Project Reference: CTE_PGR_ME_25_26_017

About the Project

This is an exciting 3-year PhD opportunity within the College of Technology and Environment (CTE) at London South Bank University (LSBU). Beginning in September 2025, the successful candidate will receive a tuition fee waiver and an annual tax-free 3-year stipend set at the UKRI rate for the project's duration.

Project Title

Impact of raising frozen food temperature by 3°C on cold chain sustainability

Project Overview

The frozen food supply chain is critical to global food security, ensuring long-term food storage while reducing waste. The industry-standard storage temperature for frozen food is -18°C or lower. However, increasing the temperature by 3°C to -15°C could lead to substantial energy savings and reduced carbon emissions across the cold chain. Despite this potential, the impact of such a shift on food quality remains poorly understood, particularly in terms of food quality and carbon emissions.
This PhD builds on the Three Degrees of Change study, an international research initiative led by LSBU and the International Institute of Refrigeration. The study assessed the feasibility of increasing frozen food temperatures to improve sustainability. It highlighted the potential for significant energy savings without compromising food safety, but identified the need for further research on food quality implications.

This PhD project will assess the feasibility of raising frozen food storage temperatures by:

- Quantifying potential energy and carbon savings across the UK frozen food cold chain, considering storage, transport, and retail operations.
- Assessing the impact on food quality, including nutrient degradation (e.g., vitamin C retention).
- Identifying operational challenges and industry-wide implications, such as effects on product shelf life, packaging, regulatory compliance, and consumer acceptance, to support potential policy and industry adoption of a -15°C standard.

This research is highly relevant to sustainability and net-zero goals, supporting UK government targets for carbon reduction in the food sector. The study aligns with industry interests, with the Cold Chain Federation and British Frozen Food Federation actively exploring this transition. Findings from this research could contribute to policy and improved industry practices.

Who Are We Looking For?

- 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.
- Applicants must be of outstanding academic merit. They should have (or be expected to gain) a first-class or an upper second-class Honours degree (or the international equivalent), or an MSc/MRes with distinction. Enthusiastic and self-motivated candidates from all countries with a background in either Mechanical, Chemical, Energy Engineering or Food Sciences or a related discipline are encouraged to apply.

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, science, or food science.
- Technical Knowledge and Experience - Evidence of interest and experience in sustainable food cold chains and energy analysis, with knowledge of thermodynamics, heat transfer, and modelling. Experience with refrigeration systems and their operation would be an advantage.
- Understanding of food quality and methods to assess quality attributes.

- Research and Analytical Skills - Ability to research subjects using libraries, the internet, and other information resources.
- 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 (e.g., EES, MATLAB, TRNSYS, EnergyPlus).
- Communication Skills - Ability to communicate visually, in writing, and verbally the outcomes of the work 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. Doctoral 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.

For Enquiry

Before applying, please get in touch with the main supervisor, **Dr Catarina Marques**, Senior Research Fellow at the School of Engineering and Design at the College of Technology and Environment.

E-mail: **catarina.marques@lsbu.ac.uk**

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.

Funding

Standard stipend £21,622 p.a. 2025/26 rates (this includes London Weighting); full home or O/S tuition fees (as applicable); funding is available for 3 years (36 months). Your fourth writing-up year will not be funded, but you will receive a fee waiver.

How to apply

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

https://www.lsbu.ac.uk/study/course-finder/mechanical-engineering-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 relevant supervisor.