Masters Scholarship in New Zealand: Call for applications

3D printing of engineered novel biomaterials from bio-waste resources for wastewater treatment

We are offering an exciting opportunity for a postgraduate master's degree student in the area of development of a 3D printing technique to fabricate bio-filters for environmental engineering applications. More specifically, you will be involved in the National Science Challenge project "Clean Water Technology for restoring Te Mana o te Wai".

In this postgraduate project, you will learn how to use cutting edge 3D printing technologies to turn materials discarded at landfills (bio-waste materials) into novel and exciting products. Our mission is to purify polluted water to make Aotearoa's water cleaner. Through your research you will work to develop a 3D printing technique and use the process to create 3D-printed wastewater treatment filters from biowastes. The project will involve the formulation and printing of new polymer inks for 3D-printed filters. 3D printing techniques will include Screen Additive Manufacturing (SAM), which was developed at the University of Canterbury, 3D bio-plotting and stereolithography (SLA).

We are looking for an enthusiastic, organized, and hardworking candidate with an interest in 3D printing hydrogels and material development. The project would suit recent graduates with a degree in product design, mechanical or mechatronics engineering. Previous 3D printing, material selection, and electronics experience will be vital in order to hit the ground running. In addition, you will need to:

- Be a strong problem solver, who is logical and practical
- Be a fast learner who works efficiently
- Be self-motivated be able to work independently
- Be a team player
- Have excellent communication skills and high attention to detail
- Have knowledge of open-source controllers and skills in embedded programming
- Have essential electronic skills and willing to learn new skills such as PCB design and prototyping
- Understand basic chemistry and mechanical testing

Further details regarding the research project and application process are outlined below.
Applications will be received until 1 June 2022, but early application is advisable

This research position is part of a wider team. The Masters will be supervised by Dr Hossein Najaf Zadeh and Dr Nick Emerson (School of Product Design) at the University of Canterbury.

Project outline:

The deterioration of freshwater quality is a critical global environmental challenge that is already driving a multi-billion-dollar industry. While there are a plethora of wastewater treatment technologies available, the materials used by these technologies have significant shortcomings, such as being non-biodegradable. Recent advances in 3D printing can help overcome these limitations. Our wider research team will develop novel composite biomaterials for use as biodegradable adsorbents and/or bio-carriers during wastewater treatment. These novel materials will be designed to minimise environmental impacts through their entire life cycle, be easy to regenerate, and/or valorise to support a regenerative (circular) economy. **This postgraduate project focuses on the fabrication of biopolymer filters using 3D-printed hydrogels. It includes the development of a 3D printing method to facilitate the fabrication of such filters.**

Further information about the project and team can be found here:

Scholarship Conditions:

- The current scholarship emolument is approximately NZ$25,000 (tax-free) for the Thesis enrolment at the New Zealand domestic rate. The scholarship also covers tuition fees for the thesis. Part-time study will be compensated on a pro-rata basis.
- There are opportunities to undertake additional paid tutoring work within the Dept. that are paid on an hourly rate.
- **Candidates will need to start the master's within New Zealand by August 2022.**
- Application for the scholarship must be made to Dr Hossein Najaf Zadeh at Hosein.Najafzadeh@canterbury.ac.nz
- Applicants may be requested to also apply for the University of Canterbury Masters Scholarships. Applicants should make themselves familiar with these regulations here.

Application Process:

All of the below material must be coherently included in your application.

1. A full academic transcript with a Bachelor of Eng. or Bachelor of product design.
2. A 2-pg max curriculum vitae emphasising courses completed with grades
3. A 1-pg statement of your previous research experience or a 1-pg statement of purpose describing your motivation and any previous experience.
4. Contact details for two referees
5. For non-native English speakers: Evidence of sufficient English communication [See here. The minimum requirements are either: (1) a TOEFL score greater than 90, of which writing must be greater than 20; or (2) a IELTS score of 6.5 with no section lower than 6.0]

Further details on postgraduate study at the University of Canterbury can be found here.

Prospective applicants can contact Dr Hossein Najaf Zadeh (Hossein.najafzadeh@canterbury.ac.nz) to informally discuss this specific research opportunity.