# Trevor McCourt

Candidate for BASc, Mechanical Engineering


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**Valid Driver's Licensce**


## SKILLS AND QUALIFICATIONS

- Familiar with many analysis methods, including advanced static analysis and FEA + CFD using SolidWorks
- Expert 3D modeller, specifically in SolidWorks, with experience in component/assembly design
- Experienced Drafter, with professional experience in detailed engineering drawing creation, who is proficient with both AutoCAD and MicroStation
- Versed in fabrication methods including 3D printing, composites + mold making, and light machining
- Excellent technical troubleshooting and problem-solving skills, with an intuition gained through the enjoyment of hands on mechanical work
- Familiar with geometric dimensioning and tolerancing (GD&T) technique
- Competent scripter; familiar with a variety of programming languages including C, Java, Python, MatLab etc.

## PROFESSIONAL EXPERIENCE

### Toronto Transit Commission

Toronto, Ontario

**May 2016- September 2016**

### Assistant Designer- Automatic Train Control (DCS + CBI)

- Designed assemblies and components related to the installation of Digital Control Systems equipment that are currently in use in both the existing YUS line and the upcoming Spadina Extension
- Performed mechanical analysis on assemblies, calculated stresses, designed components to survive cyclic loading
- 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
- Created million dollar power cable layout from circuit drawings and personally collected survey data that are currently being implemented in the Wilson Yard re-signaling and expansion project

### University of Waterloo Aerial Robotics Group

Waterloo, Ontario

**September 2015- Present**

### Mechanical Design Team Lead (Structural)

2016-Project VTOL- Design/Fabrication of VTOL UAS

- 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 designing and testing/fabricating tilt-wing mechanism
- Leading a team of new members in the development of a Robotic arm to be mounted to the VTOL
- 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 and manufacture a 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
- Aided in the development of a JavaScript based ground station

## PERSONAL 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
- Performed material and structural analysis

**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 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

**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

**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

## EDUCATION

**University of Waterloo**

**Candidate For Bachelor of Applied Science, Honors, Mechanical Engineering**

**Academically ranked 9th/211**

**September 2015-Present**

## PERSONAL ACHIEVEMENTS

- Extremely positive academic standing, with a CGPA of 3.95
- Bronze Medal, 3 years in a row, University of Toronto Metro Science Fair
- Strong in academic competitions (top 5% SIN physics exam, top 6% Avagadro chemistry exam, etc.)
- Silver Medal Overall, University of Toronto Space Design Competition
- Silver Medal, OFSSA Archery
- Top First Year Cadet, 330 Squadron, Royal Canadian Air Cadets

## INTERESTS

- Road Cycling
- Road Bike Restoration
- Trumpet
- Archery, recreational hockey