UNIVERSITY of GREENWICH

Information on Postgraduate Research Scholarship - Ref: Eng-PhD-20-25			
Faculty:	Engineering and Science	**Department:**	School of Engineering
Lead Supervisor:	Dr. Felipe A. Perdomo		
Project Title:	*Digital Design of Tunable Ionic Liquids for Efficient CO_2 Capture in Energy-Intensive Industries (EII)*		
Project Description: (maximum 500 words)	Achieving Net-Zero carbon emissions by 2050 requires rapid decarbonization of energy intensive industrial sectors such as iron and steel, cement, petrochemicals, refineries, and fertiliser production. Many of these sectors cannot be fully electrified using current renewable technologies and therefore rely on Carbon Capture, Utilisation and Storage (CCUS) as a critical pathway to emissions reduction. CCUS is also essential for low-carbon hydrogen production and engineered greenhouse-gas removal technologies identified in the UK's Net Zero Research and Innovation Framework. Current carbon capture technologies are energy-intensive, costly, and limited in flexibility. There is a pressing need for next-generation liquid sorbents that offer high CO_2 selectivity, low regeneration energy, thermal stability, and adaptability across pre- and post-combustion processes. Ionic liquids (ILs) represent a particularly promising class of solvents, as their molecular structures can be systematically tailored to optimize physicochemical properties and CO_2 reactivity. This PhD project aims to develop a digital–experimental platform for the rational design and selection of ionic liquids for CO_2 capture and conversion. By combining molecular modelling, data-driven screening, and targeted laboratory validation, the project will enable the discovery of tuneable ILs with enhanced capture efficiency, reduced energy penalties, and improved scalability compared to conventional solvent systems. The successful candidate will work at the interface of Process System Engineering, and digital chemistry, developing skills in: • Molecular design and structure–property relationships • Computational and data-driven screening of ionic liquids		

	• Experimental evaluation of solvents suitable for CO_2 absorption, selectivity, and stability. • Techno-economic and sustainability considerations for CCUS deployment The research will contribute directly to the development of low-energy, scalable CCUS technologies for hard-to-abate industrial sectors, while equipping the PhD researcher with highly transferable skills relevant to academia, industry, and policy-driven research environments. This project aligns strongly with the University of Greenwich's strategic research priorities in sustainability and industrial decarbonization, offering opportunities for cross-disciplinary collaboration and engagement with national and international research networks. The PhD will position the successful candidate at the forefront of innovation in carbon capture technologies and digital design methodologies. 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:	
• 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	**E**

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.	
Experience & Skills:	
• Previous experience of undertaking research (e.g. undergraduate or taught master's dissertation)	**E**
• Academic background in Chemical Engineering, Chemistry, Materials Science, or a closely related discipline.	**E**
• Basic programming or computational literacy (e.g. Python, MATLAB, Fortran, or similar), or strong motivation to develop these skills.	**E**
• Laboratory experience in chemical or materials experimentation (e.g. synthesis, characterization, or gas–liquid systems)	**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. Felipe Perdomo, F.Perdomo@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 (*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.

September 2021