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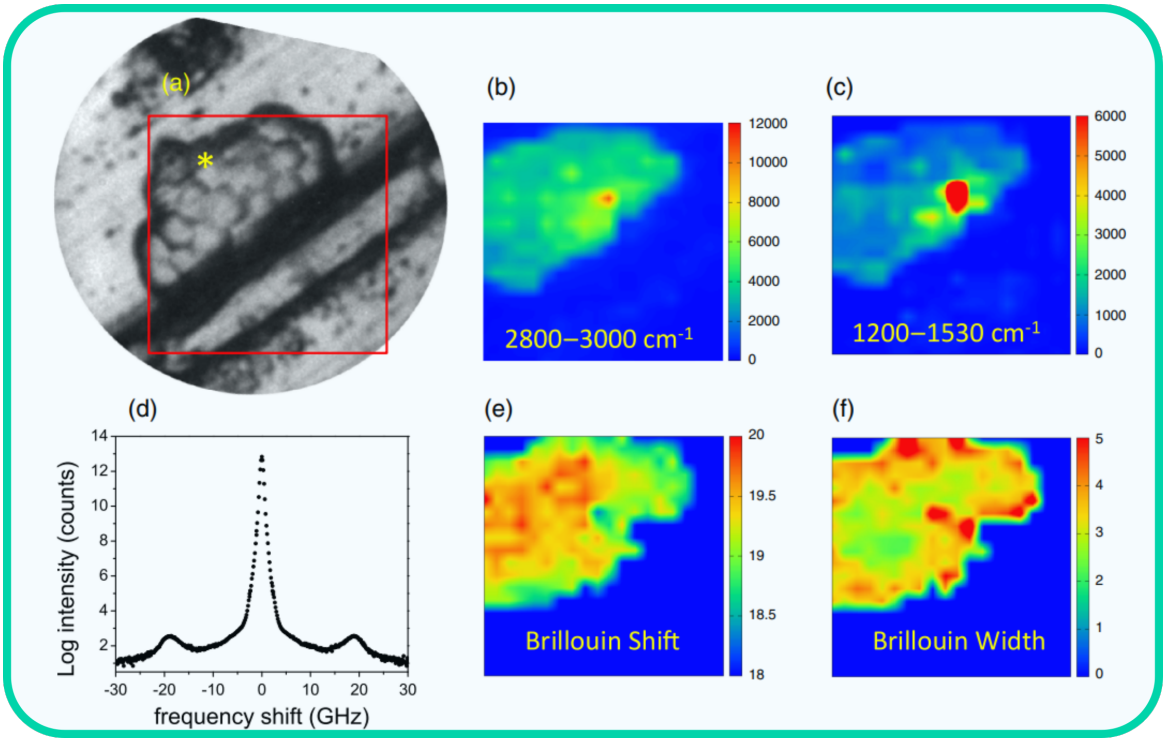
OPTICS & PHOTONICS
UNIVERSITY OF NOTTINGHAM

# Optics and Photonics Group Lunchtime Seminar

# "Brillouin microscopy to probe viscoelastic properties of tissues in health and disease"


## Prof Francesca Palombo

*University of Exeter*


13:30 Wednesday 30 November 2022
C24 - Coates Building
All Welcome

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# "Brillouin microscopy to probe viscoelastic properties of tissues in health and disease"

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MS Teams link

Mechanical properties of live cells and tissues are often determinants of their biological function and impairments in these properties can lead to complications in diseases such as osteoarthritis and atherosclerosis. Mechanics in living systems have a spatio-temporal gradient in that biological matter is viscoelastic, hence measurements performed at different frequencies can lead to remarkably different scales of the properties investigated. In addition, there are different types of elastic moduli which quantify these properties, the most common ones being the Young's, bulk and shear moduli.

Imaging mechanical properties in a contactless, depth- and spatially resolved manner with micro-scale resolution is important to understand the inner working of biological systems. For instance, native tissues need to be preserved in their 3D environment for accurate mechanical testing. Brillouin micro-spectroscopy lends itself well for this type of investigations, since it probes viscoelastic properties on a microscale without the need for an external load, transducer or label applied to the specimen of interest. A sister technique to Raman spectroscopy, Brillouin spectroscopy is based on the interaction of light with thermally induced acoustic phonons which, by propagating inside a material, sense its viscous and elastic properties providing a complementary approach to chemical analysis.

This talk will cover the fundamentals of Brillouin microscopy and its application in biomedical sciences for tissue imaging in health and disease, a key priority of Exeter BioSpec team's research in last decade. Emphasis will be put on the strengths of the method in investigating the effects of hydration, phase transition and structural anisotropy in model and real tissues, and the importance of a correlative approach with complementary techniques such as Raman or infrared spectroscopy for quantitative analysis.