Seb Blanchet

Remote | s3blanch@uwaterloo.ca | linkedin.com/in/sebblanchet | github.com/sebblanchet | sebblanchet.com

Skills

Languages : Python, Rust, Bash, C, C++, C#, Go, JavaScript, HTML, Lua, SQL, Elixir, Swift
Tools : Git, Wireshark, Neovim, Jenkins, Docker, K8, AWS, LaTeX, Markdown, Nginx, Bazel
Technologies : Numpy, Torch, Tensorflow, Pandas, Vue, React, WASM, OpenCV, CUDA, ffmpeg, ollama
Platforms : Intel x86-64, Apple Silicon, ARM Cortex, Arduino, Raspberry Pi, Xilinx FPGA, NVIDIA GPU
Simulation : MATLAB, LabVIEW, Simulink, OPAL, Speedgoat, dSPACE, SOLIDWORKS, ANSYS
Os : Windows, macOS, iOS, Ubuntu, Arch, Debian, Asahi, Fedora, RHEL, Kali, FreeRTOS, QNX
Protocols : TLS, SSH, PGP, HTTP/2/3, TCP/IP, UDP, DNS, XCP, CAN, LIN, UDS, SPI, I2C, JTAG, UART
Concepts : AI/ML, LLM, MIMO, PID, DSP, HIL, TDD, OOP, DSA, CI/CD, REST, UNIX, OSI, OWASP

Education

University of Waterloo **Sep 2013 - Jun 2019**
Bachelor of Applied Science with Distinction *Waterloo, ON, CAN*

- Honors Mechanical Engineering Co-op - GPA: 3.5 / 4.0

Experience

Apple **May 2024 - Present**
Senior Software Engineer - Human Interface Devices *Remote*

- Automating iOS/macOS testing and deployment using Bash/Python for all devices supporting Touch ID
- Collecting and analyzing sensor data to extract core metrics and perform statistical analysis and visualizations
- Integrating custom Swift native apps into the testing workflows to interact with internal SDK APIs
- Streamlining AI/ML data processing, model training tasks with automation scripts and cloud computing
- Developing and managing cloud-based CI/CD pipelines with modern Python tooling: ruff, rye, pytest, mypy
- Scaling and managing Kubernetes cloud infrastructure for Docker-based web apps and services

Apple **Jun 2021 - May 2024**
Senior Software Engineer - Special Projects Group *Cupertino, CA, USA*

- Developped test infrastructure in Rust, Go, and Python on bare-metal Linux systems for DSP/DAQ
- Architected low-level network drivers in Rust and debugging TCP/IP,UDP traffic with Wireshark and Lua
- Wrote embedded C/C++ protocol translation drivers for SoC to test-rig interfaces on ARM targets
- Trained and tested AI/ML models utilizing PyTorch for an OpenCV, ffmpeg streaming applications
- Optimized data analysis and DSP jobs using CUDA for executing parallel computing on GPU in AWS EC2
- Deployed and debugging embedded C firmware with Bazel over JTAG, UART, and UDS during SoC bring-up
- Integrated SoC with test-rig Simulink software on RTOS targets and IO hardware for hardware analysis
- Troubleshooted serial communication (I2C, SPI, CAN) hands-on and calibrating sensors with lab equipment
- Synthesized actuator control systems via sysid testing, modeling, and frequency domain analysis in MATLAB
- Designed and building mechatronics components for test system upgrades with NX CAD and ANSYS FEA
- Managed DevSecOps activities: OS upgrades, OpenVPN, PGP keygen, firewalls, CVE scans, TLS certs, YubiKeys
- Led efforts to establish scalable cloud CI/CD leveraging Git, Bash, Bazel, Jenkins, Docker, and Ansible

Pratt & Whitney Canada **Aug 2019 - Jun 2021**
Software Engineer - Test Facilities Computing *Remote*

- Shipped production ECU test and build software with modern web stack: Rust, Node, Vue, TypeScript
- Designed embedded C drivers for RTOS control systems and high-speed ECU data acquisition and processing
- Maintained concurent C++, C#, Rust microservices running on bare-metal CentOS, RHEL Linux servers
- Programmed TCP/UDP sockets for communication with APIs/SQL databases and debugged with Wireshark
- Introduced a new Agile work-flow with Git, Azure CI, Docker, and C++/C/JavaScript unit testing

