Dave Vandervies

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Summary

Qualifications: Nearly two decades of industry experience and an education in pure math
High-level skills: Turning domain knowledge into useful, robust, maintainable software
Favorite technologies: C on small microcontrollers; unix-based development environments
Works well with: Hardware engineers; machine learning experts; product managers

History

Embedded Systems Developer, North *2014—2019*
Worked on the firmware teams that shipped the Thalmic Labs Myo and Focals by North, and on R&D project teams doing new and experimental feature development

Part-time Student, University of Waterloo *2005—present*
Full-time Student, University of Waterloo *2013—2014*
Working toward BMath in Pure Math, primarily as a part-time student while working full-time; on track to graduate in 2024(ish) on current part-time schedule, or in 2020 with a final full-time stretch in 2019-2020

Software Developer, Raytheon Canada Ltd., Waterloo *2001—2013*
Responsible for major components of marine low-visibility-target tracking system, from requirements analysis through to post-delivery support

Full-time Student, University of Waterloo *1999—2001*
Completed three full-time school terms and two co-op work terms before deciding to take "a year" off

Skills

Technical skills
- **Making The Damn Thing Work** – By preference, reliably and repeatably
- **C (primarily C90/C99)** – Wizard-level knowledge and experience
- **Embedded systems** – Medium of choice in recent years
- **Unix** – Making `make` look easy
- **SML, Awk, Verilog, C++** – Able to write nontrivial useful code without adult supervision

Other skills
- **Working on cross-functional project teams** – Think globally, act locally
- **Working with large existing piles of code** – Improving things without breaking things
- **Taming complexity in large systems** – There's coherent subsystems in there somewhere
- **Building robust, maintainable, extensible systems** – And leaving the right things out
- **Abstract reasoning and problem-solving** – Practical application of math-fu
- **Presenting key technical ideas in accessible ways** – Talking tech to non-techies
- **Using existing skills in new areas** – Instant expertise; just add domain-specific details
- **Adequate communication skills** – I make words really good

Apprentice-level skills (Things I've gotten just enough of a taste of to want more)
- Static analysis and formal verification
- Large-scale parallel processing
- Functional programming, especially as it relates to the above
- Implementation of compilers and related toolchain
- Digital hardware and FPGA design

Portfolio

Focals by North

- **Early prototype development**
  - Worked with a team of 3-5 firmware developers building a modular system based on FreeRTOS
  - Worked with hardware and software teams to reduce cycle time for a broad range of prototyped features
  - Handled coprocessor firmware, interfacing, and device loading
- **First generation**
  - Worked with a team of 4-8 firmware developers on an Android-based system
  - Responsible for major parts of companion device firmware
- **Experimental feature development**
  - Worked with hardware and machine learning teams on exploratory work for new input methods
  - Built reference implementations and testbench systems for digital design team during early development of custom silicon

Thalmic Labs Myo

- Took responsibility, as one member of a team of two firmware developers, for major parts of the sensor and radio interfaces in the Myo firmware
- Worked with hardware and machine learning teams to ensure that the best possible data was available, both for training data and for online classification
- Worked with machine learning team to integrate gesture classifier into on-board firmware

Raytheon Marine Small Target Tracker

- **Responsible for major portions of a radar tracking system for low-visibility targets**
  - Responsible for ongoing maintenance and development of legacy system
  - Provided roadmap to streamline legacy subsystems into a coherent architecture
- **Designed and built radar video capture and preprocessing subsystem**
  - Took responsibility for software requirements analysis and interface specification for preprocessing subsystem
  - Worked with hardware team on hardware requirements analysis and interface specification for digitizer hardware
  - Handled software side of PCIe data interface
  - Designed and built software infrastructure for communication between subsystem modules
  - Implemented image assembly, preprocessing, and plot extraction on radar pulse data fetched from digitizer
  - Migrated legacy code's upstream interface to new front-end subsystem
  - Implemented moving-radar upgrade, with minimal impact on existing components
- **Built modular data viewer**
  - Designed GUI (for Win32) and plugin interface to display two-dimensional data with arbitrary overlays
  - Built plugins to display user-relevant radar and tracker data, and intermediate products useful for system development and tuning
  - Supported development of plugins to display data produced by other systems

School

- Working on a pure math degree
- Took one course per term, 1-2 terms per year while working full-time
- Consistently earning grades in the 90s

External references

- <https://github.com/dj3vande/> – a partial, uncurated collection of things I thought it would be interesting or useful to work on