

# ANDY REN

## Computer Engineering at University of Waterloo

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## EXPERIENCE

### Embedded Software Intern

#### Nuvation Energy

January 2021 – April 2021

Waterloo, Canada

- Developed firmware in **C/C++** for the Nuvation **Battery Management System**
- Drafted and implemented a prototype model for migrating flash memory data after a firmware upgrade
- Wrote and refactored unit and system tests in **C++** and **Python** to test various firmware features in simulated and hardware environments
- Debugged and investigated numerous real-time firmware bugs and test regressions using **gdb** and **Python**, improving system robustness

### Software Developer

#### VirtaMove

September 2019 – December 2019

Kanata, Canada

- Built a robust internal test framework for VirtaMove using **Python** and **Robot Framework**, which executed release-critical manual tests nightly, reducing software testing and verification time by up to **50%**
- Implemented features in **C/C++** which enabled V-Migrate host certificate regeneration, and resolved various runtime concurrency errors
- Configured the V-Migrate installer to automatically resolve TCP/IP port collisions, and perform closed network installation using **WiX Toolset**
- Redesigned migration agent key generation, enabling V-Maestro to communicate with previously linked agents after a system restart, improving product scalability
- Prototyped a new product activation graphical interface for migration licensing using **C#**, **.NET Core**, and **C++**

### Web Analyst

#### Agriculture and Agri-Food Canada (AAFC)

January 2019 – April 2019

Ottawa, Canada

- Developed responsive web interfaces using **JavaScript**, **HTML** and **CSS** for intra-departmental clients on the AAFC **SharePoint** platform
- Rewrote web scraping scripts in **PowerShell** using the **SharePoint API** to improve parsing functionality for remote endpoint tabulation of departmental **SharePoint** usage statistics

## PROJECTS

### home-monitor

[github.com/ren-andy/home-monitor](https://github.com/ren-andy/home-monitor)

- Built a multi-threaded home monitoring embedded system using a **Raspberry Pi 3B+** and **C++**, capable of detecting nearby intruder movement, reading and displaying temperature and humidity, and playing music.

## SUMMARY

- Professional experience in software/firmware development and testing with **ARM Cortex M** based embedded systems using **C**, **C++**, **Python**
- Practical experience with **Unix** programming, **RISC-V** assembly, and **JavaScript** backend development

## SKILLS

### Languages

C++ C C# Python MATLAB  
JavaScript RISC-V Bash

### Tools and Frameworks

Linux gcc gdb Git Docker  
Robot Framework Pyunit Cpputest

## EXTRACURRICULARS

 **Engineering Councillor**  
Advocate for the academic interests of engineering faculty students

 **Fitness Enthusiast**  
Avid weightlifter and distance runner

 **Lifelong Musician**  
Played Piano, and Alto Saxophone for over a decade

## EDUCATION

Candidate for BASc, Computer Engineering  
**University of Waterloo**

September 2018- Present

- Relevant Courses:
  - ECE 250 - Algorithms and Data Structures
  - ECE 224 - Embedded Microprocessor Systems
  - ECE 252 - Systems Programming and Concurrency
  - ECE 350 - Real-Time Operating Systems