Lachlan Campbell

Mechanical Engineer

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PROFESSIONAL SUMMARY

Final-year Mechanical Engineering (Honours) student at the University of Auckland with top academic results: first place in the cohort design project and a recent GPA of 8.3/9. Experienced across product design, embedded systems, thermal engineering and CFD, with two engineering internships, a current part-time role in Navico's EMC laboratory, two award-winning startups, and a self-run business making products used at the highest level of sailing. Strong attention to detail, a hard-working attitude, and a proven ability to lead teams and deliver high-quality work.

EXPERIENCE

EMC Test Engineer (Part-Time), **Navico Group (Brunswick Corporation)** Jun 2026 – Present

- Working part-time in the EMC (electromagnetic compatibility) laboratory, contributing to compliance testing of marine electronics.
- Balancing the role alongside final-year Mechanical Engineering (Honours) study.

Founder, **OnWater Components** 2022 – Present

- Own and operate a business making sailing products used at the highest level of the sport.
- Designed and manufactured products used by athletes at the 2024 Paris Olympics.
- Developing a digital electronic sailing compass, targeted for release in 2026.
- Full product lifecycle: design iteration, optimisation, prototyping, manufacturing, electronics and 3D printing.

Co-Founder, **Award-Winning Startups** 2026

- Co-founded an aquatech startup targeting lower-cost fish farming.
- Co-founded an electrical-engineering startup developing dynamic (real-time) monitoring of underground power cables.
- Both ventures won the Velocity Ideas Challenge (University of Auckland Centre for Innovation & Entrepreneurship).

Mechanical Engineering Intern, **Navico Group (Brunswick Corporation)** Nov 2025 – Feb 2026

- Ran a thermal-performance investigation using a custom adjustable test rig and thermal chamber.
- Designed and prototyped an active screen-cooling system (blower fans), achieving up to ~45 °C reduction in marine display surface temperature.
- Used CFD (OpenFOAM) to simulate and optimise airflow distribution across the display surface.
- Contributed to a provisional patent application for the thermal-management technology.
- Designed and tested a heat-pipe cooling system that reduced CPU temperature by ~20 °C.
- Prototyped a detachable touchpad controller and firmware to decode touchpad signals for marine chart navigation.

Mechanical Engineering Intern, **Automac Engineering** Nov 2024 – Feb 2025

- Delivered engineering projects for several of NZ's largest food producers.
- Completed a complex design update for a large-scale distribution machine and designed repair components to mitigate future wear.
- Produced pneumatic diagrams and SolidWorks workshop drawing packages for large assemblies.
- Helped design and manufacture a new packaging line (hygienic standards, IP ratings, design-manufacture-install process).
- Improved a SolidWorks macro to streamline file management and efficiency.

Bicycle Mechanic / Sales Representative, **99 Bikes, Takapuna** 2020 – 2024

- Led a team of mechanics and built strong hands-on mechanical and customer-facing skills.

EDUCATION

Bachelor of Engineering (Honours), Mechanical, **University of Auckland** Final Year (Part IV)

- First place in the cohort Mechanical Design Project (MECHENG 334).
- Latest year GPA 8.3/9; consistent A / A+ results in thermal engineering, engineering vibrations, dynamics of fluids & structures, control systems, mathematical modelling and design & manufacture.

Takapuna Grammar School 2018 – 2022

- NCEA Levels 1–3, Excellence endorsed at all three levels.

