

CEID RESEARCH: RECENT, CURRENT and FUTURE DIRECTION.

Dr. Paul Ewart, Thilanga Ariyaratna, Jai Khanna & Siju Thomas.

Research within the CEID focuses on the following cross disciplinary themes;

- Sustainability
- Health and Wellbeing
- Sports Engineering
- Engineering Education

CIVIL ENGINEERING.

ELECTRICAL ENGINEERING.

MECHANICAL ENGINEERING.

Emerging Tier 2 Research;

- Supercapacitors
- Critical thinking in Engineering
- Work Integrated Learning in Engineering Education

If you are curious and have an innovative mind, you can mine exciting circuit topologies from simple RC circuits. Supercapacitor assisted low dropout regulator (SCALDO) is one such application, to enhance by 1.33 the efficiency of a linear regulator. In other words, a similar reduction to your power bill. Supercapacitors can increase the time constant (slowdown the circuit) of the RC circuit and can eliminate any RMI/RFI concerns when they are used in power converters. They are alternative to environmentally hazardous batteries, and a reliable and durable energy storage solution.

My main research contribution is developing a supercapacitor assisted power converter for data centres, which is an outcome of my PhD at the University of Waikato. This converter is unique due to its'

- two-stage DC-UPS (sustain power during interruption of utility power)
- tolerance for wider load current and input voltage fluctuations
- extra protection with transformer isolation
- fast response immunity for surges (lightning)

If you are looking for alternative energy storage solutions and power converter solutions I'm happy to collaborate with you!

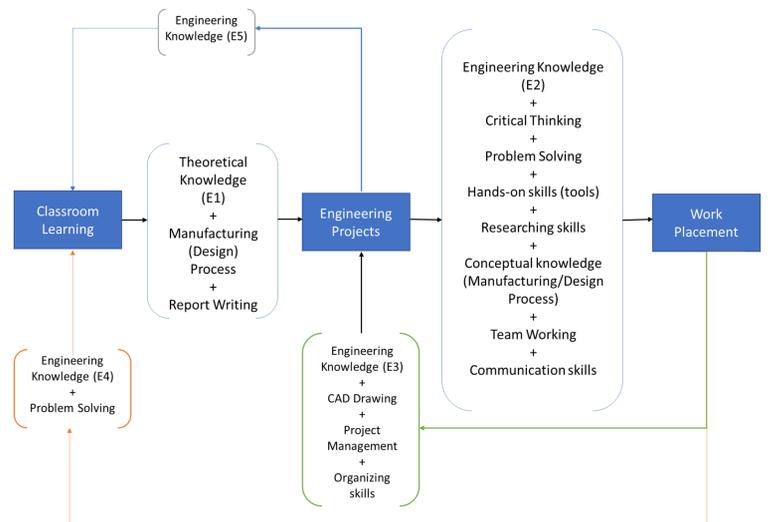


Research interests include manufacturing, processing, design engineering and engineering education.

Writing a paper for the **Australasian Association for Engineering Education 2020 conference proceedings** following the theme of engineering education. Presenting a research poster for **Manufacturing, Design and Entrepreneurship 2020** conference.

Collaborated with Civil Tutor for the **ITP Research Symposium 2020**. Collaborating with **NorthTec: Tai Tokerau Wānanga in Northland** with the research theme of building critical thinking attributes in early tertiary learners (Engineering Education).

The diagram shows initial analysis of a research study investigating the learning linkages between Work-Integrated Learning and Problem-Based Learning in engineering education in New Zealand. From the data analysis, clear linkages can be found between classroom learning, engineering projects (PBL) and work placements (WIL), in terms of engineering knowledge acquisition, and technical and non-technical skill development. This data shows how each approach complements each other, and also showing their scaffolding nature. Furthermore analysis will help to generate more accurate framework having classroom learning, engineering projects and work placements, and I believe having such a framework can be utilized to enhance engineering student's overall learning process, and to enhance their employability, and make them work-ready graduates.



Is a problem for the marine industry a solution for the medical industry.

Particulate injection molding using a cost effective tooling method created what was essentially a defect. The surface properties of titanium components were investigated and the mechanical and materials properties were not diminished. The surface effects were explained using a slip model consistent with two phase material processing and therefore a solids modelling approach can be used to graphically replicate the effect.

