UNIVERSITY of GREENWICH

Information on Postgraduate Research Scholarship - Ref: M^{3}4Impact			
Faculty:	Engineering and Science	**Department:**	Computing and Mathematical Sciences
Lead Supervisor:	Dr Bardia Mashhoodi		
Project Title:	**PhD Position in Advanced Spatial Data Analysis for Urban Energy Storage in U.K. Cities**		
Project Description:	Energy storage is emerging as a cornerstone for sustainable urban energy systems. It is critical for balancing renewable energy generation at different times of the day or year, ensuring a continuous power supply during peak demand, and reducing greenhouse gas emissions. As urban areas expand and their energy needs become increasingly dynamic, effective storage solutions not only support grid stability but also facilitate the electrification of transport and improve overall energy resilience. Various systems have been developed to store energy (Khan et al., 2019): • **Mechanical Storage Systems** – e.g., Pumped Hydro, Compressed Air, and Flywheel Storage • **Electrochemical Energy Storage (ECES)** – e.g., Batteries and superconducting magnetic energy storage • **Chemical Energy Storage** – e.g., Hydrogen and synthetic fuels • **Thermal Energy Storage** – e.g., Sensible, latent, and thermochemical storage techniques In many cases, these systems have been utilized to store energy for space and water heating, as well as for powering appliances in urban buildings, while also being applied in transportation to power both public and private vehicles. For example, various technologies—such as phase change materials (PCMs), heat storage systems, batteries, and flywheels—have been effectively used across these sectors (Koohi-Fayegh and Rosen, 2020). This PhD position invites applicants to investigate the geography of energy storage for urban buildings and transport systems in U.K. cities. The research consists of three interlinked themes: (a) **Review of Spatial Requirements for Urban Energy Storage:** – The candidate will conduct an umbrella review of the scientific literature on all storage systems to compile the spatial requirements for each technology. This includes safety distances, regulatory constraints, topography, urban subsurface infrastructure, proximity to demand centers and natural resources (e.g., sunlight,		

	water, wind), installation and operational costs, landscape appreciation, and public acceptance. (b) **Potential Estimation via Advanced Spatial Data Analytics and GeoAI:** – The candidate will leverage rich spatial datasets in the U.K. along with machine learning and GeoAI techniques to analyze satellite and street view imagery, map spatial patterns, and develop predictive models. (c) **GIS-based Multicriteria Decision Analysis (MCDA):** – The candidate will integrate diverse spatial data from the previous steps and conduct a GIS-based MCDA to identify potential locations for energy storage in U.K. cities under different scenarios. By exploring these dimensions, the PhD research aims to provide a holistic understanding of how energy storage technologies can be tailored to the unique geographic, infrastructural, and societal contexts of urban areas, ultimately supporting the transition to resilient, low-carbon energy systems in U.K. cities and beyond. **Research Environment & Benefits** You will join the **Computational Science and Engineering Group (CSEG)**—a dynamic research team with expertise in **numerical modelling, urban analytics, and digital cities**. CSEG plays a central role in **M^{3}4Impact**, a prestigious £9 million Expanding Excellence in England (E3) grant initiative. As part of this team, you will benefit from cutting-edge training, collaboration opportunities, and access to world-class research resources. This PhD offers an exciting opportunity for researchers passionate about **urban sustainability, geospatial analysis, and computational methods**. If you are eager to contribute to ground-breaking research on global urban inequalities, we encourage you to apply!
Duration:	Up to 4 years, Full-Time Study

Bursary available (subject to satisfactory performance):

Rates below are for full time (FT) mode, part time (PT) is pro rata.
Year 1: £23,237 (£19,237 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 £4,712 (FT) or pro-rata (PT), 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 M^{3}4Impact

Principal Investigators and PhD supervisors, that the thesis can be completed during the granted extension period.	
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, 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:	
• Previous experience of undertaking research (e.g. undergraduate or taught master's dissertation)	**E**
• Experience in a related discipline e.g. • Environmental Science • Mathematical Modelling	**E**
• Experience in spatial analyses software (ArcGIS, QGIS)	**E**
• Experience in programming in R or python	**D**
• Experience of Machine Learning and Statistics	**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**
• Start date is flexible and will be agreed with supervisory team and M^{3}4Impact Programme Leads	**E**
Closing date for applications:	**8th June 2025**
For further information contact:	**Dr Bardia Mashhoodi (b.mashhoodi@greenwich.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 (*M^{3}4Impact*)**– Clearly included "M^{3}4Impact" in the personal statement section together with your personal statement as to why you are applying and the PhD project title.
- **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.

February 2025