# Warren G. Holley

Systems Administrator, Software Developer, Data Scientist, Automation Specialist.

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## Experience

### Satellite Operator, Software Developer, Sys. Admin – CASSIOPE Satellite – University of Calgary

Aug 2018 – Mar 2025

- I was the co-lead Satellite Operator for the team, following and improving upon operations protocols.
- Software development in various languages. (*Python, Fortran, Perl, Bash*)
- Maintenance of legacy internal and public software. *(Python, Perl, Matlab, Fortran, Java, IDL)*
- Automation of manual processes to improve productivity. *(Python, Perl, Bash)*
- Development of cross-system interfaces & APIs. *(SQL, Flask, FastAPI)*
- Database & Dataset administration & development. *(MySQL, File System Management, Data Warehousing)*
- Server & Network administration & deployment. *(Ubuntu, Red Hat, Windows)*

### Volunteer Developer, IT & Helpdesk – Vancouver Community Network

May 2018 – Aug 2018 (Temporary Volunteer)

- Developed software for server and user account management. *(Bash, Python, CMD)*
- Provided technical support for VCN's various services. *(Dial-up internet provider, web hosting)*

## Projects

### CASSIOPE Operations Automation

CASSIOPE Project – Continuous – Python, Bash, Perl, CMD, Fortran

- Reduced maintenance of the satellite from ~6-10 man-hours per day to less than 1 man-hour per day.
- Reduced downtime of the satellite during research campaigns.
- Improved science-data production by maximizing instrument duty cycle via automated scheduling.
- Implemented numerous fixes that reduced Operator headache overall.

### Orbit & Attitude Determination System

CASSIOPE Project - Completed 2019 – Python, Numpy, C, MySQL

- System for Back-Orbit Analysis of CASSIOPE ephemeris & attitude telemetry.
- Binary data parsing & translation (ETL) in C for accelerated processing.
- API interface to AGI STK (Satellite/Systems Tools Kit) through the Windows COM API.
- Data processing using Python & Numpy, telemetry loaded to public data store and MySQL database.

### e-POP Ephemeris Library

CASSIOPE Project – Initial Deployment 2021 – Python, Numpy, MySQL

- Public, Open-Source Python Library for improving public access to the CASSIOPE/e-POP dataset.
- Designed as a library to simplify atmospheric science processing for both public and internal use.
- Provides various frame transformation (GEOPACK 08, ICRF, ITRF, Body frames) for science processing.
- Provides a simplified API to access research databases and datasets.

## Publications

**'In situ calibration of the Swarm-Echo magnetometers'** https://doi.org/10.5194/gi-11-323-2022
ESA Funded Publication - In collaboration with the University of Iowa
Magnetospheric measurement co-alignment calibration with the SWARM satellite constellation.

**'cavsiopy'** https://pypi.org/project/cavsiopy/ https://doi.org/10.5281/zenodo.8361256
Zenodo Publication - In collaboration with the University of Saskatchewan
A very early implementation of the CASSIOPE Ephemeris Library.

**'Attitude effects on the observed orientation angle of HF waves from the Radio Receiver Instrument on e-POP/Swarm-E'** https://doi.org/10.5281/zenodo.7964200
Zenodo Publication - In collaboration with the University of Saskatchewan
An analysis of the effects of the accuracy of the satellite pointing solution upon the cross-dipole radio instrument.

**'SWARM-Echo Ephemeris & Attitude Determination System'**
ESA Funded - Initially presented at ESA's SWARM 2022 Data Quality Workshop.
A presentation describing the 'Orbit & Attitude Determination System' listed under Projects.

## Education

### B.Sc., Natural Science - Concentrations in Computer Science and Mathematics - University of Calgary

Sept 2011 – Dec 2016

- **Computer Science**
  Academic focus in data science. Academic projects include database design and development *(MySQL)*, embedded systems development *(Atmel AVR, ARM Cortex)*, and a suite of software for high-integrity data administration with corruption resistance and recovery (*Python, Bash*).
- **Mathematics**
  Academic focus in data-science related fields. Calculus, Linear Algebra, and Computational Mathematics. Academic projects included data analysis, statistics, and applied cryptography.

## Skills

**Technical**

**Programming languages**: Python, C/C++, Java, Matlab, MySQL, Fortran
**Frameworks/tools:** VSCode, NumPy, Conda/vEnv/UV, Git, SVN, GitLab CI/CD
**Web Platforms:** Apache, nginx, Flask, FastAPI
**Dev platforms:** Linux *(Ubuntu, Debian, Red Hat)*, Windows *(Desktop, Server)*, Baremetal Embedded Systems *(Arm Cortex, Atmel AVR)*
**Systems Administration**: Proxmox/KVM, Docker, OPNSense, OSSEC, various security tools.
**Space Domain:** AGI STK & ODTK, GEOPACK.

**Misc.**

**Supplementary Education**: Electrical Engineering, Economics, Chemistry.
**Hobbyist Skills:** Electrical Engineering (*Power Systems, Robotics*)
**Skills In-Development**: Rust, Go, C#, T-SQL, Linux Embedded Systems (*Yocto*), Amazon Web Services