PhD SCHOLARSHIP

QUT SCHOOL OF PHYSICAL & CHEMICAL SCIENCES

Magnetic Resonance Microimaging of Cartilage

A Ph. D. project in Physics / Physical Chemistry is available at the Magnetic Resonance microimaging laboratory, QUT. Our MRI group is working on the development of novel techniques for microimaging of articular cartilage – a connective tissue that covers the articulating surfaces of long bones. The aim of this research is three-fold: (1) to improve the understanding of molecular architecture of cartilage biopolymers, collagen and proteoglycan; (2) to study the relationship between biopolymeric scaffold and the load-processing function of cartilage; and (3) to develop MRI techniques for early diagnosis of osteoarthritis – a debilitating disease of the joints that affects approximately 5% of the general population and costs Australia $9B a year in healthcare costs and lost productivity.

QUT's MRI group was set up by Prof Jim Pope, one of the first researchers to apply diffusion-tensor imaging to articular cartilage. Prof Pope is also one of the developers of the world's only MRI cartilage consolidometer – an instrument that allows MR imaging of cartilage under time-dependent mechanical load. As a Ph. D. student in our group, you will participate in the application of these and other MRI-based techniques to animal and human cartilage. The objective is to develop quantitative interpretation of MRI diffusion tensors and relaxation rates. This information will be applied to characterisation of macromolecular structure of cartilage, as well as the changes effected by mechanical load or enzymatic degradation. Other prospective directions include application of μMRI to tissue-engineered cartilage (in collaboration with QUT's Cartilage Engineering group), as well as computational studies of molecular conformation and dynamics of cartilage biopolymers.

Applicants are expected to have:

- A minimum of B. Sci. (Hons 2A) in Physics, Chemistry or Medical Engineering.
- International applicants should possess an equivalent degree

Description of the scholarship:

A successful applicant will be offered a competitive stipend for a period of three years, with the amount depending on their GPA and references.

For further information and to express your interest in this scholarship, please contact:

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References:

R Meder, SK de Visser, JC Bowden, T Bostrom, JM Pope. *Osteoarthr. Cartilage* 14, 875-881 (2006)

SK de Visser, RW Crawford, JM Pope. *Osteoarthr. Cartilage*, in press (2007)

SK de Visser, JC Bowden, E Wentrup-Byrne, L Rintoul, T Bostrom, JM Pope, KI Momot. *Osteoarthr. Cartilage*, in press (2007)