

# Patrick PRELL

## Embedded Systems Engineer

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Hi there! I'm a passionate Embedded Systems and Mechatronics Engineer, talented at finding novel solutions to difficult problems. I offer innovative ideas for embedded systems, hardware design and control systems design. I strive to create robust workflows and exceptional final products.

## PROFESSIONAL EXPERIENCE

Current  
May 2022

### Embedded Systems Engineer | ResusRight - Australia

- Took the lead on developing a Qt based app on an Embedded Linux SOM. This project involved system architecture design and BLE stack implementation on Embedded Linux. This project improved my software architecture design skills, and taught me to use the Qt UI framework.
- Developed firmware for our "Nemo" clinical resuscitation monitor. This included development on both NXP and SiliconLabs microcontrollers. I was highly involved in implementing the BLE stack and serial communication stack.
- Lead the firmware development of a testing jig used for manufacture our electronics boards. I demonstrated my ability to lead a small team by creating timelines and managing a team to deliver a project on time.
- Designed and developed a companion mobile app in Flutter for our "Juno Training Monitor". In developing this app I learned to implement a Firebase authentication and database server as well as interfacing with both IOS and Android Bluetooth stacks. My app received very positive feedback during user testing.
- Took over responsibility for the firmware development and maintenance of our "Juno Training Monitor", an ESP32 based embedded device with BLE capabilities.
- As a developer in a medical device company, it is imperative I focus on writing on robust, maintainable and efficient code. Not only to conform to the many standards surrounding medical device development, but also to ensure the safety and reliability of the end product. Working at ResusRight has given me the experience of both working in a fast-paced **startup development environment whilst also conforming to stringent code quality requirements.**

Embedded C/C++ Embedded Linux NXP  $\mu$ C Silicon Labs  $\mu$ C Espressif  $\mu$ C IEC62304 IEC60601 ISO13485  
Bluetooth LE Firebase Flutter GitHub VSCode QT Suite Python Tkinter Notion

May 2022  
Apr 2018

### Mechatronics Engineer | CORDEL - Australia

- Developing pose and velocity estimation using optic flow and machine learning for more accurate point clouds. I utilised many features of the Open CV library in C++ and created many data visualisations for verification and evaluation.
- Implemented an Extended Kalman Filter to fuse sensor data, (IMU, RTK GPS, LiDAR) for pose estimation and localisation. This project required expert knowledge about Bayesian filtering techniques and linear algebra.
- Spent a year in New York working remotely developing 3D point extraction from 2D camera footage on a train. I demonstrated my ability to work effectively outside the office environment and without intervention.
- Manufactured aluminium and carbon fibre components on a CNC using CAM software. This is where I fostered many practical skills in material properties, machinist theory and CNC operations/path planning.
- Re-designed Base station housing and layout using CAD software. I developed and documented the company workflow for Fusion 360, this dramatically improved how Cordel maintained its CAD designs. With the workflow that I developed, fewer preventable mistakes were made and maintaining designs became much more achievable.

Python C++ Embedded C C# AVR Assembly Rust GraphQL OpenCV Cloud Compare 3D Reshaper Jira  
Confluence Bitbucket VSCode Visual Studio Fusion 360 STM32 Cube IDE KiCAD GitHub

Current Sep 2019	<b>Founding Member</b>   Borne Clothing - Australia <ul style="list-style-type: none"> <li>&gt; Built parts of our website and fulfilment workflow. This has required me to utilise basic web development skills as well as integrate many online services.</li> <li>&gt; Jointly responsible for running the business day to day. I am continually learning how to best run a business and social enterprise in the most lean way possible.</li> </ul> Excel Squarespace Shopify Asana
Nov 2018 Aug 2018	<b>ELEC3850 and ENGG1003 Tutor</b>   University of Newcastle <ul style="list-style-type: none"> <li>&gt; Guided students on hardware choices and best practices for electrical/PCB design.</li> <li>&gt; Aided students with debugging their code and troubleshooting circuits.</li> <li>&gt; Explained concepts to students that they didn't understand from the lectures.</li> <li>&gt; Aided students with troubleshooting C and MATLAB code.</li> <li>&gt; Helped students consolidate their progress into a final report.</li> </ul> STM32 Eagle PCB Design Embedded C MATLAB Teaching
Apr 2018 Feb 2018	<b>Creative Technologist</b>   CORE ELECTRONICS - Adamstown <ul style="list-style-type: none"> <li>&gt; Composed maker product review articles (PyCom, Makeblock) where I was required to combine communication excitement and interest with education and information.</li> <li>&gt; Documented video tutorials and product overviews Maker community education. Here I improved my public speaking ability and communications in tech.</li> </ul> MicroPython PyCom Espressif MakeBlock Scratch

## SKILLS

Hardware Design	3D CAD design (PTC Creo, Fusion 360), PCB CAD design (KiCad, Eagle)
Hardware Manufacturing	Soldering(SMD), Prototype Modelling, 3D Printing(FDM, SLA), CNC (Router, Laser cutter)
Embedded Development	AtMega23, STM32Fx, Makefile, Embedded C, System Verilog
Software Development	Linux (main development environment), Windows, Test Driven Development, Git
Interpersonal Skills	Clear communication, enjoy collaboration, inviting to mentorship and constructive criticism

## PROGRAMMING LANGUAGES

C	● ● ● ● ●
Python	● ● ● ● ●
Rust	● ● ● ● ○
C++	● ● ● ● ○

Matlab	● ● ● ● ○
JavaScript	● ● ● ○ ○
Flutter	● ● ● ○ ○
System Verilog	● ● ○ ○ ○

## EDUCATION

13/02/2023	
16/02/2023	QMS ISO 13485 Training   Industry Short Course - SeerPharma
30/01/2022	
02/02/2022	Vision-Based Navigation   Industry Short Course - Dr Chris Renton
Jul 2019	
Feb 2015	B.Eng. Mechatronics (Honours)   University of Newcastle
Jan 2008	
Nov 2013	High School Certificate   The Kings School

## REFERENCES - CONTACT INFORMATION ON REQUEST

**Anthony Zeater**  
Principal Firmware Engineer  
RESUSRIGHT

**Matt Crott**  
Chief Technology Officer  
RESUSRIGHT

**Matt Boustred**  
Chief Executive Officer  
RESUSRIGHT