

# Fully funded Ph. D. scholarship available

## Magnetic resonance microimaging of cartilage

**School of Physical & Chemical Sciences,  
Queensland University of Technology, Brisbane**

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 the 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.

QUT's MRI group was set up by Prof Jim Pope, an internationally recognised MRI expert. Our group was one of the first to apply diffusion-tensor imaging to articular cartilage and has developed the world's first MRI cartilage consolidometer – an instrument that allows MR microimaging of cartilage under a time-dependent mechanical load. As a Ph. D. student, you will participate in the development of state-of-the-art techniques of microimaging of animal and human cartilage. The objective is to develop quantitative interpretation of MRI parameters of cartilage and to use this information for understanding the basic biophysics of the tissue and in biomedical imaging applications. Other prospective directions include application of  $\mu$ MRI 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.

Domestic applicants should have a minimum of B. Sc. (Hons 2A) in Physics, Chemistry, or Medical Engineering; international applicants should possess an equivalent qualification. All applicants must satisfy the general QUT entry requirements available on <http://www.rsc.qut.edu.au/>. A successful applicant will be offered a competitive stipend for a period of three years. Top-tier applicants will also receive a QUT tuition waiver (subject to additional selection criteria). The intended starting date is 1 June or earlier. Applicants should e-mail their CV, copies of transcripts, IELTS results (if required), a statement of research interests and experience, and the full contact details of three referees to **Dr Konstantin Momot** ([k.momot@qut.edu.au](mailto:k.momot@qut.edu.au)).

### **Selected publications:**

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*, **16**, 83-89 (2008)

SK de Visser, JC Bowden, E Wentrup-Byrne, L Rintoul, T Bostrom, JM Pope, KI Momot. *Osteoarthr. Cartilage*, **16**, 689-697 (2008)