Information on Postgraduate Research Scholarship
Ref: FS-ES-04-2027-8

Faculty:	Engineering & Science	**School:**	Engineering
Lead Supervisor:	Dr Kamran Pedram		
Project Title:	Adaptive Human–AI Collaboration for Decision-Making under Uncertainty and Risk: A Digital Twin-Enabled Engineering Framework		
Project Description:	Artificial intelligence (AI) and digital twin technologies are transforming the monitoring, diagnosis and control of complex engineering systems. However, as AI becomes increasingly autonomous, a fundamental challenge remains: when should AI systems make decisions independently, and when should decision authority be transferred to human experts? Existing Human-in-the-Loop (HITL) approaches often rely on fixed confidence thresholds or predefined intervention rules, which may be inadequate in dynamic, uncertain and critical environments. Furthermore, human intervention does not necessarily guarantee better outcomes, as both AI systems and human experts can make incorrect or inconsistent decisions. Developing intelligent mechanisms that dynamically balance human and AI decision-making is therefore essential for achieving trustworthy and reliable autonomous systems. This PhD project aims to develop and experimentally validate a novel adaptive Human–AI decision-authority framework that dynamically determines whether decisions should be AI-led, human-led or collaboratively validated. The framework will consider AI uncertainty, operational risk, system criticality, unfamiliar operating conditions and the estimated reliability of both human and AI decision-makers. The research will integrate uncertainty-aware machine learning, advanced signal processing and physics-informed digital twins to support evidence-based decision-making. A digital twin will provide a virtual representation of the physical system, enabling AI predictions and human interventions to be assessed against sensor measurements, system behaviour and physical constraints. A key innovation will be the development of methods for evaluating bidirectional reliability and calibrated reliance, recognising that neither AI recommendations nor human judgements should automatically be considered trustworthy. The proposed framework will continuously assess decision quality and dynamically adjust the allocation of decision authority according to available evidence and operational risk to develop a safer, more reliable and accountable AI-enabled engineering systems. **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**
• Proficiency in Python, MATLAB, or other relevant programming languages for machine learning and digital signal processing applications	**E**
• A relevant background in Electrical/Electronic Engineering, Computer Engineering, Artificial Intelligence, or a closely related discipline.	**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:	**Dr Kamran Pedram (Kamran.pedram@gre.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-04-2027-8)**– 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.