James Bao

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⊕ 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.

🎓 Education

Bachelor of Engineering (Hons) with First Class Honours   Mar 2021 – Dec 2024
The University of Auckland

- ❯ Specialised in **Computer Systems Engineering**
- ❯ Student Representative and **Teaching Assistant**
- ❯ Cumulative GPA of 8.5/9.0 (**A–A+**)
- ❯ Dean's Honours List (top 5%)

⚙ Technical Skills

Firmware & Embedded Systems

- ❯ Experience writing **C and C++ firmware** for **ARM Cortex** and **Atmel megaAVR** processors
- ❯ Passion for **best practises**, robust **architecture**, and thorough **documentation**
- ❯ Strong debugging skills with extensive **oscilloscope** and **logic analyser** experience
- ❯ Experience writing **unit & component tests**

❯ GPIOs	❯ UART, SPI, I2C	❯ Control systems	❯ Basic HTTP/S
❯ ADCs & DACs	❯ OS concurrency	❯ Makefiles	❯ Basic USB
❯ Timers & PWM	❯ POSIX RAII	❯ *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 with **LTspice** and **Altium Designer**
- ❯ Extensive **hands-on** experience with **soldering** and **instrumentation equipment**
- ❯ 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

Embedded Firmware Engineer   Jun 2025 – Present
Embedded Firmware Engineering Intern   Dec 2024 – Apr 2025
Apple Inc   *Auckland, NZ*

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, 2024
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, 2024
auckland.ac.nz
Faculty of Engineering
Awarded each semester to students who have achieved the highest overall mark in a particular taught course.

- COMPSYS 704 **Advanced Embedded Systems**
- 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

Youth I am a commissioned Second Lieutenant in the New Zealand Cadet Forces, NZ's oldest youth organisation.

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 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.

👥 References

References are available upon request.