Centre for Bioengineering and Nanomedicine
Te Pokapū mō te Pūkaha Koiora me te Whaiora Mōkitokito

Christchurch Regenerative Medicine and Tissue Engineering (CReaTE) Group University of Otago Christchurch, New Zealand

Department of Orthopaedic Surgery | Centre for Bioengineering & Nanomedicine

PhD Position

Oxygen control in 3D-bioprinted osteochondral constructs

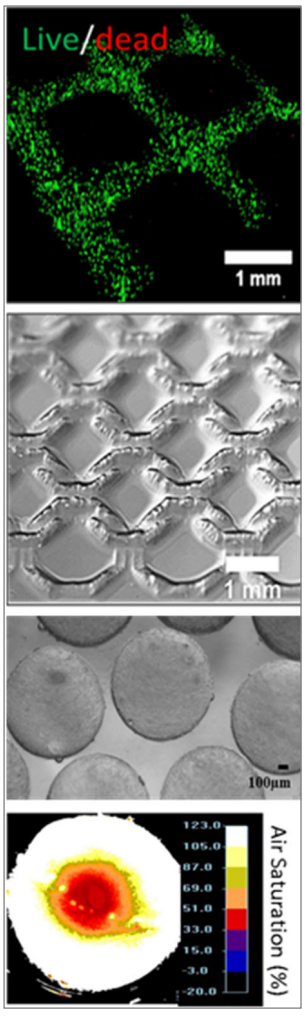
A 3-year fully funded PhD project is available in the CReaTE Group (University of Otago Christchurch), funded by the Health and research council (HRC) of New Zealand

Supervisors:
Dr. Gabriella Lindberg,
Assoc Prof Tim Woodfield

Closing date: Open until filled

Project outline: The 3-year PhD project will be focused on advanced oxygen carrying bioinks and hydrogels for 3D Bioprinting of hybrid constructs for musculoskeletal regeneration, specifically targeting bone and cartilage engineering.

Nearly 17% of New Zealanders suffer from osteoarthritis, causing significant amount of pain, disability and economic burden ($3.2billion/year). The gold standard clinical treatment remains harvesting a portion of the patient's own tissue, which is limited by availability and/or incomplete healing. The emerging field of 3D-bioprinting herein holds great promise to address these challenges by allowing the layer-by-layer placement of cell-laden hydrogels, so called bioinks, in order to manufacture customised replacement tissues with hierarchal 3D-complexity. The oxygen availability within these 3D-bioprinted constructs is, however, mainly present by diffusion, arguably remaining the biggest challenge in the field as oxygen is key to survival of most organs in our body. In this PhD project, we aim to develop oxygen carrying bioinks for sophisticated oxygen delivery and functional regeneration of tissues. This project will aid the vision to alleviate current issues faced in shortage of personalised orthopaedic replacement grafts for healing of common joint defects.



Preferred student expertise:
We are looking for an enthusiastic, proactive and dynamic student to undertake their studies in this multidisciplinary field. The PhD candidate should hold a BSc (Hons) or MSc preferably in biomedical engineering, chemistry/materials science, or cell biology. *In vitro* cell culture and biochemical analysis techniques is highly valued. Furthermore, the candidate should be highly motivated and have excellent oral and written communication skills in order to manage collaborative relationships with research project external partners. You will be joining a multidisciplinary research team of bioengineers, biologists and orthopaedic surgeons working at the interface of stem cell-biology, biomaterials science and

engineering. There will further be significant opportunities for PhD candidates to interact with medical device industry partners as well as orthopaedic and veterinary surgeons. You will work in close collaboration with international collaborators at the University of Würzburg, Germany and University of Pennsylvania, USA.

Project Funding: A $27,000 per annum stipend is available for three years for the right applicant. The applicant must be eligible for admission to the PhD programme at the University of Otago.

To apply:
All candidates with high motivation, independent thinking, and good communication skills (both written and oral) should apply. Please send a copy of your full CV including references to publications/conference proceedings; copies of undergraduate/ postgraduate academic transcripts; the names of two referees, and any other supporting information relevant to the project (e.g. lab/assay skills, software/hardware expertise) to **create.research@otago.ac.nz.**

Location:
The research will primarily take place at the University of Otago Christchurch, a multi-disciplinary campus recognized for its outstanding reputation for combining basic science and clinical health research. The University of Otago is a member of the Mataraki network of universities and rated 5 stars for quality in 2018 per QS stars rankings. Christchurch is a vibrant city based on the coast and close to the Southern Alps of New Zealand, with ample opportunities for outdoor activities locally including mountain biking, surfing, hiking and skiing. Christchurch was recently rated as one the world's top 10 cities to visit by Lonely Planet.

For a video all about Christchurch and what it's like to undertake research in the CReaTE Group and University of Otago Christchurch campus – visit **www.youtube.com/watch?v=ATGya9lGroY**

For lots more information on the CReaTE Group, facilities, staff, students and projects visit www.otago.ac.nz/regenerative-medicine/index.html