PhD studentships in real-world applications of Nonlinear Mathematics and Engineering

The Bristol Centre for Applied Nonlinear Mathematics at the Department of Engineering Mathematics of the University of Bristol is a unique interdisciplinary research environment where mathematicians, engineers and applied scientists work together on the most challenging applications of nonlinear mathematics.

Thanks to a new grant from the UK Engineering and Physical Research Council, PhD studentships are now available to join the Centre starting between May 2008 and October 2008.

We seek bright enthusiastic potential PhD students who should either have a first degree in mathematics, physics or engineering with an interest in engaging with applications, or a first degree in the life sciences with strong mathematical potential.

Full scholarships of up to £14400 tax-free are available for suitably qualified candidates (students from ANY country of the European Union).

All students will become part of the Applied Nonlinear Mathematics group of the Engineering Mathematics department at the University of Bristol (http://www.enm.bris.ac.uk/anm/). Their projects will form part of a £2 million research initiative, which also involves an extensive visitor and workshop programme.

Each project will be strongly inter-disciplinary and will be focussed on a real-world application area. Each will involve extensive collaboration between theoreticians and experimentalists.

Application and reference forms can be downloaded from: http://www.bris.ac.uk/prospectus/postgraduate/2008/intro/apply.html Alternatively, hard copies can be obtained by e-mailing enm-pg-admissions@bristol.ac.uk.

Completed applications and references should be sent to:

Postgraduate Admissions,
Faculty of Engineering,
University of Bristol,
Queen's Building,
University Walk,
Bristol, BS8 1TR
United Kingdom

A brief description of some project areas is given below.

Neurophysiology of the human brain. The aim is to develop novel mathematical techniques that may be useful to clinical and experimental neuroscientists working on a range of problems, from how brain regions communicate with each other, to understanding debilitating neurological disorders, such as epilepsy.

Biomechanics. Biomechanical systems frequently perform far better than any man-made device; the challenge is to understand how this is possible. We will focus on problems such as the mechanics of hearing, and pedestrian locomotion, which will require new theory to deal with the (self)sustained periodic, impacting (piecewise-smooth) motion of an assembly of nonlinearly elastic components with spatial extent.

Hybrid testing of engineering systems. Many engineering systems, such as bridges and aircrafts, are too large and complicated to be tested in the laboratory as a whole. Hybrid testing addresses this issue by coupling a laboratory experiment of an important part with a computer simulation of the rest of the system. Mathematical challenges include dealing with coupling delays, noise, and uncertainties in the modelling.

Mechanical transmission systems. The rotating parts of automotive transmission systems, aircraft engines and even wind turbines suffer noise and vibration problems due to the freeplay in their mechanical linkages. The aim will be to study such effects, characterised by backlash, friction and impacts, by using the theory of piecewise-smooth dynamical systems and their bifurcations.