Project Reference: **CTE_BBRC_Harput_002_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

Image Acquisition and Interpretation for Point of Care Ultrasound (POC-US) using Artificial Intelligence

Project Overview

Aim: To develop a technology that will work with existing ultrasound scanners and help non-experts perform medical ultrasound scans in point-of-care settings. This technology will be used for routine checks (e.g. to assess diabetic foot), to identify suspicious regions (e.g. tumour), to assess organ damage post-illness or post-infection, and for treatment monitoring.

Background: The ambition project will establish a 'patient-centric' technology that enables medical diagnosis and treatment monitoring closer to home while facilitating healthcare decarbonisation. The research team is collaborating with the Central London Community Healthcare NHS Trust to implement and test this technology by district nurses and physician associates within patients' homes or in local community spaces.

Project Objectives:

- **Image Capture:** An automated algorithm to select the correct imaging settings to maximize image quality. Developed software will provide visual feedback to the user to improve acquisition via colour-coded segmentation of relevant regions (carotid, liver, muscle or fluid). Process experimental data (signal processing and statistical analysis) to evaluate the therapeutic efficacy under different conditions.
- **Quantitative measurements:** Ultrasound images and videos will be analysed to provide quantitative measures of interest, e.g. Doppler based blood flow assessment, or size of inflammation region, or dimension of the synovial space.
- **Real-Time Guidance:** A short realistic training video for non-experts to understand anatomy for a specific application and provide the basics of ultrasound scanning without needing direct supervision from a trained professional. AI-powered virtual assistants will provide step-by-step instructions and feedback on probe placement, angle, and movement to acquire the best possible images.

PhD Outcomes:

- gain experience in artificial intelligence and image processing techniques;
- understand ultrasound imaging;
- develop experimental skills using ultrasound systems;
- present the findings of the project in international conferences;
- perform high-quality research and publish it as journal articles.

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.
- Previous research experience in electronic engineering, computer sciences, and/or data/signal processing is essential.
- A keen interest in biomedical sciences and healthcare technologies is highly desirable.
- Knowledge and experience in machine learning, artificial intelligence, ultrasound imaging, signal processing, statistics, and/or programming would be advantageous.

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.

Contact Person

Before applying, please contact the main supervisor, **Sevan Harput,** an Associate Professor in Electrical and Electronic Engineering at the College of Technology and Environment.
email: harputs@lsbu.ac.uk
url: https://sevanharput.github.io/

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 one of the links below:
https://www.lsbu.ac.uk/study/course-finder/general-engineering-phd
https://www.lsbu.ac.uk/study/course-finder/electronic-electrical-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 appropriate supervisor.