TECHNICAL SKILLS

CAD & Design: Creo, SolidWorks, Fusion 360, Autodesk Inventor, OnShape, FreeCAD

Simulation & Analysis: FEA, CFD, ANSYS, OpenFOAM, thermal analysis, structural optimisation

Manufacturing: CNC machining, 3D printing, injection moulding, milling, metalwork, composites, woodworking

Electronics & Software: C++, Python, JavaScript, MATLAB, embedded firmware, PCB design, sensors & controllers

KEY PROJECTS

- **Electronic Sailing Compass (2025–Present):** end-to-end embedded product using a fused IMU + magnetometer and a Kalman-filter / quaternion sensor-fusion algorithm; custom PCB and enclosure in development.
- **Carbon-Fibre Compass Mount (2022):** aerodynamic Olympic-class compass mount in carbon fibre, used by sailors at the 2024 Paris Olympics.
- **Active Display Cooling & CFD (2025):** OpenFOAM-optimised air-curtain cooling for marine displays, validated from ~90 °C to ~45 °C; led to a provisional patent application.
- **Structural Bracket Optimisation (2025):** FEA-optimised polycarbonate bracket meeting 3000 N tension / 4000 N compression targets; placed first in the cohort.

AWARDS & ACTIVITIES

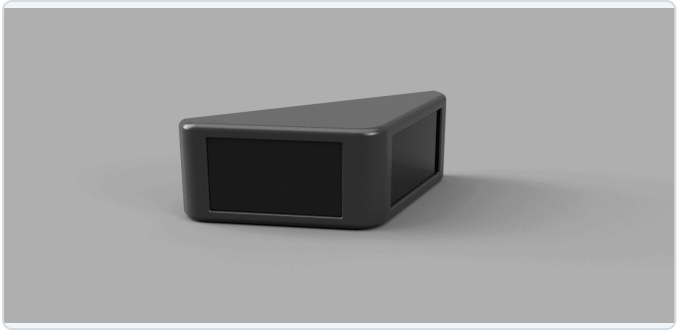
- First place in the cohort Mechanical Design Project (MECHENG 334).
- Winner of the Velocity Ideas Challenge (UoA Centre for Innovation & Entrepreneurship).
- Contributor to a provisional patent application (thermal management).
- National-level road cycling; multi-sport background.
- Member of AU Engineering Society, Mechanical / Mechatronics Students Association, and Rock & Alpine Club.

