

# DAVID YUCHEN WANG

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## EDUCATION

### National University of Singapore

Aug 2023 - Dec 2024 (expected)

Master of Computing - Specialization in Artificial Intelligence

### University of British Columbia, Canada

Sep 2018 - May 2023

Bachelor of Applied Science - Major in Engineering Physics

- Minor in Commerce.
- Presidential Scholars Award Recipient, Dean's Honors List, GPA 86%.

## WORK EXPERIENCE

### Machine Learning Research Assistant

May 2021 - Aug 2023

**TRIUMF** - Canada's Particle Accelerator Centre - <https://www.triumf.ca>

- Developed **Bayesian Optimization** model to optimize particle beamlines and boost speed by 2400% and accuracy by 120% compared to human operators.
- Designed efficient physics simulations for use on policy gradient **reinforcement learning** models. Integrated first AI-controlled interface on particle accelerators.
- Published experimental findings as first author in paper *Accelerator Tuning with Deep Reinforcement Learning* and gave video and poster presentation at **NeurIPS 2021** workshop.

### Machine Learning Engineer

May 2022 - Sep 2022

**Yakoa.io** - Web3 Startup - <https://www.yakoa.io>

- Implemented **image segmentation** framework in PyTorch from research papers to detect fraudulent features in NFT images with high accuracy.
- Deployed **self-supervised classification** models on AWS instances and fine-tuned models on a dataset of 8 million images, improving model run-times by over 300%.
- Employed **statistical analysis** of latent space of self-supervised models. Optimized hyperparameters and visualized results using Weights & Biases, leading to 150% improvement in validation accuracy.

### AI Research Intern

Jan 2020 - May 2020

**Huawei Technologies Canada** - Vancouver Big Data Lab

- Enhanced **data-preprocessing** speeds for large image datasets by 300% through designing scripts in Python and Bash.
- Boosted team productivity by 500% through configuring **custom environments** in Docker to allow parallelization of model training through cloud GPU clusters.
- Fine-tuned **deep-learning** models for **image classification** and **object detection** in TensorFlow and PyTorch. Organized documentation and presented findings to team, leading to 120% improvements on model accuracy.

### Captain and Navigation Sub-Team Lead

Sep 2019 - May 2023

**UBC AgriBot** - Student Engineering Design Team - <https://ubcagrobot.com>

- Devised project roadmaps, established a 2-year budgeting timeline, and utilized **Agile methodology** to manage a team of 70 members across 6 sub-teams to bring robot to the 2023 METRICS ACRE international competition.
- Managed marketing and outreach, promoted team initiatives through **public presentations** to educational and industry audiences, and obtained over \$25,000 in funding.
- Led a team of 8 members to integrate software codebase with hardware systems onboard robot. Interfaced with camera, lidar, and gyro sensors and utilized **computer vision** algorithms and PID control to achieve fully **autonomous navigation** through crop fields.

## SKILLS

**Programing languages:** Python, MATLAB, Java, C++, C, C#, Julia, R, HTML, CSS

**Libraries:** PyTorch, Tensorflow, Keras, OpenCV, Numpy, SciPy, Matplotlib, Weights & Biases

**Frameworks:** ROS, Gazebo, AWS, GIT, Docker, Conda, Arduino, Linux, Bash

## PUBLICATIONS

**Accelerator Tuning with Deep Reinforcement Learning** - [https://ml4physicalsciences.github.io/2021/files/NeurIPS\\_ML4PS\\_2021\\_125.pdf](https://ml4physicalsciences.github.io/2021/files/NeurIPS_ML4PS_2021_125.pdf)  
**NeurIPS 2021** - Workshop for Machine Learning and the Physical Sciences

## PROJECTS

### Robotic Interface for Precision Bioprinting

Sep 2021 - Apr 2022

🔗 UBC Capstone Project – with Aspect Biosystems

- Designed **graphical user interface** using Microsoft .NET platform in C#, allowing for real-time control of robotic prototype.
- Built a 3-axis robot to transport tissue samples for bioprinting. Interfaced with an industrial controller and wrote code connecting GUI to hardware for sub-millimeter **precision control** of robotic system.
- Analyzed associated mechanical risks and performed **CAD analysis** in SolidWorks to determine the best design. Implemented and tested design prototype for over 1000 cycles without fail.

### Numerical Analysis of Complex Physics Systems

Sep 2022 - Dec 2022

🔗 UBC PHYS 410 – Computational Physics

- Derived **numerical solutions** to 2-D Schrödinger Partial Differential Equations to accurately model propagation and interference of waves in 3-dimensional space.
- Analyzed equilibrium distributions of electric charges on surface of a sphere and performed **numerical simulations** to accurately describe system's motion over time.
- Optimized MATLAB code to numerically solve differential equations with a 500% runtime boost, performed **error analysis**, and generated 3D visualizations of results. Achieved a grade of 95% in class.

### Self-Driving and License Plate Detection

Jun 2021 - Sep 2021

🔗 UBC ENPH 353 Project Course

- Utilized Robotic Operating System (**ROS**) with **computer vision** algorithms to steer an autonomous vehicle through a simulated world and avoid moving obstacles with 0% collision rate.
- Generated custom datasets and trained **deep neural network** models in TensorFlow Keras to identify license plates in a noisy environment and classify their characters with 90% accuracy.
- Led labs and tutorials as a **Teaching Assistant** in next year for a class of 3rd year students and provided guidance in course concepts, software architecture, and working within **Linux** environments.

### Autonomous Recycling Robot

Jul 2020 - Aug 2020

🔗 UBC ENPH 253 Project Course

- Designed and soldered custom **PCBs** to interface with an STM32 micro-controller, with consideration of power limits, current distribution, and noise isolation.
- Investigated PCBs using an oscilloscope and a multimeter to discover and fix 100% of circuit issues.
- Implemented **PID control** system in C++ using reflectance sensors and employed sonar to collect and deposit soda cans with 80% accuracy.

## LEADERSHIP EXPERIENCE

**Captain** - UBC AgroBot Design Team (Sep. 2022 - May 2023)

**Grad Year Representative** - UBC Engineering Students Council (Sep. 2022 - May 2023)

**Teaching Assistant** - UBC (2020 - 2023)

3rd year Machine Learning Project Course, 1st year Introductory Physics Course, 1st year Experimental Physics Course

**Student Orientation Program Leader** - UBC (Jun. 2020 - Sep. 2020)

**President of Environment Club** - Dover Bay Secondary School (2015 - 2018)

## LANGUAGES

English, Chinese (Mandarin)

## HOBBIES

Badminton, Chess, Board Games, Hiking, Photography, Reading Sci-Fi, Cooking