UNSW SYDNEY | Australia's Global University

School of Mechanical and Manufacturing Engineering

Lightweight Functional Composites

DESCRIPTION OF OUR TECHNOLOGIES

Our group has expertise in lightweight advanced functional composites, including design, manufacturing, and performance characterisation. Examples include nanocomposites for stretchable sensors, electrical conductive flame retardant composites, conformal antenna, and structual batteries. In particular, we have developed low-cost hybrid carbon/glass composites, new quantitative imaging methods for characterising severity of structural damage, and multifunctional composites materials with greatly improved mechanical, electrical and thermal properties.

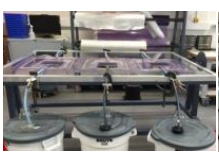
SPECIALISTS IN ADVANCED COMPOSITES

Our team conducts research related to advanced fiber-reinforced composites materials, including three major areas:

- Materials processing and manufacturing: innovative processes for composites manufacturing and enhanced functionality (structural battery, heat dissipation, self-sensing, high electrical and thermal conductivities
- Testing and characterization: development of non-destructive testing of composite materials (ultrasound, conductivity, vibration).
- Modelling and simulation: numerical study of composite materials response to static load or dynamic excitation (vibration, wave propagation).

THE TOOLS OF OUR TRADE

Automated Composite Manufacturing; Vacuum Infusion Devices; Industrial scale Autoclave; Various Mechanical Testing Instruments.



COMPETITIVE ADVANTAGES OF OUR TECHNOLOGIES

- Low-cost composites: we used computational modelling to accelerate design and manufacturing hybrid carbon/glass composites, which largely reduces the cost without compromising the properties;
- Structural health and prognostics technology: we have advanced new quantitative imaging methods for characterising severity of structural damage using in-situ sensors. We can estimate fatigue life and structural strength using crack growth modelling and fracture mechanics.

SELECTED RECENT PROJECTS and TRACK RECORD

- ARC Discovery projects: (a) Structural health monitoring; (b) Aligning and chaining carbon nanofillers in fibre composites;
- ARC-Linkage projects (a) Flame retardant composites; (b) 3D non-crimp fibre preforms for polymer composites; and (c) carbon fibre wheel to drive clean technology.
- ARC DECRA Fellowship (Stretchable Sensors).
- IMCRC and Australian Advanced Aerospace Technologies (Structural Battery);
- CSIRO (Conductive Coating);
- Lockheed Martin (USA) (Nanocomposites for Cryogenic Hydrogen Storage);
- ARC Training Centre in flame retardant technology.

OUR EXPERTS

- Professor Chun-Hui Wang: Head of School
- Dr. Philippe Blanloeuil: Research Fellow
- Dr. Shuai He: Research Fellow
- Dr. Shuying Wu: Research Fellow

新南威尔士大学火炬创新园区
Torch Innovation Precinct at UNSW

More Information Contact:
Prof. Chun Wang, chun.h.wang@unsw.edu.au
Head of School of Mechanical and Manufacturing Engineering