

Physics-based: Improving early cancer detection with hyperspectral endoscopy

About us

The mission of the VISIONLab in Cambridge is to advance our understanding of tumour evolution using next-generation imaging sciences. We are particularly interested in using non-invasive imaging to provides insights into tumour oxygenation and metabolism.

Project description

Hyperspectral imaging (HSI) captures both spatial and spectral information from a scene, enabling the chemical composition of objects within the field of view to be determined. When applied in endoscopic imaging, we have shown that hyperspectral imaging is able to discern early-stage cancer from surrounding healthy or inflamed tissues in a diagnostic setting. HSI also has potential to be applied to augment surgical guidance, to improve resection margins and maintain normal tissue health during surgery.

This PhD project will focus on the development of advanced multispectral imaging tools for application in cancer diagnosis and surgical resection. These tools will be applied to tissue mimicking phantoms, live cells in culture as well as excised tissues from patient samples, giving the student the opportunity to interact with biological and clinical collaborators, seeing their efforts transition from bench to bedside. The student will have the opportunity to work across multiple research environments and departments, with potential for research visits to other centres of excellence in hyperspectral imaging.

Desirable qualifications and skills

We are seeking a PhD candidate with a 1st class honours degree (held or predicted) in Physics or related discipline. We strongly value a candidate with the desire to learn, create and innovate. The project will combine experimental optics with simulation, computational image analysis and statistics. Full training will be provided in all areas. Additional relevant skills include: excellent oral and written communication skills; strong team working skills; an ability to take initiative to solve problems; strong motivation in driving projects forward; and a significant critical thinking capability. Examples of any past experience that demonstrates these characteristics should be highlighted in the cover letter that accompanies any application. We expect the candidate will develop into an independent experimental researcher and will present their work in academic journals, as well as at conferences.

Candidates with previous experience of optics, for example during a Masters or Diploma degree, are particularly encouraged to apply.

Further information

This PhD project is available for candidates who are able to secure competitive funding to be hosted within the laboratory. Questions related to suitability of candidate experience or support for funding applications should be made to Dr Sarah Bohndiek (seb53@cam.ac.uk) with the subject line "HSI PhD 2022" before the application to the University is completed.