Trevor McCourt

Candidate for BASc, Mechanical Engineering

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Valid Driver's License

SUMMARY OF SKILLS

- Familiar with various analysis methods, including advanced static analysis and FEA + CFD using SolidWorks
- Skilled 3D modeller, specifically in SolidWorks, with experience in component/assembly design. Familiar with Pro/E and Inventor
- Experienced Drafter, with professional experience in detailed engineering drawing creation, who is proficient with both AutoCAD and MicroStation. Familiar with GrabCAD/ProjectWise PDM systems
- Versed in fabrication methods including 3D printing, composites + mold making, and light machining
- Excellent technical troubleshooting skills; mechanical intuition gained through continuous tinkering
- Familiar with geometric dimensioning and tolerancing (GD&T) techniques
- Experience in the application of a variety of programming languages including C, Java, Python, MatLab etc.

PROFESSIONAL EXPERIENCE

Toronto Transit Commission

Toronto, Ontario

May 2016- September 2016

Assistant Mechanical Designer- Automatic Train Control

- Designed assemblies and components related to the installation of Digital Control Systems equipment that are in use on both the existing YUS line and the upcoming Spadina Extension
- Performed mechanical analysis on assemblies, calculated stresses, designed components to survive cyclic loading. Selected materials to minimize corrosion
- Developed engineering drawings with detail and precision that were peer reviewed, approved and issued for construction
- Used functional dimensioning techniques to ensure problem free large scale production of wayside mounting structures
- Troubleshot existing structurally unstable designs and developed solutions that improved on longevity and usability
- Performed surveys, ensured that my designs would not interfere (electrically or mechanically) with pre-existing equipment

University of Waterloo Aerial Robotics Group

Waterloo, Ontario

September 2015- Present

Mechanical Design Team Lead

2016- Design/Fabrication of fiberglass VTOL UAV, 2-meter wingspan

- Created 3 conceptual designs for aluminum VTOL aircraft landing gear with varying feature sets. Chose the most practical concept and created a detailed design. Performed analysis, created drawings, and fabricated final design
- Performed analysis on VTOL airframe components (by hand + FEA), derived equations to be used in cross section generation and material selection
- In the process of testing/fabricating tilt-wing mechanism
- Leading a team of new members in the development of a Robotic arm to be mounted to the VTOL
- Worked with fiberglass and CNC'd foam to create airframe components
- VTOL Project management lead; guided team meetings and online organization to ensure tasks were completed on time and with adequate communication

2015-Project SPIKE- ReadyMade RC Anaconda Outfitting

- Used SolidWorks to design a 3D printed brushless gimbal. Used successfully in 2015 unmanned systems Canada competition (See video on website!)
- Created a 3D assembly of the 2015 aircraft for systems integration purposes
- Developed control windows for a JavaScript based ground station application

PERSONAL DESIGN PROJECTS (SEE FOR MORE)

Bicycle Frame Design
- Designed and modeled an anatomically correct classic geometry carbon road bike frame based on principles found in *Lugged Bicycle Frame Construction* by Marc-Andre Chimonas
- Used CFD to calculate aerodynamic properties of the frame and cockpit
- Designed the frame to be compatible with modern Shimano components

Hybrid Aircraft
- Designed, analyzed, and manufactured a helium based hybrid aircraft
- Experienced working with quadcopter components
- Developed embedded control code

Custom Multi-Rotor
- Handpicked and assembled components to make up a fully autonomous quadcopter
- Handmade wires, soldered joints

Everyday Design
- Ongoing design and prototyping of components/assemblies using 3D printers/laser cutters that serve to improve my quality of life
- Examples include cooling chamber for laptop, pebble watch charging station, magnetic clamp to hold bike handlebars straight during maintenance , ergonomically correct iPhone 5S case

University of Toronto Space Design
- Created long-term plan that outlined the process of mining near earth asteroids
- Researched and calculated maximum payloads and orbital trajectories
- Used AutoCAD to create 3D models of rocket and lander prototypes

Injection Molder Redesign
- Redesigned an injection molding machine for a corporation to compensate for a large amount of error in the molding process
- Modeled all custom components in SolidWorks
- Evaluated thermal and structural properties of materials

RECENT SOFTWARE PROJECTS

Li-Fi Transceiver
- Developed software to be used on embedded systems to facilitate the transfer of data over the visible light spectrum
- Experienced cross-platform interaction- Java C interface
- Successfully transmitted 85% of an image over visual light
- Medaled in 2014 Metro Toronto Science Fair

Prototype Learning Search Engine
- Co-Developed search engine that displayed a tree of results based off of user keyword inputs
- Interfaced with IBM Alchemy API via python/C# to get most relevant keywords from user input and google search results

INTERESTS

- Road Cycling
- Road Bike Restoration
- Physics/Math Competitions
- Trumpet
- Archery, recreational hockey

Some projects that can be found on my website: