

MONASH CENTRE FOR ELECTRON MICROSCOPY

Medicine at the nanoscale: multi-dimensional electron diffraction of pharmaceuticals

Date: Friday, 17th October 2025

Time: 11:00 – 12:00PM

Venue: Large Seminar Room, Physics
Room 107, 10 College Walk, Monash Clayton Campus

Abstract

3D electron diffraction (3D-ED, also known as MicroED) techniques can be used for crystal structure determination, circumventing challenges posed to conventional X-ray diffraction techniques, such as sub-micron sized crystals. In parallel, 4D Scanning Transmission Electron Microscopy (4D-STEM) can be used to investigate sub-crystal microstructure. In this talk, we discuss the combined potential of these acquisition modalities as powerful tools applied to pharmaceutical materials systems. Together, these techniques can elucidate crystal structures and reveal the nature of defects in beam-sensitive small organic molecule compounds. Given the increasing focus on nanoengineering in the next generation of medicines, access to this spatially resolved structural information at the nanoscale will become crucial in managing pharmaceutical properties.



Helen W. Leung,

University of Cambridge

Biography

Helen completed her PhD with Prof. Paul Midgley in the Department of Materials Science and Metallurgy at the University of Cambridge, alongside her industrial sponsors, GSK. She works on the application of multi-modal electron and X-ray diffraction techniques to materials of pharmaceutical interest. She holds a Materials Science (MEng) degree with first class honours from the University of Oxford, where in her final year, she worked on developing convolutional neural networks for image analysis in electron micrographs under Prof. Angus Kirkland. Helen is interested in the role that characterisation techniques will play in the development of new nano-engineered drug modalities, and more broadly, how these technologies will support the era of precision medicine.

Convener: Dr Amelia Liu

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