Information on Postgraduate Research Scholarship - Ref: VCS-ACH-03-17

Faculty: Faculty of Architecture, Computing and Humanities   Department: Mathematics

Lead Supervisor: Andrew Kao

Project Title: Computational microstructural mechanics of alloys solidified in a magnetic field

Project Description:

The Computational Science and Engineering Research team at Greenwich has pioneered the study of fluid flow (introduced by the presence of an external magnetic field) on the evolution of crystalline microstructure during solidification. The ultimate aim of this work is to introduce the technique to industry so that macroscopic material properties can be tailored for specific functions. To date there has been no investigation in this context, that is linking magnetic field induced microstructural changes to macroscopic properties. This research will conduct a computational parametric study of how various thermophysical or electrical properties such as mechanical yield stress and electrical conductivity can be altered (and optimised) through careful selection of the magnetic field strength, orientation and frequency. This will be achieved by designing a model that can interface with the current solidification code that predicts microstructural evolution. The new model will represent standard benchmark tests that can be validated against experimental results, attained through collaborative research projects and an ongoing literature survey.

This field of research is truly multi-disciplinary encompassing microstructure solidification, electromagnetism, fluid flow (Magnetohydrodynamics), structural mechanics and numerical analysis. Applicants are not expected to have significant knowledge of all of these disciplines, but should have a solid grounding in at least one and basic understanding of another.

For further information contact: Andrew Kao   E-mail: A.Kao@greenwich.ac.uk

Duration: 3 years, Full-Time Study

Bursary available (subject to satisfactory performance):
        Year 1: £14,553   Year 2: In line with RCUK rate   Year 3: In line with RCUK rate
In addition, the successful candidate will receive a contribution to tuition fees equivalent to the university's Home/EU rate, currently £4,195, for the duration of their scholarship. International applicants will need to pay the remainder tuition fee, currently £8,305, for the duration of their scholarship. This fee is subject to an annual increase.

Person Specification of Essential (E) or Desirable (D) requirements:	
Criteria:	E or D
Education and Training:	
• 1st Class or 2nd class, First Division (Upper Second Class) Honours Degree or a taught Master's degree with a minimum average of 60% in all areas of assessment (UK or UK equivalent) in a relevant area to the proposed research project	E
• For those whose first language is not English and/or if from a country where English is not the majority spoken language (as recognised by the UKBA), a language proficiency score of at least IELTS 6.5 (in all elements of the test) or an equivalent UK VISA and Immigration secure English Language Test is required, unless the degree above was taught in English **and** obtained in a majority English speaking country, e.g. UK, USA, Australia, New Zealand, etc, as recognised by the UKBA.	E
Experience & Skills:	
• Previous experience of undertaking research (e.g. undergraduate or taught masters dissertation)	E
• Experience using Finite Element Analysis (FEA) codes	D
• Experience using Computational Fluid Dynamics (CFD) codes	D
• Knowledge of Electromagnetism i.e. Lorentz force	D
• Understanding of Materials Science i.e. solidification, microstructure in relation to thermos-physical properties.	D
• Experience in numerical analysis e.g. programming, solvers, discretisation techniques, parallel computing/high performance computing (HPC), optimisation.	D
Personal Attributes:	
• Understands the fundamental differences between a taught degree and a research degree in terms of approach and personal discipline/motivation	E
• Able to, under guidance, complete independent work successfully	E
Other Requirements:	
• This scholarship may require Academic Technology Approval Scheme approval for the successful candidate if from outside of the EU/EEA	E
• A PhD project research proposal that is related to the research area	E
• The scholarship must commence before 29 September 2017	E

Closing date for applications: *midnight UTC on 31 July 2017*

Making an application:
Please read this information before making an application. Information on the application process is available at: http://www2.gre.ac.uk/research/study/apply/application_process . Applications need to be made online via this link. **No other form of application will be considered**.

All applications **must include** the following information. **Applications not containing these documents will not be considered.**
- **Scholarship Reference Number (Ref)**– included in the personal statement section together with your personal statement as to why you are applying
- **a research proposal related to the subject topic** *
- **a CV including 2 referees** *
- **academic qualification certificates/transcripts and IELTs/English Language certificate if you are an international applicant or if English is not your first language or you are from a country where English is not the majority spoken language as defined by the UK Border Agency** *

upload to the qualification section of the application form. Attachments must be a PDF format.

Before submitting your application you are encouraged to liaise with the Lead Supervisor on the details above.