# MYKAL WESTEINDE

he/him |mykalrudie@gmail.com | 873-288-4509

## WORK EXPERIENCE More information on mwesteinde.github.io

**INSTRUMENTATION ENGINEER CO-OP** Summer-Fall 2021
Precision NanoSystems Inc.

- Automated a critical piece of test equipment to generate 10x more data in 1/4 of the setup time to expedite the manufacturing process of covid vaccines in Asia.
- Built a custom non-fluid contacting pressure sensor & interface to detect fluid fouling rates on critical mRNA drug formulations.

**TEACHING ASSISTANT** Summer 2021
ENPH 253 Instrument Design | Profs. A. Marziali, M. Isbasescu & B. Zender

- Helped debug over 15 custom H-bridges and other circuits by communicating effectively over zoom.
- Explained basic control theory to assist over 5 teams develop an effective tape following algorithm.

**MECHANICAL ENGINEER CO-OP** Winter 2020
Genuine Guide Gear

- Carried out over 30 separate tests, built out test reports & analyzed the data to suggest potential product improvements.
- Used SOLIDWORKS to create a CAD model of a jig to assemble binding heel plates.

**OWNER OPERATOR** Summers 2017-2019
Chelsea Property Services

- Founded a seasonal landscaping company managing 5 full time employees & 90k/summer in revenue specializing in complete backyard renovation projects.
- Sold the name & goodwill of the business, which still runs today.

## PROJECT EXPERIENCE

**SIMULATED SELF DRIVING VEHICLE** |Winner ENPH 353 2021

- Trained an ROS robot simulated in Gazebo with an imitation learning model and image processing to navigate a parking lot and read license plates.
- Worked with partner over zoom and GitHub to place 1st of 16 teams in program-wide competition.

**AUTONOMOUS COLLECTION ROBOT** | Winner ENPH 253 2020

- Complete mechanical, electrical & software build of an autonomous robot powered by a BluePill microcontroller capable of tape following, can collection & shooting ping pong balls into cups.
- 1st place robot of 64, collaborated online with team on design and best practices to place 1st of 16 in program-wide competition.

**FENTANYL QUANTITATION DEVICE** | Capstone Project Ongoing

- Integrating novel fentanyl quantitation electrochemical method into automated device to reduce sample detection time from 8 hours to 20 minutes.

## CAMPUS INVOLVEMENT

**CLUB LEAD** | UBC Nordic Ski Team 2019-Present

- Co-ordinating training, racing and fundraising for a team of 20 high-performance athletes.

## EDUCATION

**UNIVERSITY OF BRITISH COLUMBIA**
BASc. in Engineering Physics
Graduating May 2023

**Relevant Courses:**
Robotics & Instrumentation Design
Computer Vision & Machine Learning
Industrial Robotics
Autonomous Control Theory
Signals & Systems
Principles of Software Architecture
Technical Communication
Digital Logic & Microcontrollers
Circuit Design & Analysis
Machine Design

## SKILLS AND CERTIFICATIONS

**Mechanical:**
Solidworks Associate Cert. in Mechanical Design
40-hour Machine Shop Course
Design for Manufacturing
Fluid Path Design

**Electrical:**
Digital Logic Design
Circuit Analysis and Debugging
Soldering
RapidHarness

**Software:**
**5000+ lines:**
Python – Java
**1000+ lines:**
C – C++ – Assembly – MATLAB – OpenCV – ROS
**Familiar:**
Latex – VHDL

## INTERESTS

Marathon running – Guitar – Climbing – Ski Touring – Cooking – Woodworking – Environmental Conservation

## KEY SKILLS

- Python
- Java
- ROS
- C++
- SOLIDWORKS
- Machine Shop
- Linux OS
- OpenCV
- Soldering
- MATLAB
- Git
- Assembly

## WORK & PROJECT EXPERIENCE

**Autonomous Collector Robot** WINTER 2020

Designed & built an autonomous robot powered by a BluePill microcontroller capable of tape following, can collection & shooting ping pong balls into cups.

- Programmed PID control software in C++ to run BluePill STM32 microcontroller.
- Designed & soldered the entire electronic circuit from scratch, with 3 H-bridge motor drivers & 3 sensor systems.
- Collaborated online with a team of 4 on design & best practices to place first out of 16 teams.
- Wrote functions to translate sensor input to output so that robot could find cans, navigate to them & pick them up without user input.
- Designed & built the entire electronic circuit from scratch (schematics, power calculations)
- Soldering & scopes & power supplies constructing & integrating 3 H-bridge motor drivers & 3 sensor systems
- Using shielding & limiting electrical noise between components.
- Developed CAD model in OnShape to refine design
- Constructed using tools & fabrication -modelled & constructed a robust frame with corrugated plastic & limited tools.
- Placed first out of 64 robots by creating a reliable robot with an innovative design & running it through 50+ test runs in limiting conditions.
- Adapted to an online working environment
- Planning meetings
- Running online meetinfs
- as a team of 4. Collaborated on design & best practices to place first out of 16 teams.