Tesla **Sep 2018 - Dec 2018**
Firmware Engineering (Co-op) - Energy Products *Palo Alto, CA, USA*

- Coded MISRA compliant firmware in C for power electronic controls on embedded system's DSP's and MCU's
- Exposed to full-stack from RTOS kernel, serial drivers APIs (CAN, SPI), application-level controls and diagnostics
- Deployed an embedded self-test C framework on multiple ECUs eliminating manual debugging at EOL/field
- Employed a test-driven development mindset by writing C unit tests, SIL/HIL simulations, Go regression

- Assured CI in an Agile environment with Atlassian tools, Git, Bash, code review/PR and Jenkins builds

Apple **Aug 2017 - Aug 2018**
Controls Engineering (Co-op) - Special Projects Group *Cupertino, CA, USA*
- Developed a hardware-in-the-loop system for validation of power electronic control algorithms in C on MCU
- Emulated and optimized high-fidelity discrete plant models on 32-bit Xilinx FPGA for low latency second control
- Deployed LabVIEW HMI for deterministic communication between PC, PXIe RTOS controller and FPGA
- Flashed microcontroller via JTAG, serial and Ethernet with the latest software builds for bring-up of PCB
- Applied DSP theory to convert continuous Simulink filters to discrete firmware in C for data acquisition
- Implemented automated testing Python frameworks for continuous integration and software regression
- Designed system harness to interface HIL and PCB from electrical schematics and NI hardware datasheets

Altaeros **Jan 2017 - Apr 2017**
Systems Engineering (Co-op) - R & D *Boston, MA, USA*
- Performed numerical analysis in Python on prototype of an autonomous aerostat's electromechanical system
- Utilized electronic lab equipment and LabVIEW HMI to log test data and analyze with MATLAB

Ontario Die International **May 2016 - Aug 2016**
Mechanical Engineering (Co-op) - R & D *Waterloo, ON, CAN*
- Designed robotic components (electrical, hydraulic) of PLC/CNC bending systems in SOLIDWORKS
- Improved existing technology by applying lean, DFM and DFA principles to prototyping and research projects
- Automated tedious SOLIDWORKS tasks in VBA and C++ with the API in MS Visual Studio IDE
- Performed hands-on Q&A HMI testing, machined components, fabricated assemblies with power/hand tools

Pratt & Whitney Canada **Sep 2015 - Dec 2015**
Project Management (Co-op) - Turbofan Operations *Mississauga, ON, CAN*
- Communicated with the OEM in French to assure delivery of a quality engine while exceeding expectations
- Developed Excel VBA programs allowing for improvements in methods of business metric preparation
- Collaborated with a multi-disciplinary team to develop logistics plans for new design incorporation

Linamar **Jan 2015 - Apr 2015**
Manufacturing Engineering (Co-op) - Skyjack *Guelph, ON, CAN*
- Worked with a team of engineers to troubleshoot production issues at an aerial work platform manufacturer
- Increased process efficiency by organizing assembly stations and designing of jigs/fixtures with SOLIDWORKS

Nor-Arc **Jun 2014 - Aug 2014**
Mechanical Engineering (Co-op) - Steel Fabricators *Earlton, ON, CAN*
- Detailed architectural, mechanical and electrical drawings including GD&T in AutoCAD

Projects

Portfolio Web App **Jul 2024**
Personal
- Showcased portfolio using full-stack development/DevOps skills on GitHub-pages hosted application

Golf Launch Monitor **Feb 2024**
Personal
- Prototyping OpenCV/TensorFlow application to extract golf swing attributes from video on NVIDIA Jetson

Hack the Box **Oct 2023**
Apple Software University
- Solved forensics, web, corruption based challenges using Kali tools nmap, Burp, Ghidra, pwntools, gdb

Electric Drum Kit Trainer **Sep 2023**
Personal
- Developped a Rust based real-time MIDI striking pattern monitor on an NXP ARM running FreeRTOS

Robot Arm Controller **Apr 2019**
ECE 488: Multi-Variable Controls
- Modeled and controlled MIMO non-linear system in MATLAB using optimal LGC control methods

Heated Press System **Mar 2019**
ME 482: Capstone Design Project
- Led electrical system efforts including harnessing/debugging and temperature/motor controls in C on MCU

Interests

Golf, Off-Road Vehicles, Hockey, Tinkering, Electronics, Machine Learning, Cybersecurity, Socializing (French, English)