Christopher Woodall

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Technical Skills

Software: C, C++, Python, Golang, C#, Bash, Linux, Windows, macOS, Git, SVN, Simulink, MATLAB, GUI toolkits (Wx, QT, Unity), Gitlab CI/CD, unit testing.

Hardware: ARM Cortex-R/M, Intel, debugging (JTAG, oscilloscopes), Soldering, and serial communication protocols (CAN, UART, TCP/IP, USB, I2C, SPI).

Experience

Senior Real-Time Controls Engineer September 2023 - Present
Commonwealth Fusion Systems Devens, MA

- Leading the development of a configuration system for our real-time controls platform involving python, C++ and golang.
- Developing real-time capable C++ algorithms for plasma control and diagnostics systems.
- Implementing a hardware out of the loop simulation environment for testing real-time C++ applications against scientific, and machine learning based codes.

Sr. Embedded Software Engineer - Propulsion October 2019 - June 2023
BETA Technologies Burlington, VT

- Creating Continuous Integration (CI) pipelines for releasing, testing and integrating Simulink models.
- Developing control laws, plant models and tests in Simulink and MATLAB.
- Leading a team of 3 to develop software for motor controls, aircraft integration and testing motors on dynamometers.
- Implemented and integrated sensor-less motor control algorithm.
- Developing controls algorithms, fault detection and software for 300kW Permanent Magnet Motors.
- Testing new electric propulsion unit designs, working closely with the motor development team to validate design and controls.
- Writing libraries for peripherals and STM32F4/F7 processors to be used across many systems.

Lead Embedded Software Engineer February 2019 - October 2019
Apricity Somerville, MA and Bend, OR

- Writing software in C/C++, Erlang and Python for IoT, medical and bluetooth audio devices.
- Implementing version control best-practices, procedures and reviews to improve code quality.
- Meeting with clients to scope out new work, technical solutions and timelines.

Sr. Embedded Software Engineer December 2015 - February 2019
Barrett Technology, LLC Newton, MA

- Writing firmware in C and C++ for ARM Cortex-M4 microprocessors for motor control and medical applications.
- Writing processes and scripts for software configuration, manufacturing and development for a FDA regulated device, in accordance with IEC62304.
- Architecting and implementing controls and communications for a 3-DOF robot with 6 seperate firmware nodes, and high-level controls over TCP/IP from a C# library.
- Maintaining and developing GUI tools with Wx and Python for testing, and configuring hardware modules.
- Writing software and firmware to communicate reliably using CAN and CANOpen.

Electrical Engineer II June 2014 - November 2015
Vecna Technologies, Inc. Cambridge, MA

- Lead firmware and electronics designer for a lithium-polymer battery pack for mobile robotics.
- Responsible for electronics design, integration, and FCC/CE compliance for a vitals enabled patient self-service kiosk.
- Developing automation scripts, troubleshooting, and maintaining Altium Designer to improve process efficiency.

Technician January 2011 - June 2014
Boston University, Electronic Design Facility Boston, MA

- Designed and assembled scientific instrumentation and test equipment for particle physics research experiments.
- Focused on FPGA design using VHDL with Xilinx ISE, and PCB layout using KiCAD and Altium.

Education

Bachelor of Science in Electrical Engineering, Magna Cum Laude May, 2014
Boston University, College of Engineering Boston, MA

- **GPA:** 3.76 out of 4.0
- **Related Coursework:** Power Electronics, RFIC Design, Digital Signal Processing, and Embedded Systems.

Patents and Publications

- **Patent,** High Performance Current Sensing Architecture For Brushless Motors, 2020, Patent Number: 20200153372
- **Patent,** Method of Propulsor Management in Electric Aircraft, 2022, Patent Number: 20220411051
- **Patent,** Systems and methods for locking an electric propulsion system, 2023, Patent Number: 20230348087A1
- **Patent,** Apparatus and method for optimizing motor performance in an electric aircraft, 2024, Patent Number: 20240002061A1