



Thursday, February 25, 2021

3:30 PM-4:00 PM

Oxford Instruments NanoAnalysis

Multi-Colour Electron Microscopy: Using Energy Dispersive X-ray Spectrometry to Image and Analyse Biological Samples

The visualisation and analysis of life science samples has been a challenge throughout the history of electron microscopy. Biological sample preparation and the absence or addition of contrasting agents often play a key role in the development of imaging methodology. But the signals generated in an electron microscope are mostly underutilised by biologists. While energy dispersive x-ray spectrometry (EDS) has been used in materials science for many decades, sample stability and detector sensitivity have prevented a broader adoption in life sciences until recently [1]. Multi-colour electron microscopy (MCEM) combines elemental information about samples produced using EDS with ultrastructural electron data, providing a powerful and informative imaging technique [2].

MCEM addresses key research topics for the biological electron microscopist. What is it, where is it and how much? Using examples from biomedical research, animal cells and tissues, and plant cell biology, this talk will demonstrate how the addition of elemental maps to electron images contributes key information that could be used for a variety of biological imaging applications, such as region of interest profiling or automated segmentation of volumetric data). EDS is not only a powerful imaging tool, providing accurate identification of stains, labels, and ultrastructural features, but it can also be used to conduct analysis on the relative quantities of a wide range of elements, providing compositional data on native elements and exogenous features.

Speaker

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[1] Pirozzi, N.M., Hoogenboom, J.P. and Giepmans, B.N., 2018. ColorEM: analytical electron microscopy for element-guided identification and imaging of the building blocks of life. *Histochemistry and cell biology*, 150(5), pp.509-520.

[2] Scotuzzi, M., Kuipers, J., Wensveen, D.I., De Boer, P., Hoogenboom, J.P. and Giepmans, B.N., 2017. Multi-color electron microscopy by element-guided identification of cells, organelles and molecules. *Scientific reports*, 7(1), pp.1-8.