James Bao

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Professional Summary

*I am dedicated to **improving 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**
- Student Representative and **Teaching Assistant**
- Cumulative GPA of 8.4/9.0 (**A** – **A+**)
- 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
- ADCs & DACs
- Timers & PWM
- UART, SPI, I2C
- OS concurrency
- POSIX RAII
- Control systems
- Makefiles
- *nix CLI
- Basic HTTP/S
- Basic USB
- 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
2023 –

docs.jamesnzl.xyz/algovision — *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
- Figma
- LTspice
- Altium Designer
- STM32CubeMX
- MATLAB

Pathfinding Robot
2023

docs.jamesnzl.xyz/compsys301-pathfinding-robot — *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
- MATLAB
- LTspice
- Altium Designer
- PSoC Creator

Smart Energy Monitor
2022

cs209.jamesnzl.xyz — *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
- LTspice
- Microchip Studio
- Proteus VSM
- Altium Designer

Other Projects More projects can be found on my **GitHub profile**.

Achievements

Dean's Honours List
2022, 2023

auckland.ac.nz — *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
2021, 2022, 2023

auckland.ac.nz — *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
Pre-2021

- 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

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.