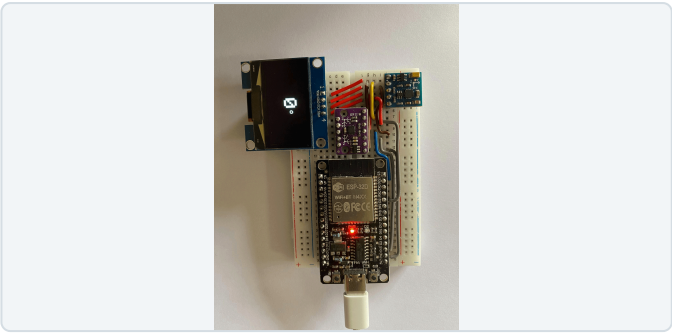
Project Portfolio

Lachlan Campbell | Mechanical Engineer

Electronic Sailing Compass

2025 – PRESENT

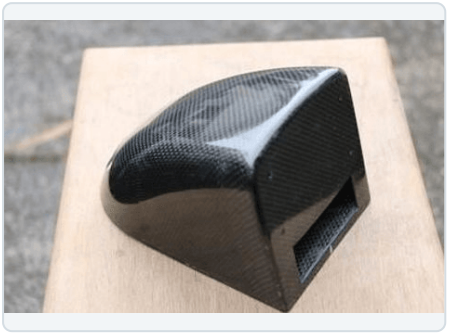


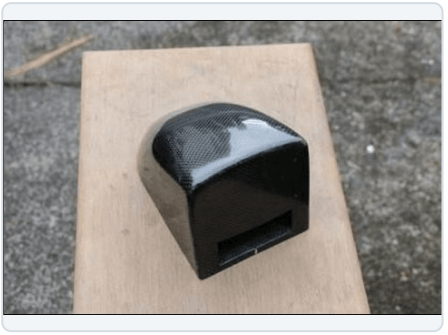


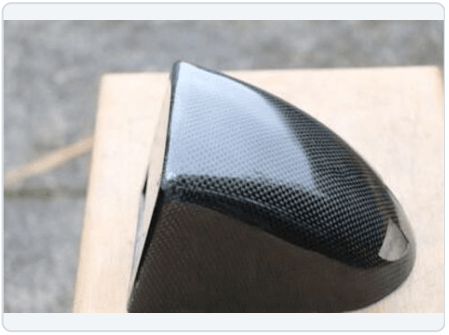
The independent development of a fully electronic sailing compass. Initial prototypes paired a microcontroller with an IMU and magnetometer, with output on an OLED screen. The core challenge, achieving accurate and stable heading data in a dynamic marine environment, was solved with a sensor-fusion algorithm combining a Kalman filter and quaternion mathematics to handle 3D orientation robustly. I am now developing a refined iteration on the target microcontroller with dual transflective displays and production sensors, housed in a 3D-printed enclosure, with a custom PCB and final production housing to follow. This project sits at the intersection of embedded systems, signal processing and mechanical design, and is my most complete example of end-to-end product development.

Carbon-Fibre Compass Mount

2022 · USED AT THE 2024 PARIS OLYMPICS



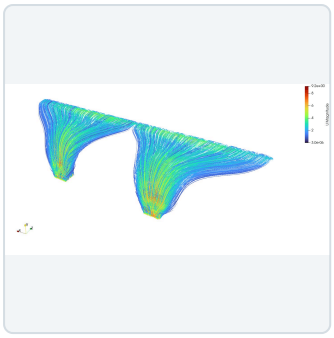
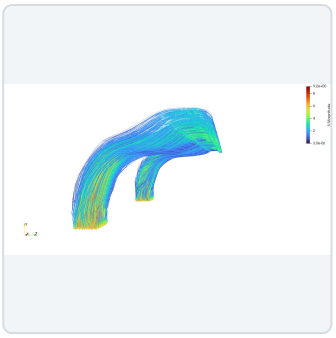
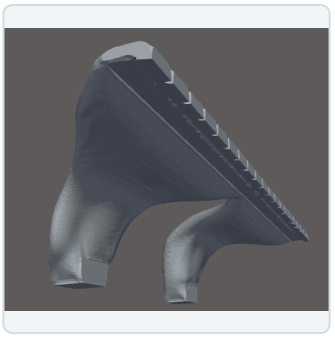
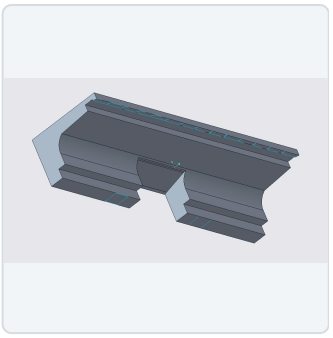




This project began with a problem identified by a friend and now business partner: existing compass mounting solutions for Olympic-class sailing yachts were inefficient and impractical. Early development involved multiple 3D-printed iterations exploring different geometries, before settling on an aerodynamic profile chosen for its dual benefits: marginal drag reduction and a reduced risk of snagging lines and ropes in the busy cockpit. The final version, produced in carbon fibre, is the lightest and most refined iteration of the design, and was used by multiple sailors competing at the 2024 Paris Olympics. It draws on my background in competitive sport and my hands-on expertise in advanced manufacturing, from rapid prototyping through to composite fabrication.

