

NATHAN SIVALINGAM

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CAREER SUMMARY

Double-degree engineering student bridging mechanical design and software development to solve complex problems. Delivered experimental thermal management research (1.12°C PV cooling improvement) while developing AR teaching tools and full-stack applications. Skilled in SolidWorks, CFD, React, and Python. Pursuing opportunities where engineering rigor meets innovative software solutions.

EDUCATION

Bachelor of Mechanical Engineering (Honours) and Bachelor of Science (Computer Science) (BE (Hons) BSc) 2021 - Ongoing

University of New South Wales, Sydney, NSW

Global Summer School Program in Emerging Engineering, Artificial Intelligence and High-end Manufacture 2025 - 2025

South China University of Technology, Guangzhou, Guangdong

WORK EXPERIENCE

Research Assistant at the University of New South Wales, Augmented Reality Project Aug 2025 - Ongoing
JigSpace, SolidWorks

- Developed multiple augmented reality models aimed at enhancing the teaching of mechanical design concepts to university students.
- Collaborated with JigSpace employees to enhance the functionality of the augmented reality software used for model development.

Casual Academic at the University of New South Wales, Academic Demonstrator Aug 2024 - Ongoing
SolidWorks, MATLAB

- Academic Demonstrator for MECH3610 (Advanced Thermofluids), DESN3000 (Strategic Design Innovation), MMAN3400 (Mechanics of Solids 2), MECH3110 (Mechanical Design 1), and DESN2000 (Engineering Design and Professional Practice)
- Delivered in-person workshops to classes of 30 students, working through individual engineering questions and providing guidance and assistance on group project activities.
- Responded to technical and non-technical forum queries for cohorts of up to 400 students.

PROJECT EXPERIENCE

An Investigation into the Height Effects of Vortex Generators in Photovoltaic Module Temperature Reduction under Forced Convection Conditions, Dec 2024 - Dec 2025

Undergraduate Thesis Project *MATLAB, FLIR, CFD, SolidWorks*

- Used cylindrical vortex generators to reduce photovoltaic module temperatures by up to 1.12°C , addressing conversion efficiency losses at elevated operating temperatures.
- Established that 15 mm cylindrical vortex generators were more effective at cooling photovoltaic modules than 75 mm devices.
- Compared experimental testing at the UNSW Large Aerodynamic Wind Tunnel with Computational Fluid Dynamics (CFD) models to successfully cross-validate results.

System and Software for Smart Vehicle Parking Management: Park Pilot, Oct 2025 - Dec 2025
Computer Science Project *JavaScript, React, Node.js, Express.js, Nest.js, Python*

- Developed a mobile application that optimised parking allocation using shortest-path algorithms and real-time occupancy tracking.
- Analysed the performance of A* and Dijkstra's shortest-path algorithms across varying car park sizes, finding A* to be $0.9\times$ slower on smaller networks but $1.8\times$ faster on larger, more realistic car parks.
- Modelled carbon emission reductions and simulated revenue generation through carbon credit earnings.

Alpha Type Stirling Engine,
Mechanical Design Project

Aug 2024 - Dec 2024
SolidWorks, MATLAB

- Designed, manufactured, and assembled a fully operational alpha-type Stirling engine.
- Computer Aided Design (CAD) software was used to design the necessary components and create an assembly drawing of the entire engine.
- A Computer Numerical Control (CNC) drilling machine was used to manufacture the base plate and brackets required to keep the engine stationary during operation.
- Performed flywheel performance analysis to identify the highest-RPM configuration, achieving a 34% increase in rotational speed.

Hand Gesture Robot,
Automated Mechatronics Project

Dec 2023 - Jan 2024
SolidWorks, FEA, Python, C++

- Developed a gesture-controlled autonomous vehicle operable via complex hand signals at distances of up to 100 metres.
- Used Finite Element Analysis (FEA) to optimise the chassis cover design, reducing structural mass by 14% while maintaining integrity.

Personalised Website,
Frontend Development Project

Dec 2023 - Jan 2024
JavaScript, React, TypeScript, HTML, CSS

- Developed a personal website using React and modern front-end development practices.
- Deployed an interactive mini-games module enabling users to play online games including Tic-Tac-Toe and Sudoku.
- Applied colour theory principles to design an accessible and visually appealing user interface.

LICENSES/CERTIFICATIONS

Elevated Work Platform License, EWPA.
General Construction White Card, SafeWork NSW

Jun 2022 - Jun 2027
Dec 2021

EXTRA-CURRICULAR ACTIVITIES

Brazilian Jiu Jitsu Competitor

Jun 2022 - Ongoing