

The University of Glasgow

PhD Studentship

Manufacture and Characterisation of Magnetorheological Elastomers

Supervisors: Dr Zaoyang Guo and Dr Philip Harrison

The Project

A three-year PhD studentship is available within the Glasgow Research Partnership in Engineering (GRPE) as part of the Joint Research Institute in Mechanics of Materials, Structures and Bioengineering at the University of Glasgow. The aim is to conduct research on Magnet-Rheological Elastomers (MRE); a 'smart' material that changes its mechanical behaviour when subjected to magnetic fields. These materials offer great promise in the design of simple variable stiffness devices. An understanding of the relationship between manufacture conditions, microstructure and macro-scale behaviour of MREs has yet to be fully achieved and a generalised constitutive model for MREs is lacking, making it currently impossible to simulate and optimise the design of MRE applications in a virtual environment. Given the importance of computer aided engineering in today's design methodology, this is clearly a significant obstacle preventing widespread exploitation of MREs.

The specific goals of the PhD will be to manufacture MREs and determine the influence of manufacture conditions on the micro-structure and magnetic-sensitivity of the resulting elastomer. This experimental work is part of a larger work programme on MREs and will support parallel theoretical and numerical investigations. The successful student will be expected to:

- develop understanding of both electromagnetism and continuum mechanics
- design and manufacture MRE manufacturing apparatus
- characterise the structure of the MREs using volume imaging techniques
- perform macro-scale characterisation of the mechanical properties of the MRE

The Studentship

Restrictions on the funding source (half from the GRPE and half from the department's Doctoral Training Account) mean that the PhD studentship is open to UK students only (EU nationals, who have spend at least 3 yrs undergraduate training at UK universities also qualify). The successful candidate for this prestigious award will be an enthusiastic and self-motivated person with a 1st or 2:1 in Engineering or a Physical Science and will receive £12,600 per annum.

Awards will be based on the merit of your application. There is no deadline for applications, but the majority of funding will be allocated in April 2008.

Further Information

For further information about the project please contact Dr Zaoyang Guo (Email: z.guo@eng.gla.ac.uk or Tel: 0141 330 3557) or Dr Philip Harrison (Email: p.harrison@mech.gla.ac.uk or Tel: 0141 330 4318)

For information on the Glasgow Research Partnership in Engineering see: <http://www.grpeng.ac.uk/departments/grpeng/>