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Nanoscale Organisation  
and Dynamics Group

**Correlative Light and Electron Microscopy (CLEM) for translational  
biomedical research**

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for Applied Medical Research, Liverpool NSW**

**Abstract**

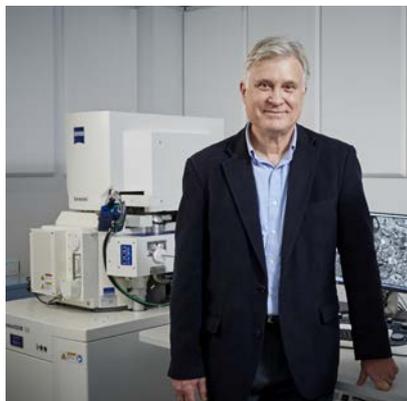
Correlative light and electron microscopy (CLEM) enables simultaneous recognition of structure and function at the organelle level within single cells. The present work explores use of the “correlation microscopy paradigm” for studies in disease pathogenesis that can yield translational outcomes to improve patient care and quality of life. The methodology used is based on combining multimodal functional probes with ultrastructure in a single sample to allow assessment of spatial distribution, abundance, frequency of protein biomarkers and rare events at single molecule resolution. Many novel applications for this technology with significant translational potential have now been established.

(i) Diagnostic pathology; new test assays are now possible from a single preparation where previously multiple samples were required. This efficiency will allow smaller biopsy samples and less invasive clinical procedures. (ii) Phenotype/genotype studies in molecular genetics for enhanced relevance and contextual information for bioinformatics data. (iii) Precision cancer medicine; patient derived primary tumour cells maintained in the laboratory for drug sensitivity, resistance testing and biomarker assays.

(iv) Clinical imaging; multiscale CLEM studies spanning the whole organ scale to build 3D volumes for overlay on MRI slices and volumes. Correlative microscopy imaging is a synergistic approach for new insights into disease pathogenesis. Linkage of patient clinical data with pathology correlative data provides unprecedented understanding of disease progression and yields significant opportunities for translational impact and intellectual property development.

**Profile**

Murray Killingsworth is Principal Scientist of the Electron Microscopy Laboratory, New South Wales Health Pathology, Liverpool NSW. He is a Conjoint Associate Professor in the School of Medicine, Western Sydney University and the South Western Sydney Clinical School of the University of New South Wales. Murray obtained his PhD in 1989 based on ultrastructural studies of ageing and degeneration of the human retina. His postdoctoral studies with the Sarks Retinal Research Group contributed to defining the role of chronic inflammation and choroidal angiogenesis in age-related macular degeneration (AMD). In 2010 Murray was awarded a Founding Fellowship of the Faculty of Science in the Royal College of Pathologists of Australasia. He has pioneered the use of nanoparticles in correlative light and electron microscopy (CLEM) studies of cell function in human pathology tissue. He is currently Clinical Sciences Stream Leader and head of the new Correlative Microscopy Facility at the Ingham Institute for Applied Medical Research.



**Staff and students at all levels are welcome to attend.**

**Venue and Time:**

This talk will be held on Friday 20 September at 11 am at the Campbelltown Campus in Building 21, Lecture Theatre 6 (CA.21.G.18). Also via **Zoom:** <https://uws.zoom.us/j/443803149>

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