Information on Postgraduate Research Scholarship
Ref: FS-ES-04-2027-22

Faculty:	Engineering & Science	**School:**	Engineering
Lead Supervisor:	Yehdego Habtay		
Project Title:	*Digital Twin Platform for AI-Based Optimisation, Resilience Assessment, and Energy Management of Smart Microgrids*		
Project Description:	**Project Overview** The transition towards low-carbon power systems is driving the need for intelligent, resilient, and highly efficient electricity networks. This PhD will develop a real-time digital twin platform for smart renewable-energy microgrids, integrating Artificial Intelligence (AI), Internet of Things (IoT) technologies, and Hardware-in-the-Loop (HIL) testing using a Speedgoat real-time simulator or other suitable tools. The research will create a digital replica of a laboratory-scale microgrid comprising solar photovoltaic generation, battery energy storage, controllable loads, and distribution network components. Advanced AI algorithms will be developed to optimise energy management, enhance renewable energy utilisation, improve battery operation, and detect system faults in real time. The project offers a unique opportunity to combine power systems, renewable energy, machine learning, digital twins, and real-time control within an experimental environment. Successful candidates will contribute to the development of next-generation smart grids that support Net Zero objectives while improving power system efficiency, flexibility, and resilience. **Key Research Objectives** 1. Develop a real-time digital twin of a renewable energy microgrid using HIL and MATLAB/Simulink. 2. Integrate IoT-based sensing and communication to synchronise physical assets with the digital twin in real time. 3. Design AI-based algorithms for energy management, battery scheduling, and renewable energy optimisation. 4. Develop intelligent fault detection and resilience assessment capabilities using machine learning techniques. 5. Validate the proposed framework experimentally using laboratory-scale PV, battery storage, smart metering, and programmable load systems. 6. Quantify improvements in energy efficiency, reliability, resilience, and renewable energy utilisation **Candidate Profile:** • **Academic Background:** First or Upper Second Class (2:1) Master's/MEng degree in Electrical Engineering, Power Electronics, Control Systems, or closely related discipline. • • Technical Skills: Knowledge of power systems, renewable energy technologies, power electronics, control systems, or energy management. Experience with engineering software such as MATLAB/Simulink and the ability to undertake analytical modelling, simulation, and		

	experimental work are essential. Basic programming skills (e.g., MATLAB or Python) are highly desirable • **Desirable Skills:** Experience in one or more of the following areas would be advantageous: artificial intelligence and machine learning, digital twins, IoT systems, embedded systems, battery energy storage systems, Hardware-in-the-Loop (HIL) simulation, smart grids, data analytics, or optimisation techniques. Strong problem-solving abilities, research aptitude, and a willingness to work across interdisciplinary areas are also desirable. **This scholarship is awarded competitively, and all applications are carefully reviewed. While we cannot guarantee an offer, we encourage strong candidates to apply.**
Duration:	3 years, full-time study 6 years, part-time study

Support available (subject to satisfactory performance):

For Home students

- A full tuition fee waiver at the Home student rate for the duration of the scholarship.

For International students

- 50% tuition fee waiver against the International student rate for the duration of the scholarship.

Important information

- Tuition fees are subject to annual review and may increase during the course of study.
- This scholarship covers tuition fees only and does not include funding for living, accommodation, or maintenance costs.

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**

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**
• The scholarship must commence before 5th April 2027	**E**
Closing date for applications:	**Midnight UTC on 30th November 2026**
For further information contact:	Yehdego Habtay (Y.T.Habtay@ 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 (FS-ES-04-2027-22)**– 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, 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.