Nicholas Bratvold

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Core Skills and Competencies

- SKM
- SolidWorks
- Micro-controller design
- Excel
- Java
- Python
- C
- MATLAB
- GIS
- Machine Shop Knowledge
- PCB Design
- Basic Lab Skills

Technical Professional Experience

Electrical Distribution Design Assistant| MCW Consultants Ltd. **Jan 2020 – Apr 2020**

Reporting to a Partner and Engineer, evaluated power distribution assets throughout BC to recommend new asset design.

- **Data Assessment:** Physical assessment of power poles using survey equipment to design replacement based on location, soil type, power line voltage, and number of lines. The created design was added to an Excel tracker that I streamlined. Design packages were uploaded to BC Hydro's GIS software for workers to implement.
- **Arc Flash Study:** Analyzed contracted airport electrical circuits, including YVR's new LiDAR Tower. Used SKM Powertools to recommend optimal breaker and fuse settings, produce arc flash safety labels, and produce formal report.
- **Time Management:** Thrived in an independent and self-driven operator role, managing own priorities and timelines. Organized weeklong work trips in northern BC. Stayed time efficient during work-from-home protocols.

Data Input Operator | Medicine Hat Municipal Works **May 2019 – Aug 2019**

Reporting to an Engineering Technician, evaluated municipal works assets throughout the city to identify assets in need of replacement or repair.

- **Data Assessment:** Physical assessment of over 5000 traffic signs to prioritize replacement based on location, reflectiveness, damage, and type of sign. Evaluated various municipal assets by using survey equipment and then imported collected data into ArcGIS and Excel for assessment.
- **Communication:** Engage ArcGIS specialists and municipal works stakeholders to discuss opportunities and priorities associated with the repair or replacement of roads during a 2 million dollar road overlay project.
- **Time Management:** Thrived in an independent and self-driven operator role, managing own priorities and timelines.

Technical Project Experience

Autonomous Recycling Robot| UBC **May 2020 – Aug 2020**

Placed 1st in a four-month team design competition using simple materials and hobbyist electronics to create autonomous robot from scratch that could pick up and move as many empty cans into a recycling box as it could in a minute.

- **Software:** Wrote C++ for a STM32 microcontroller in an Arduino framework. to track tape path, control tire speeds, and control combine speed. Created heat map of success rate over competition surface by logging test runs with Excel. Used Git for version control.
- **Mechanical:** Constructed robot chassis from basic materials using hand tools. Created removable electronic circuit for easy debugging. Added and removed weight in strategic locations to create low center of mass while keeping weight under 4 lbs.
- **Electrical:** Designed electrical schematics and constructed circuit with hobbyist electronics, blank PCB, solder iron, and salvaged wires. Design included, noise cancellation, H-bridge motor control, analog to digital conversion, and PID tuning knobs. Circuit debugging achieved by segmented circuit analysis using an oscilloscope.

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Waves & Music Software Project| UBC **Sep 2019 – Oct 2019**

A software assignment to represent sound waves as an object and perform operations on them using Java.

- **Sound Wave Manipulation:** Created a software to manipulate audio files in a variety of ways including volume adjustments, add echoes, superimpose waves, filter frequencies, and group sound waves by similarity.
- **Team Work:** Collaboration with a partner using GitHub for task management and simple communication. Peer reviewed and wrote tests to find and fix bugs. Obtained 100% branch coverage.
- **Usage:** I use the software to create backing tracks to play guitar over, and filter out frequencies from recordings to produce a better sound.

Treehouse Elevator| UBC **Nov 2020 – Dec 2020**

A team-based course assignment to design a mechanical system using knowledge from course.

- **Mechanics:** Designed a hand cranked elevator which is able to raise 2 children 8 feet in under 2 minutes with input force of 5 lbs. Worm gear, wire ropes, and sheaves were fully analyzed using textbook formulas in excel to create iterative process to produce optimal mechanical design with requirements in mind.
- **CAD:** Modeled preliminary designs using OnShape and paper, moved forward with most promising design. Final CAD model was used in final report.

Crosswalk Assessment Matrix| Medicine Hat Municipal Works **May 2019 – Jun 2019**

Aided civil engineers in creating additional features for a tool to quickly assess and prioritize placement of crosswalks in order to provide pedestrians with a safe way to cross roads.

- **Weighted Design Matrix:** TAC guidelines are used as design parameters for the assessment matrix, these are given a weight and then summed into an overall crosswalk grade, which is used to prioritize the type and location of the crosswalk to be implemented. 20 crosswalks have been assessed using the matrix in 2019.
- **Data Analysis:** Analyzed pedestrian crossing opportunities based on traffic volume and road width data by with an Excel model that I designed. Used Miovision, survey equipment, and ArcGIS to collect data.

Education

Bachelor of Applied Science in Engineering Physics | University of British Columbia **Sep 2018 – Apr 2023 (Expected)**

Volunteer Experience

Graduating Class President | Medicine Hat High School **Nov 2017 – Jun 2018**

Led a team of students who organized the graduation ceremonies for 250 students.

- **Budgeting:** Designed and sold apparel as well as organized outdoor movie on large outdoor cinema allowing tickets to be subsidized. Resulted in the least expensive ticket in the last 10 years.
- **Leadership:** Organized weekly meetings and aided team members with their respective roles. Actively sought the student bodies opinions through online polls and incorporated them into the graduation ceremonies.

Interests

- Guitar
- Travel
- Duplicate Bridge
- Board Games
- Camping
- Fishing