EPSRC supported PhD with Integrated Study: How well do models of particle motion represent industrial reality?

Dr Andrew Ingram (Chem Eng, University of Birmingham)

An industrial consortium

Tax free bursary of £17,800 p.a, plus fees paid

Granular or particulate materials are common in nature and in process engineering, particularly as products such as instant foods, pharmaceuticals and consumer goods such as washing powders. Compared with simple fluids, they show interesting and useful behaviour, from kinetic free-flow in some circumstances to slow friction-dominated motion in others.

In recent years there has been much progress in modelling their behaviour, particularly using the Discrete Element Method (DEM), in which each particle is considered separately and its interactions with its neighbours computed in order to predict its next position.

Many industrial companies are now using such methods for design and process prediction but testing of such models against reality is difficult because the systems of interest are usually opaque and often held within metal-walled containers.

This project will make use of a cutting-edge technique for tracking particle motion called Positron Emission Particle Tracking (PEPT) to map particle behaviour in a set of experiments which will be simultaneously modelled using DEM.

The goal is to devise calibration tests for models which are able to discriminate between good and bad modelling approaches. The work is collaborative with a number of industrial partners through the International Fine Particle Research Institute (IFPRI), a US-based organisation of international industrial members, many of whom will be actively participating in the work through their in-house modelling teams.

The ideal candidate will have an interest in coding and preferably a basic proficiency in one or more programming languages, as well as an interest in the physics and engineering of particulate and multiphase systems.

To be eligible for EPSRC funding candidates must have at least a 2(1) in an Engineering or Scientific discipline or a 2(2) plus MSc. Please email your c.v. to r.w.greenwood@bham.ac.uk. For more details on the Engineering Doctorate scheme please visit http://www.birmingham.ac.uk/schools/chemical-engineering/postgraduate/eng-d/index.aspx