




Joel Tsuchitori

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Education

University of British Columbia

Bachelor of Applied Science in Engineering Physics, Grade Average: 86.1%

'Iolani Highschool

GPA: 3.9

Expected May 2025

Vancouver, BC, CA

Class of 2020

Honolulu, HI, USA

Experience

Resemble AI | Python, PyTorch, Linux, Machine Learning

Machine Learning Researcher Intern

May 2023 – Jan 2024

Remote

- Developed and deployed novel AI deepfake detection techniques for speech and audio with state of the art performance.
- Created multiple novel ML algorithms and implemented ones found in the literature to benchmark against.
- Collected multiple large datasets of thousands of hours of AI-generated, deepfake, and bonafide data to train models against.
- Used state of the art Deepfake models to generate training data for use in deepfake detection training.

Murphy Lab | Python, PyTorch, KiCad, OnShape, Linux, Machine Learning

Neuroscience Lab Assistant Intern

May 2023 – Jan 2024

Vancouver, BC

- Investigated using transformer based neural networks for creating interpretable neural embeddings.
- Extended and Improved state of the art neural network embedding techniques to work with widefield Mesoscope data.
- Designed and constructed experiment setups for researching social interaction and strokes in mice using laser cutting, 3d printing, and machining.
- Routed circuits and created PCB for circuits to drive Optogenetic imaging systems and camera arrays for 3d reconstruction.

NRC Herzberg: CCAT | Xilinx Vivado, Matlab, Simulink, Linux, Signal Processing

Astronomy Instrumentation Design Intern

Jan 2022 – May 2022

Victoria, BC

- Designed a novel method of tone generation for superconducting Kinetic Inductance Detector Readout reducing memory by 99% compared to existing techniques.
- Optimized readout architecture significantly reducing resource utilization compared to previous generation readout systems.
- Designed and implemented gateway designs using Simulink and Vivado for the Xilinx RFSOC and verified their behavior in the lab on FPGAs.

Sailbots Design Team | Skills: Python, Matlab, Docker, ROS

Controls Team Software Lead

Sep. 2020 – Jan 2023

Vancouver, BC

- Designed and Implemented a novel control system for an autonomous ocean-going sailboat using Python and ROS, building upon existing research in the field.
- Coordinated live testing of the boat, implementing solutions on the fly and generating useful feedback to improve the control system.
- Organized and held sub-team meetings interviewed potential team members for recruitment.

Projects

Frequency Domain Electromagnetic UXO Survey Device | *MATLAB, Analog Circuit Design, Python, Rapid Prototyping, Geophysics*

- Designed an electromagnetic frequency domain geophysical survey device for detecting UXOs and soil properties.
- Developed MATLAB and Python based geophysical electromagnetic simulation tools for characterizing and validating our design.
- Used CAD and rapid prototyping to design and create coils and mounting hardware for testing the FDEM system.

Digital AI Clone Capstone Project | *PyTorch, Python, Machine Learning, Generative AI, High Performance Computing*

- Developed an Unconditional Audio Diffusion model building off of SOTA work in Diffusion
- Created and Trained a custom video auto-encoder model for use in long-range multimodal diffusion.
- Developed and trained a multimodal diffusion based agent trained off of player data collected from Minecraft.

Silicon Photonics Fabry Perot Cavity | *Silicon Photonics, Lumerical, Matlab, Simulation, KLayout*

- Designed a Fabry Perot Cavity with Bragg Grating mirrors to maximize Q factor of the transmission spectrum at a target wavelength
- Layed out the Designs in KLayout to be manufactured with Electron Beam Lithography and tested

Engineering Physics Robotics Competition | *Arduino Code, Prototyping, CAD, Soldering, Circuit Design, Control theory*

- Designed and built a robot using an STM-32 microcontroller to compete against other students in the program.
- Implemented an IMU based navigation system which used PID controllers and sensor filtering successfully navigate the competition course.
- Used signal processing knowledge to design a digital signal processing algorithm which could differentiate and track IR beacons of different frequencies.
- Analyzed different motor options and drive configurations for a drivetrain using CAD, documentation, and testing, before ultimately desinging and building the robot drivetrain.

Technical Skills

Programming Languages: Python, C, Matlab, Bash, Rust, Java

Software & Tools: PyTorch, Anaconda, Slurm, Solidworks, ROS, Matlab, Simulink, Linux (Arch, Ubuntu), Excel, KiCad, Onshape

Hardware & Prototyping: CAD, Soldering, Circuit Design, PCB fabrication & SMD component Soldering, 3d Printing, Laser Cutting, Waterjet Cutting, Metalworking (Mill & Lathe)

Concepts: Digital Signal Processing, Control Theory, Machine Learning, Diffusion, Generative AI, Neural Networks, Hardware Prototyping, Circuit Design, API, Research, FPGA Development, Robotics