



Next generation nano-photonic biosensors for early diagnosis of cancers

School: School of Science and Technology
Study mode(s): Full-time
Starting: 2025
Funding: UK student / Fully-funded

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Overview

Project ID: DTC_10 Theme: Health Innovation

One of the 21st century's main challenges is human health. For healthy ageing and improved patient outcomes we need to detect cancer earlier to provide the best opportunity for successful treatment options. Pancreatic cancer (PC), in particular, is often diagnosed at late stage. As one of the deadliest cancers, PC is the third-leading cause of cancer-related mortality worldwide, with its incidence increasing. For PC the average 5-year survival is 5-10% and worse for distal disease with only 1% survival over 3 years. Earlier diagnosis based on multimodal detections can enable more effective surgery and subsequently improved survival. However, current approaches are laborious, costly, time-consuming and difficult to identify small lesions. There is an urgent need for rapid, highly sensitive, and reliable approaches to overcome those drawbacks. Recently, two-dimensional (2D) nanomaterials integrated photonics technologies have attracted enormous attention due to their distinctive properties, such as their nanometre-scale footprints, ultralow energy consumption, and broad/ultrafast response. The nanophotonics have been recently explored as a new platform for building next generation biosensors.

This project aims to exploit new emerging opportunities with the integration of photonic technologies and 2D materials to develop highly sensitive, rapid and label-free biosensors for early diagnosis of cancers. The specific research objectives include (1) Using cutting-edge technologies for the fabrication of novel photonic devices; (2) Creating bio-nano-photonic configurations with enhanced light-matter interaction; (3) Exploring pre-clinical/clinical early diagnosis of cancers.

We will achieve the aims and objectives by naturally integrating the multidisciplinary innovative research (in physics, materials, chemistry, nanotech, biology). This project will provide excellent multidisciplinary training, incubating a new generation of young researcher in key enabling technologies with solid knowledge and skills in fundamental, experimental and applied research. The PhD candidate will work with a unique multidisciplinary supervisory team, including DoS (bio-nano-photonics) and 3 co-supervisors (experts in chemistry, materials, cancer cell and molecular biology), with three well-designed research work packages, and with access to world-class research centres and facilities in NTU.

Supervisory team

<u>Xianfeng Chen</u>

Amanda Coutts

Carole Perry

Lesley Hoyles

Staff profiles



Entry qualifications

Please see our <u>applications page</u> for guidance and eligibility criteria.

How to apply

Please see our applications page for guidance and eligibility criteria. The closing date for applications is Friday 14 February 2025.

The NTU Doctoral School continues to build an inclusive culture that encourages, supports and celebrates the diverse voices and experiences of our researchers. We welcome the unique contributions that you can bring and we encourage people from underrepresented communities and backgrounds to apply for a studentship.

Fees and funding

This is a fully funded PhD studentship opportunity, open for UK applicants.

Guidance and support

Find out more about Nottingham Trent University's fully funded PhD studentships.

Find out about guidance and support for PhD students.

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Teaching Excellence Framework



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enquiries@ntu.ac.uk

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Lines are open: Monday – Thursday 8.30 am – 5 pm Friday 8.30 am – 4.30 pm

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