

# James Bao

@ james@jamesnzl.xyz

+64 22 410 1580

Auckland, New Zealand

/JamesNZL

/JamesNZL

jamesnzl.xyz

## Professional Summary

I am driven to **improve human lives** through a **beautiful combination** of hardware and firmware.  
I am **hungry for best practises**, with a commitment to **continuous learning** and personal growth.  
I have a **proven problem-solving** mindset, and leave things **better than I found them**.  
I am an effective **communicator & collaborator**, leading multiple **top university design teams** to success.  
I am an **asset to any team**—I don't make promises I cannot keep.

## Education

### Bachelor of Engineering (Honours)

2021 – 2024

The University of Auckland

- Part IV **Computer Systems Engineering**
- Cumulative GPA of 8.4/9.0 (**A – A+**)
- Student Representative and **Teaching Assistant**
- Dean's Honours List (top 5%)

## Technical Skills

### Firmware & Embedded Systems

- Experience writing **C and C++ firmware** for **Atmel megaAVR** and **ARM Cortex** processors
- Hands-on with **bare-metal**, **FreeRTOS**, and Freescale MXP RTOS
- Passion for **best practises**, robust **architecture**, and thorough **documentation**
- Strong debugging skills with extensive **oscilloscope** and **logic analyser** experience
- Experience writing **unit & component tests**
- Development experience on **Linux, macOS, and Windows**
- Familiarity with **digital processor design** and specification
- GPIOs
- UART, SPI, I2C
- Control systems
- Basic HTTP/S
- ADCs & DACs
- OS concurrency
- Makefiles
- Basic USB
- Timers & PWM
- POSIX RAIL
- \*nix CLI
- Basic JTAG

### Power & Analogue Electronics

- Circuit & PCB design** learnt through practical application
- Wireless **inductive power transfer** and power electronics familiarity
- Parts selection and **board bring-up** design experience
- Extensive **hands-on** experience with **soldering** and **instrumentation equipment**
- Fluency with **LTspice** and **Altium Designer**
- Designed and built the **third-fastest IPT** RC car out of 21 teams in **ELECTENG 734: Power Electronics**

### Git/GitHub

- Fluency with **feature branches**, pull requests, issues, and GitHub Actions
- 8100+ contributions** accrued over the past **6 years**

**Other Languages** On top of **C/C++**, I am fluent in **TypeScript/JavaScript**, and have experience with **MATLAB**, **Python**, **Julia**, **C#**, **Java**, **VHDL**, and **MIPS assembly**.

## Industry Experience

### Firmware Engineer Intern

Nov 2023 – Feb 2024

EROAD Ltd

Auckland, NZ

- Writing **C++ RTOS application** service with **GoogleTest** unit & component tests
- Developed a 'highly polished internal support tool' that **reduced 4+ hours**-worth of work to **less than 2 minutes**
- Implemented **REST API** business logic to facilitate asynchronous **remote file retrieval** from in-field devices
- Produced **security architecture**, threat modelling, and data flow diagrams to identify & secure attack vectors

### Embedded Software Engineer Intern

Nov 2022 – Mar 2023

Windcave Ltd

Auckland, NZ

- Writing **C firmware** on STM32U585 **ARM** board
- Performed **rapid prototyping** of external **QSPI and OSPI** flash memories to inform hardware revision
- Implemented a **FreeRTOS** graphical Point-of-Sale system prototype on a Windcave payment terminal to satisfy **long-outstanding customer demand**

## Project Experience

### algovision

[docs.jamesnzl.xyz/algovision](https://docs.jamesnzl.xyz/algovision)

2023 –  
Personal Project

- **Self-directed** project to build a **algorithm visualisation tool** in hardware
- **Full design process**, parts selection, and **board bring-up**
- USB Power Delivery, custom LED matrix display, STM32U575 **ARM Cortex-M33** firmware

- ▶ Git and GitHub
- ▶ LTspice
- ▶ STM32CubeMX
- ▶ Figma
- ▶ Altium Designer
- ▶ MATLAB

### Pathfinding Robot

[docs.jamesnzl.xyz/compsys301-pathfinding-robot](https://docs.jamesnzl.xyz/compsys301-pathfinding-robot)

2023  
The University of Auckland

- **Pathfinding robot** I designed in a **group of four**
- **Top team** out of all **23 teams** across the computer engineering cohort
- Analogue **circuit & PCB** design, time- & frequency-domain **signal analysis**, using a **PSoC 5LP**, pathfinding algorithms, and motor **control systems**

- ▶ Git and GitHub
- ▶ LTspice
- ▶ PSoC Creator
- ▶ MATLAB
- ▶ Altium Designer

### Smart Energy Monitor

[cs209.jamesnzl.xyz](https://cs209.jamesnzl.xyz)

2022  
The University of Auckland

- **Smart energy monitor** I designed in a **group of four**
- **Lecturer's Choice** for **top team** out of all **40 teams** across the electrical & computer engineering cohort
- Analogue **circuit & PCB** design, signal conditioning, using an **ATmega328PB**, writing **firmware** drivers, and UART & **Bluetooth** communication

- ▶ Git and GitHub
- ▶ Microchip Studio
- ▶ Altium Designer
- ▶ LTspice
- ▶ Proteus VSM

**Other Projects** More projects can be found on my [GitHub profile](#).

## Achievements

### Dean's Honours List

[auckland.ac.nz](https://auckland.ac.nz)

2022, 2023  
Faculty of Engineering

Awarded to students who are either placed in the top 5% of their Engineering study in their discipline and part, and/or have attained a GPA of at least 8.25 from their enrolled Engineering courses for that year.

### First in Course Awards

[auckland.ac.nz](https://auckland.ac.nz)

2021, 2022, 2023  
Faculty of Engineering

First in Course Awards are given each semester to students who have achieved the highest overall mark in a particular taught course.

- COMPSYS 301: **Hardware Firmware Systems Design**
- COMPSYS 303: **Microcomputers and Embedded Systems**
- COMPSYS 209: **Analogue and Embedded Firmware Design**
- ENGGEN 131: Introduction to **Engineering Computation and Software Development**

### Other

- Bayonet of Honour — *City of Auckland Cadet Unit*
- Top of Course Award — *New Zealand Cadet Forces*
- School Prefect and Deputy House Captain
- First in Level 3 Calculus
- First in Level 2 Physics
- First in Level 2 Programming

Pre-2021

## Passions

**Outdoors** I have a deep love for the outdoors, and find it an amazing outlet to recharge my batteries.

**Teaching** I love crafting intuitive explanations for difficult, technical concepts—and seeing the lightbulb moment.

**Te Ao Māori** I am passionate about our indigenous culture & language—I achieved Excellence in my NCEA Level 3 Te Reo Māori examinations, and maintain involvement with Te Whānau o Te Puna at Westlake Boys' High School.

**Youth Development** I now volunteer as an Officer Cadet in the New Zealand Cadet Forces, after 5 years as a cadet with 17 months as a senior Cadet Warrant Officer Class II.

## References

References are available on request.