# Ryan Sutherland

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## Skills

**Programming** Python, C++, Java, MATLAB, C, Machine Learning Certificate, JavaScript

**Electrical** PCB Development, Soldering, Multimeter, Oscilliscope, Waveform Generator

**Mechanical** SolidWorks, Fusion360, Rapid Prototyping, Lathe, Milling Machine

## Technical Experience

**FPGA Machine Learning Application for LHC - Capstone** **September 2023 - April 2024**
- Developed a pipeline for Large Hadron Collider experiments that would allow ATLAS to disregard "un-interesting" interactions, saving computer storage
- Prototyped models on an FPGA and analyzed metrics to ensure speed constraints and precision were retained

**Fuel Cell Defect Detection - Capstone** **September 2022 - April 2023**
- Responsible for creating an automated, AI powered system capable of classifying various defects found on fuel cells
- Developed a structure to introduce controlled lighting and surface conditions
- Utilized and implemented existing YOLO framework to classify and identify regions of defects

**UBC Biomedical Engineering Student Team (Co-Captain Projects)** **September 2022 - August 2023**
- Responsible for helping teams develop timelines and aid in project management
- Communicating with faculty about reserving proper meeting and prototyping space
- Developed various pipelines to streamline processes including: on-boarding, training and project proposals

**UBC Biomedical Engineering Student Team (SportsMed)** **September 2021 - August 2023**
- Founded SportsMed team to reimagine ways of treating and preventing common sports injuries
- Developing a core-activation device that informs users of ways to improve their posture and strength abdominal muscles
- Delegated research topics to team members and ensured constant communication between individuals

**Can Collection Robot** **Summer 2021**
- Designed robot using CAD, ensuring all components could effectively be integrated using assemblies
- Created custom PCBs for effective power distribution and signal management
- Created a state-machine that allowed all components of the robot to work together synchronously with precise timing for specific tasks
- Placed 3rd in competition

**Plate Recognition Robot** **Fall 2021**
- Developed code for a robot in gazebo to drive a course and recognize car plates while avoiding obstacles
- Used a PID loop to effectively control sharp turns with minimal shaking afterwards
- Created a pedestrian/car avoidance system using image subtraction to identify movement
- Trained two neural networks using TensorFlow to identify letters and numbers

**UBC Biomedical Engineering Student Team (MINT)** **2019-2021**
- Developed an electrode headset to read brain waves to enable individuals to perform day to day tasks through thought
- Designed a mechanical headset that was adaptable to all head sizes and integrable with headset electronics
- Prototyped headset using SolidWorks and rapid prototyping techniques
- Tested parts by ensuring that they fit on various head sizes and parts functioned cohesively with electrical aspects

**Autonomous Soccer Playing Robots** **2016-2018**
- Designed and prototyped all aspects of the robot using Arduino coding and CAD
- Determined proper motherboard and motor shield need to function with components
- Fully soldered a breadboard ensuring proper power distribution to several components simultaneously
- Ensured effective integration of numerous components into a functioning and coherent system while limiting brownouts
- Represented Canada in WorldCup Junior, placing within the top 30% of all teams

## Employment Experience

**Sparkmate, Paris, France** **May 2023 - Present**
- Joined a team of engineers to develop a wine fridge that could individually cool wine bottles to various temperatures
- Designed a custom PCB that could integrate 8 different compartments with various sensors and features
- Wrote C++ code to control the hardware of the system ensuring each compartment was held at the appropriate temperature
- Developed a python GUI to analyze, store, and plan testing of the device

**TRAIN Fitness, Toronto, ON** **May - December 2022**
- Created an automated labeling system using computer vision techniques to increase data available for model training
- Developed AI that could identify wrong form exercises with 98% accuracy
- Interacted and parsed through large data files to extract vital information and pinpoint potential flaws in our database
- Developed position estimation algorithm to identify users movement through space given sensors available on the watch

**ConeTec, Burnaby, BC** **January - April 2021**
- Created precise SolidWorks drawings for use by machinists
- Designed custom PCB for accurately controlling motor outputs

## Education

**Ph.D, Robotics, Oregon State University** **2024-Present**

**Bachelor of Applied Science, Engineering Physics, The University of British Columbia** **2019-2024**
Cumalative Average 82.9%, Graduated with Distinction in the Co-Operative Education Program, Dean's Honour's List

## Interests

**Lifesaving** Certified to perform and teach lifesaving and swimming skills **2016 - Present**

**Marksmanship** Precision shooting of air rifles on the provincial stage **2017 - 2019**

**Pitcher/Second Baseman** Newmarket Hawks A/AA Baseball (Provincial Champions) **2017 - 2019**