

PhD Studentship in Multiscale Modelling of Polymer Nanocomposite Manufacturing

Project Overview: Polymers filled with multifunctional nanoparticles (e.g. graphene) are promising material candidates for producing multifunctional components/devices for use in sectors such as energy storage, flexible electronics, electromagnetic shielding. One of the main challenges in achieving optimum multifunctional properties is to obtain optimum dispersion and distribution of nanoparticles in the polymer. Melt state and quasi-solid state manufacturing processes offer means for controlling nanocomposite morphology, and hence of their end-use properties. However, those processes require a careful selection of optimum processing conditions, and may also benefit from the application of external fields (e.g. magnetic) to fully control the morphology.

The ultimate objective of this project is to develop an advanced 3D nonlinear multiscale computational model for prediction and optimisation of the melt and quasi-solid state processing of polymer nanocomposites, with and without the external fields. The model development will address computer reconstruction of 3D nanocomposite morphologies, application/computer implementation of physically-based constitutive models for polymers in the melt and quasi-solid state, and coupling of mechanical and external fields.

The successful candidate will be based in the International Institute for Nanocomposites Manufacturing (IINM), where the model will be experimentally-validated.

Awards available: 1 award available.

Funding Details: Fees and maintenance at RCUK Level

Length of Award: 3.5 years (PhD)

Eligibility: Due to funding restrictions, the position is only available for well-qualified UK or EU students. Other motivated students are encouraged to apply but will need to secure their own funding. Candidates should hold a 1st or 2.1 degree in any science or engineering discipline which had a significant materials/engineering simulation content.

Application Details: This project is available to start on 5th January 2015 or as soon as possible thereafter. Please contact Dr Łukasz Figiel by email (l.w.figiel@warwick.ac.uk) with informal enquires about this project. Please apply directly via PG Admissions and note the reference number. Click here for the application form: <http://go.warwick.ac.uk/pgapply>

Deadline: 19th December 2014