

## PhD Scholarship in Dual-modality cancer therapy with ultrasound and microwaves using nanodroplets

The aim of this research project is to develop a **novel therapeutic method by combining ultrasound and microwave imaging modalities to activate nanodroplets**. Microwave imaging is an emerging technology that shows potential for healthcare diagnostic applications and therapy particularly for brain and breast cancer detection. Ultrasound on the other hand is a well-established method in the clinic, but the use of nanodroplets with ultrasound is only demonstrated in research settings. This project will employ both of these modalities and use nanodroplets as therapeutic agents for the treatment of brain and breast tumours. The effect of ultrasound and microwaves has not been demonstrated for simultaneous activation and imaging of nanodroplets.

### Project Objectives:

- Construct an experimental measurement setup to perform ultrasonic and microwave measurements with nanodroplets
- Process experimental data (signal processing and statistical analysis) to evaluate the therapeutic efficacy under different conditions
- Develop an imaging method to monitor nanodroplets activation using the existing ultrasound and microwave imaging equipment.

The PhD project will focus on characterization of novel therapeutic nanodroplets using ultrasound and microwaves. You will work closely with the Prof Thanou's research team at King's College London, who are developing the nanodroplets.

**PhD Outcomes:** The outcomes of this project for the PhD candidate are:

- understand ultrasound and microwave imaging;
- develop experimental skills using high-frame rate ultrasound system and microwave equipment;
- gain experience in signal and image processing techniques;
- present the findings of the project in international conferences
- perform high-quality research and publish it as journal articles

This will be a 3.5-year fully funded studentship for UK/EU and overseas applicants who are keen to conduct research in ultrasound and microwave imaging at LSBU.

**Supervisory Team:** The successful applicant will be working Dr Sevan Harput (<https://scholar.google.co.uk/citations?user=oe12ZHcAAAAJ&hl=en>) (<https://sevanharput.github.io/>) and Prof Mohammad Ghavami (<https://scholar.google.co.uk/citations?user=dYyMtnMAAAJ>) at the BioEngineering Research Centre.

**Requirements:** Applicants must be of outstanding academic merit and should have (or be expected to gain) either a first-class or an upper second-class Honours degree (or equivalent), or an MSc/MRes with distinction. Enthusiastic and self-motivated candidates from all countries with a background in Engineering, Physics or Mathematics are encouraged to apply.

A good knowledge and experience in ultrasound imaging, microwave technology, signal processing, statistics, and/or programming would be advantageous.

This PhD is a School of Engineering Bursary covering fees and a £18k stipend per annum for three years. As part of the candidate's academic development, the bursary agreement includes that the successful PhD candidate engages in 4 hours per week student contact time, comprising lab class assistance and extracurricular activity development. If you have any informal query please email the supervision team directly. We encourage applications from underrepresented groups.

Enquiries should be directed to Dr Harput ([harputs@lsbu.ac.uk](mailto:harputs@lsbu.ac.uk)). Please send a copy of your CV and a cover letter.