Graydon Strachan

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Education

University of British Columbia — Vancouver, BC
Bachelor of Applied Science Computer Engineering — *Expected Graduation: April 2026*

Experience

UBC AeroDesign Sensors and Communications Team Member — September 2023 – Present
University of British Columbia — *Vancouver, BC*

- Collaboratively developing a Base Station and its peripherals to guide an autonomous **SAE** aircraft
- Transferred ground truth GPS correction data from a fixed satellite to a small aircraft via radio transceiver
- Developed a **Real Time Kinematic Positioning GNSS** transfer system in *Rust*
- Interfaced with the u-blox ZED-F9P precision GNSS module serial output

Selected Awards

Silver Medal Canada Wide Science Fair (CWSF) — May 2022
Bronze Medal Canada Wide Science Fair (CWSF) — May 2021
Silver Medal Canada Wide Science Fair (CWSF) — May 2019
The Actuarial Foundation of Canada Award — May 2019

Projects

C++ Neural Network Library | *C++, Makefile, Git* — October 2023

- Developed a machine learning library from scratch aimed at optimization via **gradient descent**
- Supported multiple activation functions, including **ReLU**, **sigmoid**, and **tanh**
- Added support for the **Genetic Algorithm** for simulating recombination and mutation
- **Optimization**: Implemented a custom back propagation algorithm using optimized vector and matrix data types
- **Serialization** Implemented a rapid saving and loading scheme for local models and training data

Neural SDFs: ML Approach to Approximating 3D Bodies | *TensorFlow, WebGPU, JavaScript* — October 2023

- Read data from a WaveFront OBJ mesh object and transformed it into discrete training data
- Trained a neural network via **TensorFlow** aimed at predicting a mesh's *Signed Distance Function*
- Developed a bespoke **WebGPU** based *ray marcher* utilizing the $Blinn - Phong$ reflection model
- Transformed a TensorFlow model into a series of matrices to be used natively in GLSL

C++ Custom Language Compiler | *C++, Makefile, Git, LLVM* — August 2022 – Present

- Developed a custom compiler front end based on a personal language syntax dubbed *mu*
- **Optimization**: Performed keyword tokenization using a **trie** to achieve $O(n)$ lexer runtime
- **Algorithms**: Implemented a top down recursive descent parser to generate an *Abstract Syntax Tree*
- Developing the compilers back end using **LLVM** to maximize target architecture compiled binary compatibility

ML Based Weather Cell Temperature Prediction | *Python, TensorFlow* — September 2020 – May 2021

- Developed a weather prediction model based on a localized weather cell using TensorFlow
- Scraped and preprocessed weather data from Environment Canada's historic weather archive
- Developed a simple Gradio based visualization software for analysing the models outputs and its training
- Achieved an accuracy of up to **80%** for weather predictions within a day of look ahead
- This project won a bronze medal at the Canada Wide Science Fair

Technical Skills

Languages: Java, C, C++, SQL, JavaScript, TypeScript, Python
Frameworks: React, Node.js
Developer Tools: Git, GitHub, Visual Studio, IntelliJ, Fusion360, Blender, SolidWorks
Libraries: Chart.js, TensorFlow, NumPy, Matplotlib