Cooper Wolfden

cooper.wolfden@icloud.com · (+61) 426 175 343

Education

Flinders University — Adelaide, Australia
Bachelor of Engineering (Electrical and Electronic) (Honours) — 2019–2023

- *Thesis: Performance Augmentation using Biosignals*
- *Chancellor's Letter of Commendation (2020)*
- *President of Flinders Motorsport (2021–2022)*
- *Research publication:*

  Wolfden, C and Zanj, A 2023, 'Development of a semi-automated undervine slasher', *Wine & Viticulture Journal*, vol. 38, no. 1, pp. 61-66.
  link: https://winetitles.com.au/wvj/articles/wine-viticulture-journal-volume-38-no-1-2023/viticulture-development-of-a-semiautomated-undervine-slasher/

Work Experience

Adelaide Convention Centre — Adelaide, Australia
Senior AV Operations Technician — 2018–Current

- *Ability to read and follow technical specifications*
  visualising what has been specified and determining what is still required
  being resourceful and "making it work"
- *Working with varying levels of supervision*
  in highly structured, complex teams with many people
  as well as completely independently with little to no supervision
- *Technical problem solving in both high-level "systems" and low-level "signals"*
  thinking in terms of signal flow, quickly identifying faults and determining solutions
  often working "top to bottom"; ability to perceive bigger picture
  understanding when to ask for help and when not to spend other people's time
- *Operation of speciality equipment during events*
  mapping structure of system such that problems can be fixed quickly in high pressure situations
- *Professional client communication and problem resolution*
- *Following WHS in high-risk areas and around forklifts, scissor lifts, etc.*
- *Maintaining professional working relationships regardless of external pressures*

Flinders University — Adelaide, Australia
Student Ambassador — 2022–2023

- *Maintaining professional demeanour while speaking to general public*
- *Communicating effectively with wide range of people from different backgrounds*

Skills

- **Programs:** Altium, Inventor, KiCad, ROS, LabVIEW, MATLAB, Simulink, MPLAB X, STMCubeIDE, Arduino
- **Languages:** Python, C, C++, ARM Assembly, JavaScript, LaTeX, SQL, Rust
- **Concepts:** Embedded Systems, Analog Design (ADCs, OPAMPs, decoupling, biasing, signal integrity, grounding),
  "Bare metal" programming (no stdlib, no heap allocation),
  Linux (embedded, remote via SSH, general command line use, version control, build systems),
  General understanding of object-oriented and functional programming,
  Can be writing usable code in a new language within a week
- **Soldering:** Can solder down to 0603 comfortably with minimal tools (iron and tweezers)
  Experience terminating connectors and providing adequate cable relief
  Fixing mistakes on circuit boards (cutting traces/soldering wires, pins/pads often significantly smaller than 0603)
  General resourcefulness - much faster/cheaper to buy connectors and reuse old cables

Projects

Server-less application for synchronising spreadsheet roster to calendar 2019
- Written in JavaScript
- Over 1,300 lines of code
- Uses Google Cloud free tier (strict resource management)
- Learnt many lessons about code management and versioning (ie. scope, version control utilisation)

Rust application for filtering pricing information from RS Components for low cost rapid prototyping 2022
- Written in Rust
- Essentially opposite of previous project - high(er) performance CLI tool
- Code written with minimal dependencies with greater attempt to be bug free
- Lesson learnt from previous project, do one thing and do it well

Custom PCB to receive and transmit CAN bus data 2022
- PCB has footprint of less than $30mm^2$ (efficient use of space, placement and routing considerations)
- Programming via SWO for smaller footprint, step debugging, and ITM trace printing
- Used to serialise sensor readings and provide longer transmission distances in high noise environments

High current buck converter to drive 12V audio amplifier from 18V DC supply 2023
- Allows 18V power tool batteries to efficiently power 12V devices
- Design process involved considering alternatives methods such as linear regulation, reviewing costs of existing devices, selecting complimentary components to increase device performance
- Fulfils application requirements while remaining passively cooled
- PCB designed to fit tolerances of existing enclosure

Real-time audio signal processing in C 2024
- Written with only C libraries
- Wanted to experiment with Linux pipes and use them for real-time processing
- Audio samples piped to stdin and processed samples written to stdout, which can then be piped to stdin of aplay (or similar) for listening
- Design allows for several different (or the same) applications to be chained together for interesting results

Roster calendar synchroniser rewrite 2024
- Rewrote original project in Python, with minimum external dependencies
- Works as a grouping of tools for doing each individual step
- Provides isolation between each tool, allowing them to be tested and debugged easily
- Actual application is just a script that runs each tool in a chain

Lighting controller using Novation Launchpad and Launch Control 2024
- Want to be able to control lights using additional buttons and faders
- Actual implementation is quite easy, lighting consoles support OSC, messages sent over the network
- Age of Launchpad causes Windows 10 driver to be unstable, works much more reliably under Linux
- Originally Launchpad button presses from Raspberry Pi to Windows using custom socket implementation
- Eventually moved to Unix sockets communicating between programs running on the same Raspberry Pi to decrease latency
- Used Systemd units to manage starting, stopping, and restarting relevant hardware services when corresponding hardware is connected
- "Core" system service is started at boot, all inputs are sanitised, all possible error states either correct themselves or trigger a service restart
- Rewrote launchpad receiver code in C using ALSA library to reduce IO CPU usage using by utilising poll

Wilderness Society GPS image processing and correlation 2024
- First time building a graphical interface for an application
- Meets requirements of non-technical people, tool adapts to their needs rather than them adapting to it
- Real-time image processing and transformation in OpenCV

Small-footprint microcontroller module 2024
- Standardise software development of future projects by building from the same base each time

2.4GHz transceiver module *Ongoing*
- First time designing antenna - project primarily used for experience
- Integrating with previously designed module to add wireless capability to future projects