Research Topic:
Development of 3D-printed natural fibre-reinforced bio-based polymer composites for civil engineering applications.

Description:
Positive economic and environmental aspects of natural fibres/polymer composites have resulted in considerable worldwide interest for use in structural applications. The main advantages of natural fibres over synthetic fibres include lightweight, reasonable mechanical properties, high sustainability, and lower carbon footprint. However, they are commonly combined with fossil fuel-based plastics which although are lightweight, result in an environmental burden. Bio-based polymers, on the other hand, are less hazardous and naturally available worldwide. While many studies are available on natural fibre–synthetic polymer and synthetic fibre-bio-based polymer composite systems, limited studies have focused on the combined use of natural fibres/bio-based composite materials and little implementation in civil engineering structures has occurred.

In this research, the short-term (flexural, tensile, impact) and long-term (fatigue and durability) performance of structures containing 3D-printed bio-based polymer composites reinforced with hemp and harakeke fibres will be investigated; an enhanced understanding of the performance of the proposed system is the main expected outcome. Inclusion of analytical and numerical simulations will give a clear indication of the suitability of this innovative technology in the civil engineering infrastructure.

The successful applicants should be eligible to enrol at the University of Waikato.

Eligibility criteria:
Level: Postgraduate (PhD)
Full-time
Domestic, International, and PR students are eligible to apply

Qualifications:
BE(Hons) (First Class or Second Class Upper Division) or Masters Degree in Civil Engineering, Material Engineering and Structural Engineering.

Value and Tenure:
Start date: April 2018
$27,500/pa + domestic tuition fees for three years

Application documents required:
- Research proposal about the topic
- CV
- 3 x Academic References

Contact and email address for applications:
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Closing date:
30 March 2018