Active Display Cooling & CFD

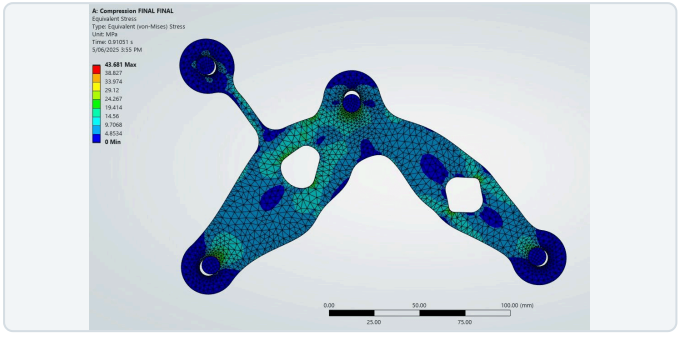
2025 · PROVISIONAL PATENT APPLICATION

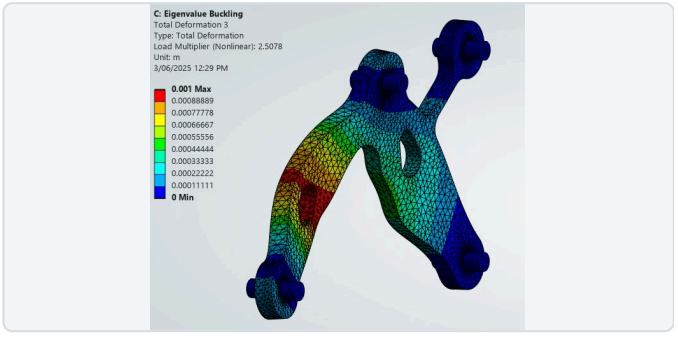





Marine displays are exposed to intense solar radiation, with prior testing at Navico recording screen surface temperatures as high as 90 to 95 °C, problematic for both performance and user safety. I proposed and developed an active cooling system using forced convection, designing a blower-fan assembly that generates a high-velocity curtain of air directed down across the display surface. An initial 3D-printed prototype demonstrated ~10 °C reduction; I then used computational fluid dynamics (OpenFOAM) to optimise the vent geometry for an even air curtain across the full display width. Thermal validation confirmed a reduction from ~90 °C to ~45 °C at the top of the screen when active cooling was engaged. The concept was developed as both a standalone accessory and an integrated housing feature, ultimately leading to a provisional patent application and direct exposure to the IP process.

Structural Bracket Optimisation

2025 · PLACED FIRST IN THE COHORT

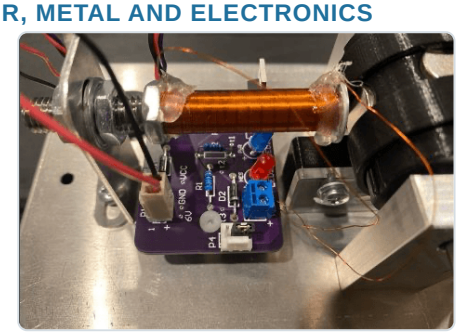
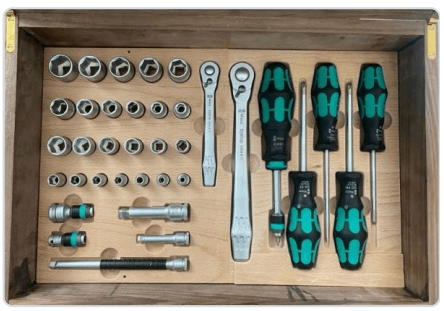




A cohort-wide design challenge: design and optimise a polycarbonate bracket using Finite Element Analysis to meet specific reaction-force targets of 3000 N in tension and 4000 N in compression at 1 mm displacement. Using a 3D modelling approach with localised mesh refinements and frictional contact simulations, I produced a final model that matched the requirements, then generated the CAM toolpath to machine the physical bracket. After machining, my design placed highest out of the entire class. It was both the lightest bracket produced and the closest to the target force values, demonstrating technical ability across the full breadth of a mechanical project.

Other Projects

PERSONAL BUILDS ACROSS TIMBER, METAL AND ELECTRONICS

Wooden Bike Frame
A full ride-able bicycle frame built from laminated timber.

Electric Motor
A hand-wound electric motor driven by a custom PCB.

Walnut Tool Chest
A handmade dovetailed walnut tool chest with CNC-machined wooden tool inserts and magnetic retention.