

LECTURES_{at the} LEADING EDGE

Chemical Engineering & Applied Chemistry
University of Toronto

IAN GILMORE

National Physical Laboratory (UK)

METABOLIC IMAGING AT THE SINGLE-CELL SCALE: RECENT ADVANCES AND FUTURE CHALLENGES IN MASS SPECTROMETRY IMAGING

Super-resolution optical microscopy using fluorescent labels has been transformational in allowing the machinery of life, e.g. proteins, to be seen at the nanoscale. There is a great desire in the life-sciences to achieve this level of insight for metabolites. This will allow unprecedented ability to understand rewiring of metabolic networks involved in disease, understanding of the uptake of drugs in cells and construct mechanistic understanding in fundamental biology. However, this is a monumental challenge since fluorescent labelling strategies cannot be used because of the dynamic processes in the creation of metabolites and because the fluorescent labels themselves radically alter the chemistry of the metabolite.

For imaging at the organelle scale, e.g. mitochondria and lysosomes, then a resolution of 50 nm or better is needed. This is achieved with the CAMECA NanoSIMS 50L. Normally, the solvent based sample preparation procedures used wash out drug molecules. We have developed a method that traps molecules within the organelles and use this to demonstrate the first direct evidence of drug induced phospholipidosis caused by amiodarone uptake in rat alveolar macrophages.

WEDNESDAY, MARCH 20, 2019 | 12:00 PM - 1:00 PM
ROOM 116 | WALLBERG BUILDING | 200 COLLEGE STREET

IAN GILMORE is a Senior NPL Fellow in Surface & Nanoanalysis and a Visiting Professor in the School of Pharmacy at the University of Nottingham. His research focus is on the analysis of molecules at surfaces and interfaces in a wide range of sciences, including the intracellular distribution of pharmaceuticals, drug delivery systems, medical devices, organic electronics and devices using 2D materials.

Ian is a Fellow of the Institute of Physics (UK) and was awarded the Institute's Paterson Medal (2004) for his innovation of G-SIMS. He is a Fellow of the American Vacuum Society, a major science and technology society in the USA, and served on the Board of Directors in 2013-14 where he led the development of the Society's strategy.

Ian has made a major contribution to international leadership in surface analysis, recognised by the Rivière Prize in 2013 from the UK Surface Analysis Forum. He is chair of the International SIMS conference series and is chairing a Royal Society Scientific Meeting on Mass Spectrometry Imaging in 2015. He has previously successfully co-chaired the SIMS XV international conference (Manchester, 2005) and chaired the IUVSTA workshop on sputtering and ion emission by cluster ion beams (Scotland, 2007).



For more info about this series: UOFT.ME/LLE2018-19