

Information on Postgraduate Research Scholarship - Ref: M34Impact-MSE3	
Faculty:	Engineering and Science
Department:	Computing and Mathematical Sciences
Lead Supervisor:	Dr Mikhail Poluektov
Project Title:	Computational methods for evolving-domain problems with application to phase transitions in materials
Project Description:	<p>This is an interdisciplinary PhD project that unites applied mathematics (continuum mechanics, stability analysis), computational mathematics (numerical methods for PDEs, numerical analysis) and engineering (mechanics of materials).</p> <p>A large range of physical phenomena, taking place in materials, involves propagating interfaces between distinct material phases. A typical example is the process of formation of oxides, where the interface is a chemical reaction front between the oxidised and the pristine phases. Behaviour of such materials is described using partial differential equations (PDEs) that are defined on domains with time-dependent interfaces – the so-called free-boundary problems. Even though these problems have been studied since mid-twentieth century, their computational handling still presents a challenge, especially in a highly non-linear case.</p> <p>The aim of this project is to advance further one of the methods to handle problems with propagating interfaces – the cut-finite-element method, specifically targeting PDEs describing phase transitions in materials. Within this approach, phase boundaries are handled as sharp (infinitely-thin) interfaces that move across a fixed finite-element mesh. The developments will focus on improving accuracy and efficiency of the computational approach when applied to PDEs describing a range of material systems revealing multi-physics behaviour, such as chemo-mechanical (e.g. formation of oxide layers on metals, formation of solid-electrolyte interphase on battery electrodes) or magneto-mechanical (e.g. twin-boundary kinetics in magnetic shape-memory alloys).</p> <p>The successful candidate will become a member of the Computational Science and Engineering Group (CSEG) and will join a team with extensive expertise in computational materials modelling and phase transformation processes. This studentship is fully funded by the M³4Impact programme, a £9 million Expanding Excellence in England (E3) grant. The successful candidate will be a part of a dynamically-growing research group and will benefit from training and other initiatives funded by this grant. The project will be supervised by Dr Mikhail Poluektov and co-supervised by Prof Andrew Kao and Dr Ivars Krastins.</p>
Duration:	4 years, Full-Time Study or 7 years, Part-Time Study
Bursary available (subject to satisfactory performance):	

Rates below are for full time (FT) mode.

Year 1: £24,780 (£20,780 UKRI rate + London weighting = £2,000 + Enhanced bursary = £2,000)

Year 2: In line with UKRI rate + London weighting = £2,000 + Enhanced bursary = £2,000

Year 3: In line with UKRI rate + London weighting = £2,000 + Enhanced bursary = £2,000

Year 4*: In line with UKRI rate + London weighting = £2,000 + Enhanced bursary = £2,000

In addition, the successful candidate will receive a contribution to tuition fees, equivalent to the University Home Rate, currently £5,006 (FT), for the duration of their scholarship. International applicants may need to pay the remainder tuition fee for the duration of their scholarship**.

This fee is subject to an annual increase.

* The bursary is for 3 years with a potential extension of up to a maximum of 12 months. Funding extensions may be granted if the student demonstrates, to the satisfaction of the M³4Impact Principal Investigators and PhD supervisors, that the thesis can be completed during the granted extension period.

** For exceptional international applicants the tuition fees may be covered by the M34Impact.

Person Specification of Essential (E) or Desirable (D) requirements:

Criteria:	E or D
Education and Training:	
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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, if your programme falls within the faculty of Engineering and Science a language proficiency score of at least IELTS 6.5 overall with a minimum of 6.0 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:	
<ul style="list-style-type: none"> Previous experience of undertaking research (e.g. undergraduate or taught master's dissertation) 	E
<ul style="list-style-type: none"> Proficiency in MATLAB 	E
<ul style="list-style-type: none"> A strong knowledge of the theory of finite-element methods (FEM) 	E
<ul style="list-style-type: none"> Knowledge of continuum mechanics and thermodynamics 	E
<ul style="list-style-type: none"> Proficiency in additional programming languages 	D
<ul style="list-style-type: none"> Experience in implementation of FEM for linear and non-linear problems 	D
<ul style="list-style-type: none"> Knowledge of tensor algebra and analysis 	D
<ul style="list-style-type: none"> Knowledge of material models and material behaviour 	D
Personal Attributes:	

<ul style="list-style-type: none"> Understands the fundamental differences between a taught degree and a research degree in terms of approach and personal discipline/motivation 	E
<ul style="list-style-type: none"> Able to, under guidance, complete independent work successfully 	E
Other Requirements:	
<ul style="list-style-type: none"> This scholarship may require Academic Technology Approval Scheme approval for the successful candidate if from outside of the EU/EEA 	E
<ul style="list-style-type: none"> The scholarship must commence before 1 September 2026 	E
Closing date for applications:	midnight UTC on 17 April 2026
For further information contact:	Dr Mikhail Poluektov (M.Poluektov@greenwich.ac.uk)
<p>Making an application: Please read this information before making an application. All applications must include the following information. Applications not containing these documents will not be considered.</p> <ul style="list-style-type: none"> Scholarship Reference Number (“M34Impact-MSE3”)– included in the personal statement section together with your personal statement as to why you are applying 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 * <p><i>*upload to the qualification section of the application form. Attachments must be a PDF format.</i></p> <p>Before submitting your application, you are encouraged to liaise with the Lead Supervisor on the details above.</p> <p>Information on the application process is available at: https://www.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.</p>	