**Result:** 1st place robot of 64, 1st place team of 16, ability to collect all objects in under half the allotted time.

**Instrumentation Engineer Co-op** SUMMER-FALL 2021

*Precision Nanosystems Inc.*

- Automated a critical piece of test equipment to generate 10x more data in 1/4 of the setup time to expedite the manufacturing process of covid vaccines in Asia.
- Built a custom non-fluid contacting pressure sensor & interface to detect fluid fouling rates on critical formulations.

**Teaching Assistant** SUMMER 2021

*ENPH 253 Instrument Design. Professors A. Marziali, M. Isbasescu & B. Zender*

Helped students design & develop their own autonomous robots.

- Helped debug over 15 custom H-bridges by communicating effectively over zoom.
- Taught basic control theory to assist over 5 teams develop an effective tape following algorithm.

**Result:** Five-star TA rating, 64 students with incredible robots.

**Fentanyl Quantitation System Project** FALL-WINTER 2021/22

*Professors D. Bizzotto, G. Sammis*

Building a

**Mechanical Design & Test Co-op** WINTER 2020

*Genuine Guide Gear*

Supported the product development team from the ideation phase to the manufacturing line.

- Created & executed test plans for 5 separate products.
- Carried out over 30 separate tests, built out test reports & analyzed the data to suggest potential product improvements.
- Used SOLIDWORKS to create a CAD model of a jig to assemble binding heel plates.
- Designed & built a test jig to carry out binding impact tests more quickly & accurately than previous iterations.

**Result:** Reliable testing data to improve 5 products, more efficient manufacturing process.

**OpenCV Autonomous Vehicle Simulation** WINTER 2021

Using OpenCV & ROS in python to train a robot simulated in Gazebo to navigate a parking lot while obeying traffic rules & reading license plate numbers.

- Training a neural network to convert live video feed of car license plates to text.
- Using PID control to stay in a lane & avoid pedestrians & other cars.
- Programming in a Linux environment using shell scripting.
- Collaborating closely with a partner online with Git.

**Result:** 1st place team of 16, 100% accuracy of license plate reader.

**Founder, Owner, Operator** SUMMERS 2017 to 2019

**Chelsea Property Services | Chelsea, QC**

Founded a seasonal l&scaping company managing 5 full time employees specializing in complete backyard renovation projects.

- Designed & built over 20 decks, patios, sheds & retaining walls valued up to 14k each.
- Grew revenue from $20k to $85k per season by building a strong local reputation of delivering quality work at reasonable prices.
- Issued over 200 detailed quotes & formed close relationships with suppliers.
- Completed over 90% of jobs on time & under budget by managing deadlines effectively with an efficient team.
- Maintained a perfect safety record by implementing a strong orientation & training session for all new employees.
- Sold the name & goodwill of the business, which still runs today.

**Result:** Over 120 happy clients, 5-star Google & Facebook rating, provided 5 full-time summer incomes & fully funded my first 2 years of university.

**Wiki Servers Java Project** FALL 2019

Built a mediator service for Wikipedia in Java with the jwiki API.

- Implemented a breadth-first search algorithm to find a path between any two Wikipedia pages.
- Built a cache that stored recent data to speed up searches without using network resources.
- Implemented a client/server-based application capable of h&ling multiple requests simultaneously.

- Used multithreading to h&le multiple JSON-formatted requests simultaneously.
- Created test cases with 100%-line coverage to ensure program ran successfully for all valid inputs.

**Result:** Perfect project score.

**Image Movement Tracking** FALL 2020

Built a program in Python to detect the direction of movement in a video.

- Used a cross-correlation algorithm on subsequent frames of the video to identify in which direction the video was moving.

**Virtual World Simulation** FALL 2019

Built a reusable graph ADT in Java & integrated it into a space-themed game.

Implemented algorithms for computing the shortest path & the minimum spanning tree of any set of nodes.

## EDUCATION

**Bachelor of Applied Science** | Engineering Physics APRIL 2023

The University of British Columbia, Vancouver, BC

**CSWA Solidworks Associate Certification in Mechanical Design** WINTER 2020

**PHAS Machine Shop Course** FALL 2019

40-hour course with lathes, mills, waterjet cutters & modelling.

## HOBBIES & INTERESTS

- Cross-country skiing – UBC Ski Team Club Lead
- Marathon Running, 3:21 PB
- Climbing & Mountaineering
- Environmental Conservation
- Ski Touring
- Guitar