

Matthew Lai

Summary of Qualifications

- Proficient in mechanical design, with experience in rapid prototyping techniques, design for manufacturing/assembly, GD&T, and various CAD softwares such as SolidWorks, AutoCAD, and Fusion360
- Advanced understanding of MATLAB with working knowledge of C/C++, and Python, in addition to hands-on experience with prototyping electronics such as the Arduino and Raspberry Pi platforms
- Well-experienced with additive manufacturing technologies, with exposure to production- and consumer-grade DMLS, FDM, SLA and multi-jetting and systems
- Multifaceted approach to problem solving developed through multiple collaborations during the engineering major, in addition to previous terms in the sciences and humanities
- Excellent organizational skills with high attention to detail, ability to work effectively alone or in cooperation with others demonstrated through six co-operative work terms, achieving three Outstanding and three Excellent ranks

Education

Bachelor of Applied Science

Honours Mechanical Engineering, Option in Life Sciences

University of Waterloo
September 2015 - April 2020

Experience

Pegasus Aeronautics

Product Engineering

Waterloo, Ontario
May 2019 - August 2019

- Undertook the manufacturing efforts of Pegasus' most in-demand product, the GE70 UAV range extender
- Independently designed and prototyped new iteration of components with the in-house Tormach CNC mill and Fusion 360 CAM software
- Engaged in expanding the company portfolio through the research and development of novel products and technologies which would benefit and enhance the current roster of range extenders
- Refined quality assurance and increased efficiency with the creation of testing procedures and fixtures

Brachium Inc.

Mechatronics Engineering Intern

San Ramon, California
September 2018 - December 2018

- Independently re-engineered and prototyped an integral sub-component of Brachium's automated dental procedure system that enhances user experience, and through internal testing, subjectively achieved a greater satisfaction and comfort level when compared to the currently used devices
- Piloted the creation of a testing method to measure physical flow characteristics of existing and novel dental tools, using a custom-built Arduino shield to monitor inputs and MATLAB scripts to analyze the results
- Collaborated with the design, prototyping, and testing of the robotic end effector through multiple additive manufacturing method, including SLA, FDM, and DMLS

Multi-Scale Additive Manufacturing Laboratory

Additive Manufacturing Designer

Waterloo, Ontario
January 2018 - April 2018

- Managed the mechanical design of major components and subsystems for a novel directed energy deposition additive manufacturing system
- Supported in the design of experiments (DOE) of many projects for industrial partners, including GE Aviation and Lockheed Martin
- Prepared design for manufacturing and assembly (DFM/DFA) models for internal university research groups

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Experience (continued)

The Hospital for Sick Children

Robotics Research Assistant

Toronto, Ontario

April 2017 - August 2017

- Designed and manufactured, through rapid prototyping techniques, surgical tool handles, adapting robotic tools for manual usage
- Contributed to the design and manufacture of novel surgical tools using nickel titanium alloy, assisting in the advancement of minimally-invasive surgical techniques and procedures
- Oversaw all external projects, with assignments including: designing silicon molds, and slicing and 3D printing of skulls for clinical studies

3D Print Centre, University of Waterloo

Circuit Board Manufacturing Engineering Assistant

Waterloo, Ontario

September 2016 - December 2016

- Independently managed printed circuit board manufacturing operations and oversaw major 3D printing projects
- Investigated and audited original processes and methods, and established cost-saving techniques while continuously maintaining customer satisfaction

3D Print Centre Engineering Assistant

January 2016 - April 2016

- Independently managed 3D printing operations and optimized work flow through excellent scheduling and time management skills, resulting in highest-grossing term for in centre history
- Acquired significant knowledge and hands-on experience with professional grade 3D printers through the daily operation and maintenance of two Fortus 360mc printers and one Dimension SST 1200es

Notable Projects

Design of a Liquid Rocket Engine

Fourth Year Capstone Project

May 2019 - August 2019

- Undertook the task of designing a novel liquid rocket engine in association with the Waterloo Rocketry student team of a collegiate competition
- Independently designed of an injector valve assembly for the engine to sequentially actuate oxidizer and fuel ball valves, which consisted of a air piston-driven rank and pinion mated to a custom Geneva mechanism
- Responsible for all electrical components used in and for testing of the liquid rocket engine