Project Reference: CTE_EMERC_Alex_Paurine_001_25_26

About the Project

This is an exciting PhD opportunity within the College of Technology and Environment (CTE) at London South Bank University (LSBU). The successful candidate will receive a tuition fee waiver beginning in September 2025 for 4 years, including the write-up year.

Project Title

Balancing Agricultural Exports, Soil Health, and Energy Efficiency: Strategies for a Sustainable Future

Project Overview

Agricultural exports are vital to global food security and economic stability, yet they often result in soil nutrient depletion and increasing energy inefficiencies. Intensive export-driven farming accelerates soil degradation, necessitating greater reliance on synthetic fertilisers, mechanised tillage, and high-energy irrigation systems. Additionally, long-distance food transportation contributes to high fuel consumption and carbon emissions, further exacerbating the environmental impact. This research aims to develop engineering-based strategies and policy frameworks to optimise agricultural efficiency, enhance soil health, and reduce energy demand in food export systems.

The study will adopt an interdisciplinary engineering approach, integrating agricultural systems engineering, energy modelling, and supply chain optimisation. A quantitative assessment will be conducted to evaluate how soil degradation increases energy consumption in fertiliser production, irrigation, mechanisation, and logistics. Life Cycle Assessment (LCA) and computational modelling will be employed to quantify the energy footprint of agricultural exports, identifying key inefficiencies. Case studies from high-export agricultural regions (e.g. Tanzania, India and Kenya) will be used to develop scalable engineering solutions such as precision agriculture, regenerative soil techniques, and optimised logistics networks.

The findings will inform sustainable trade policies, carbon offset strategies, and renewable energy integration within agricultural systems. By bridging engineering, policy, and environmental management, this research will provide data-driven recommendations to enhance agricultural resilience, reduce energy waste, and support long-term food security in export economies. The outcomes will be instrumental in shaping low-carbon agricultural supply chains and sustainable resource management practices for future global food systems.

Who Are We Looking For?

Essential Requirements:

- Open to any UK or international candidates. Starting in September 2025.
- The candidate must meet the minimum entry requirements for our PhD programme by clicking the 'Apply' link.
- A strong academic background in one or more of the following: agricultural engineering, environmental engineering, mechanical engineering, energy systems, sustainability science, or related disciplines.
- Evidence of quantitative research skills, including data analysis, modelling, and/or simulation.
- Familiarity with life cycle assessment (LCA) or environmental impact modelling techniques.

Desirable Attributes:

- Prior research experience related to agriculture, soil science, or energy efficiency in supply chains.
- A keen interest in systems thinking, sustainable trade, and low-carbon technology applications.

- Motivation to work across disciplines and engage with both technical and policy-driven questions.

Selection Criteria:

- Academic Qualifications - You should normally have at least a 2.1 honours degree from a UK University or an equivalent qualification in engineering, computer science, etc.
  - Research and Analytical Skills – Ability to research subjects using libraries, the internet, and other information resources, ability to conduct comprehensive literature reviews, experience in qualitative and quantitative data collection and analysis, strong research design and methodology skills, ability to independently collaborate with stakeholders, and excellent academic writing and communication skills.
  - **Professional Skills -** Project management and organisational skills, ability to work independently and as part of a team, problem-solving and critical thinking skills, and adaptability and willingness to learn new skills.
  - Software and Modelling Experience - Experience developing and utilising spreadsheet-based models (e.g., Microsoft Excel) to an advanced level. Experience with other software packages relevant to the discipline would be an advantage.
  - Communication Skills - The candidate should be highly motivated, able to collaborate, have good visual, oral, and written communication skills, and communicate the work's outcomes to commercial, industrial, and scientific audiences.
  - Teamwork and Collaboration - Ability to work with industrial and academic supervisors.
  - Language Proficiency - Overseas applicants must have a minimum English language IELTS score of 6.5, with at least 5.5 in any of the components.
  - Understanding of Equality and Diversity - Able to demonstrate an understanding of equality and diversity and their practical applications.
  - Visa and Legal Requirements - Non-EU/EEA nationals may need to apply to the Foreign and Commonwealth Office (FCO) for clearance from the Academic Technology Approval Scheme (ATAS).

Training & Development Opportunities

Doctoral students at London South Bank University (LSBU), through the London Doctoral College (LDC), benefit from a rich and structured training environment designed to support academic excellence and professional development. All PhD candidates are offered a comprehensive programme of workshops and seminars covering essential research skills, including research design, data analysis, academic writing, ethics, and project management. These sessions aim to support students through every stage of their doctoral journey—from literature review and methodology to thesis completion and viva preparation. Postgraduate researchers can access advanced, discipline-specific training aligned with their research focus. LSBU's doctoral training environment is designed to build deep expertise in a chosen research area and the broader skills necessary for successful careers in research, industry, and beyond.

