PhD studentship in
Mathematics/ Applied Mathematics/ Mathematical Biology

A PhD studentship (3.5 years) is available at the Division of Mathematics at University of Dundee. Apply before 25th of March 2015

Multiscale modelling and analysis in biomechanics

The multiscale nature of biological and physical systems is fascinating and challenging. Many biomaterials possess excellent stiffness, toughness, and strength relative to their low density. For example, the bone’s strength, in many respects, is similar to that of steel, but it is only one third of the weight and an order of magnitude more flexible. Recent research suggests that this is primarily a consequence of the complex microstructure of biomaterials. It is also observed that in addition to the microstructure biochemical processes e.g. signalling, control and repair mechanisms influence mechanical behaviour of biomaterials.

The main focus of the research project will on the analysis of mathematical models for mechanical properties of biomaterials and/or development of new models defining the influence of microstructures on the macroscopic behaviour of biological systems. Multiscale analysis and homogenization techniques will be used to determine the macroscopic properties of biomaterials comprised of wide range of microstructures.

A better understanding of the influence of microstructure and biochemical processes on mechanical properties of biomaterials is not only a theoretical challenge in itself but may also help to improve the design and production of synthetic materials.

Training opportunities:

The successful applicant will receive a broad training in several modern aspects of mathematics. In relation to the project, he/she will be trained in mathematical modelling and analysis (PDEs and stochastic processes). Additionally, he/she will have the opportunity to attend courses on Pure and Applied Mathematics provided by the Scottish Mathematical Sciences Training Centre (http://www.smstc.ac.uk) and receive specialised Postgraduate Skills Training via the University’s Organisational & Professional Development unit (http://www.dundee.ac.uk/opd/). He/she will be part of an active research group, and will be offered a range of regular seminars in Mathematical and Numerical Analysis and Modelling. Attention will be paid to make sure that he/she will be integrated in an international research network and grow as an independent researcher. There are active collaborations with the Universities of Heidelberg and Muenster (Germany), Autonomous University of Madrid (Spain), and Narvik University College (Norway).

Because of EPSRC restrictions, the full studentships will be available only to UK residents. (For complete information on students eligibility, please consult the EPSRC website http://www.epsrc.ac.uk/skills/students/help/Pages/eligibility.aspx).

If you are interested in this PhD position please contact

Dr Mariya Ptashnyk, Division of Mathematics, University of Dundee, mptashnyk@maths.dundee.ac.uk.

Please include a cover letter, a full CV and contact information of two referees.