

**Information on Postgraduate Research Scholarship - Ref: VCS-FLAS-01-20**

<b>Faculty:</b>	<b>Liberal Arts and Sciences</b>	<b>Department:</b>	<b>Computing and Mathematics</b>
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<b>Lead Supervisor:</b>	<b>Dr Timothy Reis</b>
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<b>Project Title:</b>	<b>Lattice Boltzmann Modelling of Disease Outbreaks</b>
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**Project Description:**

The COVID-19 crisis has highlighted how mathematics can be used to model epidemics and, ultimately, inform (inter)national policy on managing them. Most existing mechanistic models describe how the number of individuals infected with a disease in a closed population changes in time. However, to understand the spread and outbreak of epidemics, spatial effects such as random mixing (uncorrelated random walks, i.e. diffusion) or biased directions of travel (i.e. advection), as well as temporal changes in the population, could be considered. Extra dimensions add extra complexity: one now expects advection-reaction-diffusion equations to describe the change in place and time of the number of infections. Furthermore, there is no guarantee that contact between infected and susceptible individuals will result in transmission. Thus mathematical models that consider the transmission of diseases to be stochastic may be more realistic.

This project will construct stochastic lattice Boltzmann equations (LBEs) to solve mechanistic models of disease spreading with the aim of finding relationships between spatially dependent parameters and the spread of infectious diseases. It will bring together advances in mathematical epidemiology, numerical modelling and simulation, and stochastic processes to address some of the outstanding challenges of modelling infectious disease outbreaks.

<b>Duration:</b>	<b>3 years, Full-Time Study</b>
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**Bursary available (subject to satisfactory performance):**

Year 1: £15,285      Year 2: In line with UKRI rate      Year 3: In line with UKRI rate

In addition, the successful candidate will receive a contribution to tuition fees equivalent to the university's Home/EU rate, currently £4,407, for the duration of their scholarship. International applicants will need to pay the remainder tuition fee for the duration of their scholarship. This fee is subject to an annual increase.

<b>Person Specification of Essential (E) or Desirable (D) requirements:</b>	
<b>Criteria:</b>	<b>E or D</b>
<b>Education and Training:</b>	
<ul style="list-style-type: none"> <li>1<sup>st</sup> Class or 2<sup>nd</sup> class, First Division (Upper Second Class) Honours Degree or a taught Master's degree in a subject relevant to the project with a minimum average of 60% (UK or UK equivalent).</li> </ul>	<b>E</b>
<ul style="list-style-type: none"> <li>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 <b>and</b> obtained in a majority English speaking country, e.g. UK, USA, Australia, New Zealand, etc, as recognised by the UKBA.</li> </ul>	<b>E</b>
<b>Experience &amp; Skills:</b>	
<ul style="list-style-type: none"> <li>Previous experience of undertaking research (e.g. undergraduate or taught masters dissertation)</li> </ul>	<b>E</b>
<ul style="list-style-type: none"> <li>Knowledge numerical methods for solving ODEs/PDEs</li> </ul>	<b>D</b>
<ul style="list-style-type: none"> <li>Knowledge of probability theory or stochastic modelling</li> </ul>	<b>D</b>
<ul style="list-style-type: none"> <li>Previous experience of mathematical modelling</li> </ul>	<b>D</b>
<b>Personal Attributes:</b>	
<ul style="list-style-type: none"> <li>Understands the fundamental differences between a taught degree and a research degree in terms of approach and personal discipline/motivation</li> </ul>	<b>E</b>
<ul style="list-style-type: none"> <li>Able to, under guidance, complete independent work successfully</li> </ul>	<b>E</b>
<b>Other Requirements:</b>	
<ul style="list-style-type: none"> <li>This scholarship may require Academic Technology Approval Scheme approval for the successful candidate if from outside of the EU/EEA</li> </ul>	<b>E</b>
<ul style="list-style-type: none"> <li>A PhD project research proposal that is related to the research area</li> </ul>	<b>E</b>
<ul style="list-style-type: none"> <li>The scholarship must commence asap</li> </ul>	<b>E</b>

**Closing date for applications: *midnight UTC on 19<sup>th</sup> November 2020***

**For further information contact: Dr Timothy Reis      *E-mail: T.Reis@grenwich.ac.uk***

**Making an application:**

Please read this information before making an application. 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.**

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.