About the College

The College of Technology and Environment (CTE) at London South Bank University (LSBU) is a newly formed academic college, launched in January following the university's recent reorganisation. Led by Executive Dean Professor Chris Harty, CTE brings together four schools: Architecture & Planning, Construction, Property & Surveying, Engineering & Design, and Computer Science & Digital Technologies. The college fosters a collaborative and interdisciplinary environment, addressing the complex challenges of the built and digital environments. CTE strongly emphasises research, with doctoral students playing a key role in shaping and contributing to the college's research agenda. CTE prepares students to become future leaders through innovation, industry partnerships, and a commitment to sustainability. With a focus on real-world impact and academic excellence, the college is set to drive forward LSBU's vision of delivering applied knowledge that transforms lives and communities locally and globally. The university has five centres, and any academic staff and students in the college can join. These research centres are described below.

About the Bioscience and Bioengineering (BB) Research Centre

The Bioscience and Bioengineering Research Centre advances understanding of health and disease through biological research and innovative technologies. Our interdisciplinary team focuses on improving diagnostics, treatments, and patient management across healthcare settings. Areas of expertise include cancer biology, bioinformatics, pharmacokinetics/pharmacodynamics, microwave and ultrasound sensing, and image analysis. We also explore human biomechanics and the mechanical properties of muscle and tendon in both healthy and diseased states. By integrating science and engineering, we strive to translate cutting-edge research into real-world healthcare improvements that benefit patients and practitioners alike.

About the Building Future Communities (BFC) Research Centre

The Building Future Communities Research Centre supports inclusive, participatory research on real-world transformation and social justice. We work collaboratively with diverse stakeholders—charities, community groups, local authorities, and more—to co-create research with impact. Using an intersectional approach, our work spans funded research, enterprise, consultancy, and researcher development. BFC is a creative and unifying umbrella for projects prioritising community voice and engagement. Our goal is to drive positive change through research that reflects and responds to the needs and experiences of communities, with a clear commitment to inclusion, equity, and collaborative practice.

About the Digital x Data (DD) Research Centre

Digital x Data Research Centre is a university-wide interdisciplinary research centre exploring the impact and potential of digitalisation and datafication. We focus on cutting-edge AI and data science developments, addressing opportunities and challenges through a responsible, explainable, and sustainable lens. Rooted in LSBU's commitment to social justice, our research fosters equity by integrating science, technology, the arts, and the humanities. We drive innovation through applied research and strong partnerships with industry, academia, and the public sector and ensure that our work delivers real-world, transformative outcomes. Our approach is collaborative and future-facing, aiming to inform policy, practice, and public understanding.

About the Energy, Materials and Environment (EME) Research Centre

The Energy, Materials and Environment Research Centre leads interdisciplinary research on sustainable energy systems and material innovation. We address climate change by developing whole energy systems, spanning generation, storage, distribution, and consumption. Our research draws from materials engineering, policy, and societal impact to understand and influence the complex relationships between energy, economy, and society. With expertise in multiscale systems and cross-sector collaboration, we aim to shape policy and technology that supports the transition to a low-carbon future. Our work informs sustainable development strategies that balance environmental, economic, and social needs across local and global contexts.

About the Health and Wellbeing (HW) Research Centre

The Health and Wellbeing Research Centre promotes understanding how to protect and enhance health and wellbeing across all life stages. We focus on underserved populations and the services and professionals supporting them. Our research, grounded in social justice and inclusion, aims to reduce inequalities and improve outcomes through knowledge mobilisation and real-world application. Collaborating with academics across disciplines and health and social care partners, we explore lived experiences, service delivery, and workforce development. Our work informs policies and practices that support more effective, inclusive, and responsive health and social care systems.
For Enquiry

Contact Person

Before applying, please contact the main supervisor, Alex Paurine**,** an Assoc. Professor at the School of Engineering and Desing, College of Technology and Environment.

E-mail: paurina2@lsbu.ac.uk
Phone: N/A

In your email, include:

- Details of your current level of study and academic background.
- A summary of any relevant experience.
- A brief paragraph about your motivation for pursuing this PhD project.

Fee Waiver

The fee waiver is available for 4 years (48 months), including the writing-up year, examination period, and submission of the corrected thesis.

How to apply

Applications should be submitted via the programme page using the links below:

https://www.lsbu.ac.uk/study/course-finder/engineering-built-environment-phd

You should upload the problem statement, qualifications, CV, and other relevant documentation to the application portal. Remember to state the correct reference number and the appropriate supervisor.