Information on Postgraduate Research Scholarship - Ref: Eng-PhD-02-25			
Faculty:	Engineering and Science	**Department:**	School of Engineering
Lead Supervisor:	Dr Soumya Prakash Rana, Lecturer in Computer Engineering, University of Greenwich		
Project Title:	AI-Driven Multimodal Non-Contact Sensing for Human Gait Modelling and Analysis		
Project Description: (maximum 500 words)	Human gait analysis plays a critical role in sports performance optimisation, rehabilitation, and early detection of movement disorders. Traditional gait assessment methods often rely on expensive motion-capture systems or intrusive wearable sensors, limiting their scalability and real-world deployment. This PhD project proposes a novel, low-cost, and interpretable framework for multimodal and non-contact gait analysis, integrating wearable and remote sensing technologies with advanced mathematical modelling and artificial intelligence. The project will investigate the fusion of three complementary sensing modalities: (i) wearable 3D accelerometers (IMUs), (ii) non-contact 3D depth imaging using Intel RealSense cameras, and (iii) ultra-wideband (UWB) radar-based sensing. The core novelty lies in developing a unified mathematical and AI-driven representation of human gait that is robust across sensing modalities while remaining interpretable and computationally efficient. The research will begin with the design of a flexible experimental platform for multimodal data acquisition during controlled walking and movement tasks. Mathematical modelling techniques will be applied to derive physically meaningful gait descriptors, including differential and integral features, gait energy measures, symmetry indices, cumulative effort metrics, and nonlinear characteristics such as detrended fluctuation analysis (DFA). These representations will enable principled comparison across wearable and non-contact sensing approaches. Building on this foundation, the project will develop data-driven models using modern machine learning techniques, including 1D and 2D convolutional neural networks, temporal transformers, and self-supervised learning methods. These models will be used for gait classification, abnormality detection, and athlete performance profiling, with an emphasis on generalisation and explainability. Multimodal data fusion strategies will be explored to align heterogeneous sensor streams in time and feature space. The PhD will also include system-level validation, benchmarking the performance of wearable versus non-contact sensing under different conditions, and culminate in a prototype for real-time gait monitoring.		

	The work will be implemented using Python and MATLAB, leveraging existing signal-processing and embedded-systems facilities within the School of Engineering. The expected outcomes include novel mathematical frameworks for gait interpretation, comparative performance benchmarks across sensing technologies, and AI models suitable for real-world deployment in sports analytics and healthcare. The project aligns strongly with the School's research themes in intelligent sensing, AI, signal processing, and healthcare technology, and supports multidisciplinary collaboration across engineering, computing, and human movement science. 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 or 6 years, Part-Time Study

Support available (subject to satisfactory performance):

A successful Home candidate will receive:

- A Full tuition fee waiver at the university Home-student rate for the specified duration of the scholarship

A successful International candidate will receive:

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

Tuition fees are subject to annual increases.

This scholarship does not include funding for living expenses.

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

Criteria:	**E or D**
Education and Training:	
• First- or Upper Second-Class honours degree, or a taught Master's degree (minimum 60%) in Electrical/Electronic Engineering, Computer Engineering, Computer Science, Biomedical Engineering, Data Science, or a closely related discipline (E)	**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**
• Background in signal processing, machine learning, or data analysis	**E**
• Programming skills in Python and/or MATLAB	**E**
• Experience with sensors, embedded systems, or AI frameworks	**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**
• The scholarship must commence before 15th July 2026 (offers will be withdrawn if this condition is not met)	**E**
Closing date for applications:	***midnight UTC on 20th February 2026***
For further information contact:	***Dr Soumya Prakash Rana*** ***School of Engineering, University of Greenwich*** ***Email: sr8132k@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 (*insert reference*)**– 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** *

**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.