

SKILLSET

Software Engineering

- Python
- Basic Rust, Java, Go, and **TypeScript**
- Git
- Linux
- Docker
- CI/CD
- Relational databases (**PostgreSQL**) and ORMs
- Grafana

Electrical Systems

- Power and signal electronics analysis
- Digital design
- Microcontrollers and single-board computers
- Real-time systems

WHERE I EXCEL

- Showing initiative in end-to-end problem solving, from conception to deployment
- Creating reusable, well-tested, and fast software
- Considering all aspects of a problem, from technical to green energy implications

EXPERIENCE

Optimization Engineer

BluWave~ai

2022 – Present
Ottawa, ON

- Created a high-level model of Ontario's electrical grid for optimization using data from Ontario's system operator and OpenInfrastructureMap data
- Developed, deployed, and maintained an optimization service that performs city-wide demand response by controlling grid-scale batteries and fleets of EVs, for an ongoing program with Canadian utilities and system operators
 - Created an algorithm that controls EVs' charging to consume power when the energy mix is green
- Developed and deployed software to optimally control a solar-powered hydrogen production and storage system, extending its component lifespan while generating electricity from green hydrogen at high-demand times
- Collaboratively developed, and deployed, a cloud service that sends timely and helpful charging station recommendations to EV taxi drivers based on location
 - Helped progress the pilot project with the taxi company to the next stage by creating a real-time simulator of EV taxi fleet operations, showcased at COP28
- Developed and deployed prototype optimizers of electric bus charging operations for multiple transit agencies in simulation
 - Created optimization models for minimizing energy cost and grid strain in a model predictive control scheme, used in a simulation study for many Ontario school bus depots
 - Created a library used by multiple projects for testing smart grid control software in a variety of simulated environments
 - Created, evaluated, and deployed novel load predictors for Mumbai and Prince Edward Island (which outperformed LGBM by 17%)
 - Completed a 10-MW grid-scale battery study for reducing grid strain in St. John's
 - Co-inventor on five patents, including for the real-time, data-driven minimization of cost and greenhouse gas emissions with EV charging stations

Systems Engineering Co-op

Jastram Engineering

Sep – Dec 2020
Vancouver, BC

- For steering systems on naval frigates:
 - Developed documentation for security, safety, risk management, and failure analysis
 - Verified conformance of electrical systems to NATO standards
 - Successfully performed vibration analysis for hydraulic power units in Python

EDUCATION

BASc Mechatronic Systems Engineering

Simon Fraser University

2016 – 2021

Vancouver, BC

- 3.67 CGPA; President's Honour Roll, three-time Dean's Honour Roll

PERSONAL PROJECTS

[IoT Integration of a Hydroponic Farm](#)

2022 – 2023

- Integrated a Raspberry Pi and microcontroller with a variety of sensors and actuators
- Created an IoT dashboard and Python-based interface for remote monitoring & control
- Completed the first phase on-time to successfully control the farm across Canada

[Simulation of Mid-Air Refueling of a Hydrogen-Powered Airliner](#)

2023 – Present

- Design and [feasibility study](#) determining how to refuel a sustainably-powered commercial airliner
- Developed a [3D computer simulation](#) of mid-air refueling by AT200 cargo UAVs
- Created a flight controller [UI mockup](#)

[Author of multiple Python libraries](#)

2024 – Present

- Applications span [signal resampling](#), [Pandas/dataclasses interoperability](#), and ease of writing [explainable, traceable, and auditable Python programs](#)

[Series About Energy, Renewables, and Climate Change](#)

2022 – Present

- A series of web postings of interesting, significant, and actionable facts and pieces of information about energy, renewables, and fighting climate change

[Cluedo Game Simulator and AI Assistant](#)

2023

- Wrote software guaranteed to beat human players at Cluedo by solving the game as a Boolean satisfiability problem
- Made an interactive player dashboard to visualize game and simulation results

[Energy Yield Model of a Gas Turbine](#)

2021

- Performed statistical analysis and trained machine learning models on sensor data
- Verified, visualized, and reported model performances

[Model of Fuel Cell EV Air Supply System for Optimization](#)

2020

- Identified the potential for optimization among car manufacturers
- Defined an empirical relationship between fuel cell humidity and performance
- Numerically modeled turbo compressor to feed fuel cell oxygen

[Optimization of a Telescopic Handler Mechanism](#)

2020

- Applications in structural engineering and robotics
- Verified and visualized solution to 1000-variable optimization problem obtained using tuned gradient-based and genetic algorithms