TREVOR MCCOURT

Candidate for BASc, Mechanical Engineering
University of Waterloo, 4.0

SUMMARY OF SKILLS

- **Engineering Analysis:** Conventional hand calculations, finite element methods, tolerance stack up, material testing
- **Manufacturing Methods:** Specific experience with various plastic processing methods, including injection molding, thermoforming, and die cutting. Have created parts and molds. Experience in sheet metal and machined part design
- **CAD:** SolidWorks, including simulation, plastics, sheet metal, and surfacing. Familiar with HSM CAM. Basic GD&T
- **Machining:** 4 months experience in an R&D machine shop. Tormach milling, waterject, and manual mill and lathe work
- **Programming:** Have developed numerous pieces of control and otherwise software in C-like languages.

PROFESSIONAL EXPERIENCE

Zaber Technologies	Mechanical Engineering	Aug '17-Dec '17

- **Optical Encoder Centering :** Developed control code for a machine capable of consistently centering optical encoders on wheel gears to within 5 microns. Used machine vision to record edge of encoder grating and designed an algorithm that compensated for the high viscosity and springiness of the glue used to fasten the disk to the hub. Several before me were unable to solve this and Zaber saves hundreds of dollars in labor and materials every time the machine is used
- **In-Line Testing:** Designed, fabricated, and developed control code for a machine capable of automatically testing the stiffness and rolling resistance of a linear stage type product. Device was capable of detecting the start and end of the tested stages, increasing ease of use. Machine was accurate and achieved ±5% repeatability 95% of the time
- **Thermoforming**: Created the company's first production ready piece of thermoformed packaging. Developed a mathematical model that estimated the force induced during impact and estimated the required rib dimensions. Created molds using FDM polycarbonate. Fabricated prototype packaging and found that the developed model accurately predicted 3rd quartile accelerations during impact. Partially automated the manual machine that was purchased to ease development
- **GD&T**: Improved drawings to increase part quality and solve reported production issues.

Lava Computer MFG	Mechatronics Designer	Jan '17-Apr '17

- **R&D:** Researched current methods of low-pressure polymer PCB over-molding and proposed a solution based off of off the shelf hot melt adhesive applicators to implement the technology at a fraction of the cost of commercial solutions
- **Plastic Part Design:** Designed parts for injection molding based mass production. Learned and exercised injection molding DFM practices. Designed clips and living hinges. Brought parts to mass production in quantities ranging from 10-100k /year.
- **Product Development**: Developed a secure sheet metal enclosure for Samsung tablets in the capacity of a contractor for Smart Cabinets Inc**.** Developed designs optimized for both tool/die and standard press brake fabrication. Communicated with machine shops through prototyping and eventual mass production. Enabled the sale of thousands of boards
- **Software:** Completed the development of a web-based temperature sensor control platform for use on an embedded webserver. Created front end and middleware using C, js, and a proprietary version of BASIC

UW – Research Assistant	Undergrad Research Assistant	May '17-Current

- **???? (3A):**
- **Fabric Metallization Lab (2B):** Developing a machine to apply organometallic fabric to textiles in the pursuit of smart clothing. Machine is currently composed of a 2 axis gantry adapted from a laser engraver, a custom designed end-effector, and a surplus fluid applicator. Fabricated prototype end effector parts out of aluminum using a mill and press-brake

Toronto Transit Commission	Assistant Mechanical Designer- ATC	May '16-Sep '16

- **Strut Design:** Designed assemblies using unistrut compatible components that allowed for the mounting of trackside radio equipment. Performed analysis on assemblies to verify structural integrity under static and cyclic loading
- **Component Design:** Created various metal components for CNC machining to solve specific fixturing problems
- **Drafting:** Created detailed drawings to be used in the installation of radio and signal equipment. Issued 100+ in 4 months
- **Troubleshooting:** Performed surveys to diagnose problems in existing mechanical systems. Created improved designs

PROJECTS

Knifemaking: Design and fabricate fixed and folding knives. Most recent design is a spring assist folder, A2 Blade
UW Aerial Robotics Group: Undertook several mechanical design projects for the team, including a brushless gimbal and work on a VTOL aircraft. Served in a leadership position for a term.
Structural optimization: Developed a matlab FEA based truss solver and traditional beam profile optimizer

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