Joel Lee

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SKILLS

Programming Knowledge: C/C++, C#, Python, Jupyter, Java, XML, Matlab, Git, LaTeX
Embedded systems: Texas Instruments, Onsemi, VectorNAV, Arduino, Raspberry Pi
CAD & PCB design: OnShape, Solidworks, Altium Designer
OS: Linux, Windows
Applications: Word, Excel, PowerPoint, Teams, VScode, CLion, Atlassian/Agile methods, Jenkins

WORK EXPERIENCE

FIRMWARE DEVELOPER | ONSEMI — Waterloo, ON | Jan 2023 - Apr 2023

- Implemented and validated the world's lowest power bluetooth microcontroller (RSL15) targeting industries for implantable medical devices, automotives and hearables.
- Developed multi-protocol SoC for ultra–low power secure Arm Cortex–M33 processor in an Agile environment using C/C++.
- Released RSL15 SDK 1.5 firmware package with new sample applications, libraries and drivers.
- Created a feature to allow users to dynamically configure the number of paired devices and the memory allocated to store each device's information in the FLASH.
- Created sample code template to run RSL15 as a BLE peripheral that periodically enters into standby mode, reducing power consumption while operating the device at 17 µA.
- Designed and refactored the calibration routine for low power clocks (XTAL and RC Oscillators).

HARDWARE & FIRMWARE DEVELOPER | UW ORBITAL — Waterloo, ON | May 2022 - Aug 2022

- Part of the winning team of the Canadian Satellite Design Challenge, designing a satellite payload system used for image capture in space.
- Designed and built the attitude determination and control systems (ADCS) PCB using Altium Designer, enabling control of sensors and actuators that stabilize the orientation of the cube satellite in space.
- Developed drivers for a VectorNAV Internal measurement unit (IMU) and H-Bridge motor IC using a Texas Instruments microcontroller (RM46) in C/C++
- Researched, selected and sourced motor drivers, motors and IMU for the attitude determination system.

TECHNICAL PROJECTS

GESTURE CONTROLLED VEHICLE — Python, Raspberry Pi, Flask, Computer Vision, Multiprocessing

- Designed A robotic vehicle capable of being controlled by intuitive hand motions. System included multiple Raspberry Pi's for driving motors as well as reading, transmitting and processing sensor data.
- Created a flask web server for user to view the vehicle's real time camera output.
- Implemented traffic sign detection software using YOLO's object detection algorithm and OpenCV.

EMG-HAND PROSTHETIC — Arduino, C++, Soidworks, 3D prototyping, Robotic Prosthetic

- Designed a hand prosthetic with a gripper capable of carrying everyday household loads and items up to 10lbs with the use of servo motors and an EMG sensor.
- Prototyped and performed 3D modelling, FEA, motion studies and topography using solidworks.
- 3D models and prototypes were printed using Prusaslicer printers and software.
- Created the circuitry for an EMG sensor by filtering and amplifying biosignals generated by electrodes attached to a user's forearm.

EDUCATION

BASc. Biomedical Engineering (2026 Candidate) — Waterloo, ON
University of Waterloo