

Shuyu van Kerkwijk

Vancouver | svankerk@student.ubc.ca | +1(647)632-0231 | [Linkedin](#) | [Github](#) | [Portfolio](#) | Canadian & Dutch Citizen

Education

University of British Columbia, BAsC Engineering Physics, BSc Honours CS – **Average: 92.9** *Sept 2022 – May 2027*

- **Key Coursework:** Machine Learning, Deep Learning, Computer Structures & Algorithms, Computer Systems, Optics, Fluid Dynamics, Signal Processing, Complex Analysis, Vector Calculus, ODEs, PDEs, Probability, Linear Algebra

Work Experience

Caltech DSA-2000 Radio Array, Research Intern – Pasadena, CA *May – Aug 2025*

Recipient of Caltech SURF Award under Dr. Vikram Ravi

- [Here](#) is a description of the exciting DSA-2000 project and my (approved) proposal on characterizing the test array.

UBC-NASA CGEM Telescope, Research Intern – Vancouver, BC *Apr 2024 – May 2025*

Recipient of national NSERC USRA Award under Dr. Mark Halpern

- Built and validated the azimuthal and elevation angle pointing data systems for the telescope.
- Designed and calibrated the **ADC signal chain**, reducing quantization error, 60Hz radiated pickup, and aliasing.
- Programmed STM F4/H7 microcontrollers, RPis, FPGA, ADCs, and LNAs for fast data acquisition and interfacing.
- Used frequency-domain analysis and signal processing techniques to process waveguide-separated polarization signals.

UofT Lunenfeld-Tanenbaum Research Institute, Research Intern – Toronto, ON *May – Aug 2023*

Recipient of UofT DSI SUDS Award under Dr. Mei Zhen

- Built an automated pipeline to create 3D neuron models from microscope image slices, reducing manual effort by >90%
- Co-developed CaTracker, an **LSTM-based tool** for live neuronal activity analysis, and built the full GUI.
- Trained a **U-Net CNN** in PyTorch to segment nuclei, as part of a global project to generate full brain connectivity models.
- Presented 2x award-winning [research](#) on stress-induced neuron structural changes at UofT conferences

Competitions

Self-Driving Robot Competition, Team member of 2 (2025) [Website](#) [Github](#)

- Training a robot for real-time autonomous obstacle course navigation using ROS and Gazebo (following [this](#) approach).
- Built a custom **CNN** in TensorFlow for real-time alphanumeric character recognition.
- Trained an imitation learning model to navigate on paved and unpaved roads and avoid pedestrians

Burger-Cooking Robot Competition, Team member of 3 (2024) [Website](#) [Github](#)

- Built an autonomous 22-DOF robot to cook and assemble burgers, leveraging vacuum-based encoded crane arms.
- Developed **FreeRTOS** firmware in C++ coordinating 3 microcontrollers and 40+ calibrated sensors/actuators.
- Achieved 95% **object detection** accuracy on dynamic surfaces with Raspberry Pi camera stack and OpenCV algorithms.
- Designed and soldered custom PCBs (motor drivers, bandpass filters, etc.) and fabricated chassis components (CAD).

Projects

Flatiron Institute CryoJax, Contributor (2025) [Github](#)

- CryoJax, built on JAX, is commonly used for simulating and analyzing cryo-electron microscopy (cryo-EM) images.
- Implemented the first physical solvent model in CryoJax, following [Parkhurst et al.'s](#) (2024) analytical model.

Parkinson's Freezing-Of-Gait (FOG) Medical Device, Course Project (2024), *voted "Best Project"*

- Designed a wearable device to detect turn direction and provide muscle stimulation, reducing FOG episodes by >50%.
- Iterated on the design using my grandfather's feedback, integrating wireless functionality and electrical stimulation.

Technical Skills

Languages: Python, C, C++, Java, Assembly, VHDL & *English, Dutch, Mandarin*

Softwares & Tools: JAX, PyTorch, TensorFlow, ROS, Gazebo, OpenCV, PyQt, Linux, STM32CubeIDE, KiCad, FreeRTOS

Hardware: Machine Shop Certification (lathe, mill, drill, waterjet), Oscilloscope, Spectrum Analyzer

Awards

Academic: FYSRE Award, UBC Charles & Jane Banks Scholarship, UBC Dean's Scholar, UTS W. Livingstone Physics Prize

Other: Scratch Featured Project (age 11), 2nd at Volleyball Canada Nationals (2024), Harold Smith Essay Award