## Optics and Photonics Group
## Lunchtime Seminar

# "Future improvements in Breast cancer diagnostics: The Case for Deep Raman spectroscopy"

## Dr Adrian Ghita
*University of Hertfordshire*



## 13:30 Wednesday 3 May 2023
## Coates Building - C24
## All Welcome

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# "Future improvements in Breast cancer diagnostics: The Case for Deep Raman spectroscopy"

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MS Teams link

Breast cancer is currently the one of leading type of cancer globally, comprising 11.7% of new cancer cases diagnosed in 2020. While various imaging methods such as X mammography, ultrasound, MRI, and PET are used for detecting and clinically managing breast cancer, they are limited in their ability to provide information about the chemical nature of the malignancy. Thus, additional excisional biopsy and histopathological assessment are necessary for a definitive diagnosis. To address this issue, non-invasive biopsies based on optical methods are being explored as complementary tool for medical diagnosis. This research aims to develop a non-invasive Raman spectroscopy approach to probe the composition of inorganic chemicals buried deep within biological samples, including breast tissue. The method is based on Transmission Raman Spectroscopy (TRS) and allows for chemical-specific detection of molecules within a large sampling volume. The study aims to demonstrate the ability of deep Raman spectroscopy to non-invasively expose changes in molecular markers within biological tissues at depths of centimeters. The research focuses on detecting specific molecular markers such as calcium hydroxyapatite and calcium oxalate, which are observed in breast calcifications, as well as water content that accumulates in large amounts during cancerous tumor development. The chemical composition of breast calcifications and water content reflects the pathology of the surrounding tissue, whether it is malignant or benign, and potentially the grade of malignancy. The proposed method can provide more detailed and accurate information about the composition of breast tissue, leading to improvements in diagnosis, and treatment of the breast cancer.