Joel Tsuchitori

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Education

University of British Columbia (UBC) *Vancouver*

Engineering Physics Sep. 2020 - Jun. 2025 (Projected)

Technical Skills

Programming Languages	Matlab, C, Python, Jupyter, Java, Bash Scripting, Rust
Software & Tools	Simulink, Vivado, Solidworks, OnShape, Linux (Arch, Ubuntu), ROS, Excel, Windows, KiCad
Graphics & Typesetting	Office, LaTeX, Graphic Design, Video Editing
Hardware	Soldering, Oscilloscope, Circuit Analysis, Breadboarding, Arduino, PCB Design, Machine Shop

Work Experience

Murphy Lab - Mouse Research Lab Assistant COOP *Djavad Mowafahian Center for Brain Health*

Skills: PCB Design, 3D Printing, Python, Experiment Design, Pytorch, AI, Data Science May - December 2023

- Using Pytorch designed Neural Networks for decoding Optogenetic signals into behavior videos.
- Extended and Improved state of the art neural network embedding techniques to work with 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.
- Used Python for data analysis investigating correlation in mice brain activity during social interaction.

CCAT Collaboration - KIDS Readout Development COOP *NRC Herzberg*

Skills: Xilinx Vivado, Linux, Matlab, Simulink, LaTeX, Oscilloscope, Network Analysis, Signal Processing Jan. - May 2022

- Designed a novel method of tone generation for 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 gateware designs using Simulink and Vivado for the Xilinx RFSOC and verified their behavior in the lab.
- Reviewed existing literature for potential improvements to readout design and tested and evaluated new potential gateware designs, creating research documentation for future work to be based off of.
- Credited in two publications for contributions to the project.

Extracurriculars & Projects

Sailbots Design Team - Control Lead *UBC*

Skills: Python, Matlab, Docker, ROS, Control Theory, Git, Github CI Sep. 2020 - Current

- 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.

Iolani First Robotics Competition Team - Software Lead *Iolani High School*

Skills: Git, Java, Control Theory, Leadership, Electrical Design, Soldering Sep. 2017 - May 2020

- Organized team meetings and division of labor in the robotics software team.
- Tutored younger students in programming in Java both in our school as well as at other schools and in other teams.
- Used Java to design control algorithms for the autonomous control of a large 120 lb robot to compete in multiple international events.
- Helped design and prototype various components for the robot such as arms, drivetrains, and ball shooters.

Engineering Physics - ENPH 353 Competition *UBC*

Skills: Signal Processing, ROS, Pytorch, Python, Machine Learning, Virtual Machines January - April 2023

- Created a robot control algorithm using a combination of traditional control theory and Machine Learning to autonomously navigate a virtual course.
- Used Gym and ROS to create a virtual environment to test and run an AI powered self driving algorithm.

Engineering Physics - Robotics Competition *UBC*

Skills: Arduino Code, Prototyping, CAD, Soldering, Circuit Design, Control theory, Signal Procesing May - August 2022

- 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.

GPT-3 Based Letter Writing Assistant *Personal*

Skills: Python, Bash, Linux, AI, GPT-3 Jan. 2023

- Designed a Python based letter writing assistant using OpenAI's GPT-3 API.
- Implemented a simple command line interface for the program to allow for prompting and editing the AI output.