
- **Campus Wingman** – Currently serving as a member of the Canada Action Coalition to educate and inspire other Canadians about Canadian energy and resources. A campus wingman also helps recruit others in his/her community.

REFERENCES

Scott McNally – Engineer, Crescent Point Energy. Harvard, Stanford Graduate

Piotr Forysinski, PhD – Manager, Compression Systems Testing, General Fusion Inc.

Sergio Perez – Engineering Lead, Ergonomyx Technologies Canada Inc.

***Referee contact information available upon request.**

***See *https://matteoaiello.github.io* for more information on projects, skills, etc.**