(778) 237-5533
keeganmjgreen@gmail.com
Ottawa, ON

# KEEGAN GREEN

**MOTIVATED · ADAPTABLE · DEPENDABLE**

## SKILLSET

**Software Engineering**

- **Python** · Pandas, NumPy, SciPy, Plotly/Dash, Kedro, SQLAlchemy
- **Optimization** · Pyomo, Cbc, GLPK
- Git
- Linux
- Docker
- Relational databases (PostgreSQL) and ORMs
- Grafana
- MLflow
- Basic Java
- Basic Go
- MATLAB/Simulink and Optimization Toolbox

**Control Systems**

- Modern optimal and digital control
- Modeling and simulation

**Electrical Systems**

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

## WHAT I'M GREAT AT

- End-to-end problem solving, from conception to deployment
- Creating reusable, well-documented software
- Considering all aspects of a problem, from technical to green energy implications

## EXPERIENCE

**Optimization Engineer** 2024 – Present
*BluWave~ai* Ottawa, ON

- Developed, deployed, and maintained an optimization service to perform city-wide demand response by controlling grid-scale batteries and hundreds of EVs, for an ongoing EV Everywhere program with Hydro Ottawa
  - Created an algorithm that controls EVs' charging to consume power when the energy mix is green
- Developed and deployed an optimizer that sends timely and helpful charging site recommendations to Dubai Taxi EV drivers
  - Created a real-time simulator of EV taxi fleet operations, showcased at COP28, essential to progressing the pilot project with Dubai Taxi to the next stage
- Developed and deployed prototype optimizers of electric bus charging operations for multiple transit agencies in simulation
  - Created optimization models for peak-shaving and energy cost minimization in a model predictive control scheme, used in a simulation study for Ontario's 11 Roxborough school bus depots
- Developed optimization software to smooth the power input to a solar-powered hydrogen generation and storage system, to extend its lifespan
- Created a library used by multiple projects for testing smart grid control software in a variety of simulated environments
- Created, evaluated, and deployed an estimator of peak power consumption to improve the accuracy of a predictor for Mumbai's city load
- Completed a 10-megawatt peak-shaving study for the city of St. John's grid
- Co-inventor on three patent applications for BluWave's EV Fleet Orchestrator system
- Co-inventor on a patent application for the real-time, data-driven minimization of cost and greenhouse gas emissions with EV charging stations

**Systems Engineering Co-op** Sep – Dec 2020
*Jastram Engineering* 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 standardization agreement
  - Successfuly performed vibration analysis for hydraulic power units in Python

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## EDUCATION

**BASc Mechatronic Systems Engineering** 2016 – 2021
*Simon Fraser University* Vancouver, BC

- 3.67 CGPA; President's Honour Roll, three-time Dean's Honour Roll
- 4.33 GPA in statistics and engineering optimization courses

## PROJECTS

**Simulation of Mid-Air Refueling of a Hydrogen-Powered Airliner** July 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

**SignalPerfect Python library for signal resampling** July – Dec 2024

- Derived a special class of quadratic spline for resampling time series data
- Used a number of linear algebra computing strategies to reduce complexity from $O(n^3)$ to $O(n)$

**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** Feb – Mar 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 artifacted game and simulation results

**IoT Integration of a Hydroponic Farm** Sep 2022 – Jan 2023

- Created IoT dashboard and Python-based interface for remote monitoring and control
- Developed farm process model for minimizing consumption of energy and resources
- Completed first phase on-time to successfully control farm across Canada

**Energy Yield Model of a Gas Turbine** Jan – Feb 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** Mar – May 2020

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

**Optimization of a Telescopic Handler Mechanism** Mar – Apr 2020

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