

<b>Information on Postgraduate Research Scholarship - Ref: FES-PhD-2425-06</b>	
<b>Faculty:</b>	Engineering & Science
<b>Department:</b>	Engineering
<b>Lead Supervisor:</b>	Dr Reginald Kogbara
<b>Project Title:</b>	Valorisation of sewage sludge through phosphate-based geopolymer production
<b>Project Description:</b>	<p>Are you interested in contributing to net zero by creating environmentally friendly cementitious systems from unconventional materials? If yes, then why not consider this project?</p> <p>Sewage sludge is rich in valuable nutrients/minerals such as phosphorus and aluminosilicates. However, its management represents some 20 – 60% of operational costs and thus require effective solutions. Hence, this project aims to leverage on its chemical composition to produce geopolymers. Geopolymers are new-generation environmentally friendly binders in contrast to Portland cement that can be synthesized from aluminosilicate sources through alkali or acid activation. However, very few studies have considered acid activation for geopolymer production using sewage sludge as aluminosilicate source. Thus, this work will employ sewage sludge as aluminosilicate source and phosphoric acid as acid source to produce acid-activated geopolymer mixtures, which can be used as construction materials and even slow-release fertilisers. It will attempt to generate phosphoric acid from sewage sludge through thermal and chemical treatments including use of sulphuric acid and sodium aluminate. Additionally, triple super phosphate (TSP) would be ground to powder form and used as acid source for geopolymer activation. The project's objectives are:</p> <ol style="list-style-type: none"> <li>(1) Investigation of the potential of different mixture formulations of the thermally treated sludge cakes, ground TSP and the additives to produce geopolymeric cementitious composites that immobilises any toxic components of the sludge within their alumino-silicate structures.</li> <li>(2) Assessment of the mechanical, durability, microstructural and environmental performance of the geopolymeric composites produced using conventional tests for concrete and pH-dependent granular leaching tests.</li> <li>(3) Evaluation of the potential of utilising the geopolymeric composites produced for 3D concrete printing by optimising the mixture formulations using suitable additives.</li> </ol> <p>The PhD student working on the project will gain significant exposure on a range of techniques in wet chemistry, materials characterisation and environmental testing, and writing papers for publication in leading journals.</p>
<b>Duration:</b>	3 years, Full-Time Study or 6 years, Part-Time Study
<b>Bursary available (subject to satisfactory performance):</b>	

Please note that as part of your application process, there will be short-listing of candidates per project. Those shortlisted will be interviewed and then there is a competitive selection that includes the project and candidate to decide which project will receive which financial support. This financial support can take up the form of a (partial) tuition fee waiver and/or stipend for your PhD studies. You will be made aware of what that offer will be and will then be asked to decide on moving forwards with your application or not.

In case of allocation of financial support, then the tuition fee waiver would include a contribution to tuition fees equivalent to the university's Home rate, currently £4,786 (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.

In case of the allocation of a stipend, then this fee would be subject to an annual increase.

Year 1: £19,237 (FT) or pro-rata (PT)

Year 2: In line with UKRI rate

Year 3: In line with UKRI rate

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

<b>Criteria:</b>	<b>E or D</b>
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***Education and Training:***

<ul style="list-style-type: none"> <li>1<sup>st</sup> Class or 2<sup>nd</sup> class, First Division (Upper Second Class) honours degree or a taught master's degree with a minimum 60% overall (or equivalent) in a relevant area to the proposed research project</li> </ul>	<b>E</b>
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<ul style="list-style-type: none"> <li>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 <b>and</b> obtained in a majority English speaking country, e.g. UK, USA, Australia, New Zealand, etc, as recognised by the UKBA.</li> </ul>	<b>E</b>
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***Experience & Skills:***

<ul style="list-style-type: none"> <li>Previous experience of undertaking research (e.g. undergraduate or taught master's dissertation)</li> </ul>	<b>E</b>
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<ul style="list-style-type: none"> <li>Practical (laboratory) experience in materials characterisation, chemistry, and environmental testing</li> </ul>	<b>E</b>
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<ul style="list-style-type: none"> <li>Demonstrable communication skills in scientific/technical language</li> </ul>	<b>E</b>
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<ul style="list-style-type: none"> <li>Ability to work independently and operate within a diverse team, exhibiting excellent organisational, IT and interpersonal skills</li> </ul>	<b>E</b>
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***Personal Attributes:***

<ul style="list-style-type: none"> <li>Understands the fundamental differences between a taught degree and a research degree in terms of approach and personal discipline/motivation</li> </ul>	<b>E</b>
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<ul style="list-style-type: none"> <li>Able to, under guidance, complete independent work successfully</li> </ul>	<b>E</b>
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***Other Requirements:***

<ul style="list-style-type: none"> <li>This scholarship may require Academic Technology Approval Scheme approval for the successful candidate if from outside of the EU/EEA</li> </ul>	<b>E</b>
<ul style="list-style-type: none"> <li>The scholarship must commence by September 2025</li> </ul>	<b>E</b>
<b>Closing date for applications:</b>	<b><i>midnight UTC on 16/02/2025</i></b>
<b>For further information contact:</b>	<b><i>Dr Reginald Kogbara (reginald.kogbara@gre.ac.uk)</i></b>
<p><b>Making an application:</b>  Please read this information before making an application. Information on the application process is available at: <a href="https://www.gre.ac.uk/research/study/apply/application-process">https://www.gre.ac.uk/research/study/apply/application-process</a>. Applications need to be made online via this link. <b>No other form of application will be considered.</b></p> <p>All applications <b>must include</b> the following information. <b>Applications not containing these documents will not be considered.</b></p> <ul style="list-style-type: none"> <li><b>Scholarship Reference Number (* FES-PhD-2425-06 *)</b>– included in the personal statement section together with your personal statement as to why you are applying</li> <li><b>a CV including 2 referees *</b></li> <li><b>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 *</b></li> </ul> <p><i>*upload to the qualification section of the application form. Attachments must be a PDF format.</i></p> <p>Before submitting your application, you are encouraged to liaise with the Lead Supervisor on the details above.</p>	