PHD PROJECT AVAILABLE

ADVANCED DESIGN AND TOPOLOGY OPTIMISATION OF POROUS BONE-INTERFACING IMPLANTS

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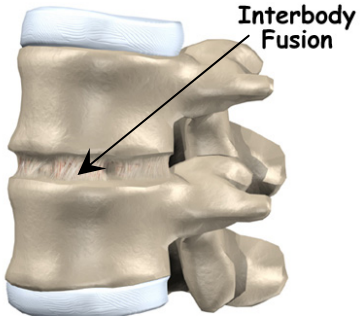
This PhD project is focussed in the fields of advanced medical device design, numerical modelling and topology optimisation of porous biomaterial scaffolds. We are looking for a highly motivated and enthusiastic PhD student with excellent computational modelling and written skills, who has a background in (Bio)Engineering, Computational Mechanics, Numerical Methods, and/or Finite Element Analysis. An interest in biomaterials, materials processing and rapid prototyping would be beneficial. The successful candidate will join an interdisciplinary team on a Foundation for Research, Science & Technology (FRST) funded project investigating novel metal alloys and advanced porous implant design for orthopaedic bone-interfacing implants.

Background & Rationale: Recent trends toward biomaterials having interconnected porosity has brought about enhanced bone growth, vascularisation and nutrient diffusion in implant devices, as well as implant stiffness more closely matching that of natural bone. Current porous implant devices have architectures, and hence mechanical and biological properties, that are inherently random due to the fabrication routes used.



This project will focus on the design and analysis of porous 3D architectures on a macro-scale based on micro-scale topology optimisation algorithms. FEA and mechanical testing of optimised implants produced using rapid prototyping of novel metal alloys will complement *in vitro* and *in vivo* research in our group aimed at designing porous bone-interfacing implants.
This work is conducted in the Biomaterials & Tissue Engineering (BioMATE) group (www.bioengineering.canterbury.ac.nz/biomate) in co-operation with researchers and clinicians from the Department of Anatomy & Structural Biology and the Department of Orthopaedic Surgery (University of Otago), as well as with local biotechnology industry.
The candidate will have the opportunity to work on a cutting edge project in a rapidly developing area of medical device design. Numerical and Computational Mechanics research within Mechanical Engineering Department (www.mech.canterbury.ac.nz) and Centre for Bioengineering (www.bioengineering.canterbury.ac.nz/biomate) at the University of Canterbury are renowned for their excellence, as are the world class supercomputing facilities available (www.ucsc.canterbury.ac.nz). Completion of the PhD degree in this project would prepare the candidate with unique skills for further research work in academia or biotechnology industry.

Funding arrangements: Grant funding from FRST will support the successful candidate with a $20,000 p.a. stipend for the duration of the degree (3 years).

Living & Studying in New Zealand: University of Canterbury is the premier University of New Zealand for engineering studies (www.canterbury.ac.nz/theuni). With a population of over 300,000 people, Christchurch is the largest city in the South Island, located on the east coast. The city is close to both the mountains and the sea, offering a huge range of recreational options. Christchurch is the most affordable major New Zealand city to live in and is also the least congested. Christchurch is within easy reach of the great outdoors for climbing, tramping, mountain biking, skiing, sailing, surfing and much more – the ultimate place to live and study.

Interested? To register your interest, please send your C.V. to
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