

# Nicholas Bratvold

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## Education

**University of British Columbia**  
BASc Engineering Physics  
Student Council Vice President Events

Expected graduation date: Apr. 2024

## Experience

### Zen Maker Lab

May. 2021 - Dec. 2021

#### Engineer Project Designer

*Python, C++, Unity, Fusion 360, 3D printing*

- Developed a Battle-Bot design kit with laser cut MDF, modular C++ interface, and hobbyist electronics.
- Lead a project-based learning program to empower student's ambitious ideas and equip them with the skillset to realize them, such as; a Tesla coil, a self-watering plant pot, and a wildlife camera website.

### MCW Group of Companies

Jan. 2020 - Apr. 2020

#### Electrical Distribution Design Assistant

*GIS, SKM Powertools, AutoCAD, Excel*

- Evaluated power distribution assets throughout BC in order to recommend new asset design.
- Conducted arc flash studies on contracted airport electrical circuits in western Canada, including YVR's new LiDAR Tower. Recommended optimal breaker and fuse settings, created arc flash safety labels, and produced formal reports.

## Projects

### EleutherAI

Sep. 2023 - Ongoing

#### Generative AI Video Model

*Python, JAX, OpenCV*

- An open source model that generates video through a two-stage architecture consisting of a variational autoencoder and diffusion transformer, supporting a 500x312 resolution at various video lengths.
- Achieved 500x training speed improvement through fully sharded data parallelism and data preprocessing.
- Finetuned hyperparameters to improve generated video quality and assess model scalability.

### UBC Envision

Sep. 2023 - Ongoing

#### Brewing the Internet of Things - Instrumentation Member

*Python, C++, SQL*

- Designed device to automate lab equipment to test ultrasonic effects on fermentation processes.
- Rebuilt PostgreSQL database and incorporated brewing sensors to remotely track brewing parameters.

### University of British Columbia

Sep. 2021 - Apr. 2022

#### Portable Fentanyl Quantification Device

*Python, OnShape, PCB Design, Microfluidics*

- Integrated a proven three-stage process of chromatography, voltammetry, and computational analysis to produce precise readings of fentanyl and other drug concentrations. Capable of detecting 100x below the lethal dose of fentanyl.
- Designed and validated a 50µL electrochemical flow cell to ensure accurate results. Prioritized a portable design with a GUI to allow ease of transport and increase investor interest in the product.

### University of British Columbia

Jan. 2021 - Apr. 2021

#### License Detection AI

*Python, Tensorflow, Keras, OpenCV, ROS*

- Combined computer vision and a CNN to accurately identify license plate characters from a simulated race course.
- Driving was controlled by a reinforcement learning model. Drove 35% faster than its competitors.

### University of British Columbia

May. 2020 - Aug. 2020

#### Autonomous Recycling Robot - 1st Place

*C++, SolidWorks*

- Created a STM32 controlled autonomous robot from scratch that could move cans into a recycling box.
- Designed and constructed electrical circuit with noise cancellation, ADC, and H-bridge motor control.

## Skills

### Languages:

Python, C++, Java, MATLAB, HTML/CSS

### Technologies & Tools:

CV2, JAX, TensorFlow, PyTorch, Keras, ROS, Git, Linux, Cadence, SolidWorks, 3D Printing

