School of Medical Sciences Seminar Series

Wednesday 5th of August 2020

3:00 – 4:00pm on Microsoft Teams

We ask all attendees to mute and turn off their video

Professor Ewa Goldys

"Big data and hyperspectral imaging uncover hidden regularities of native colours and patterns in cells and tissues"

Bio: Professor Ewa M. Goldys is Deputy Director of the Australian Research Council Centre of Excellence in Nanoscale Biophotonics (cnbp.org.au) and Professor at the Graduate School of Biomedical Engineering, the University of New South Wales, Sydney, Australia. She is Fellow of SPIE, OSA, the Australian Academy of Technological Science and Engineering (ATSE), and winner of the 2016 Australian Museum Eureka Prize for 'Innovative Use of Technology'. She has ongoing involvement with SPIE BIOS, the world's largest international biomedical optics meeting and part of SPIE's Photonics West where she serves as one of six Track Chairs. Her research spans the area of biomedical science, bioimaging, biosensing and materials science. She developed novel approaches to biochemical and medical sensing and deployable medical diagnostics. Current projects focus on non-invasive high content imaging of colours and patterns in cells and tissues

Talk: The Australian Research Council Centre of Excellence for Nanoscale Biophotonics draws on key advances of the 21st century, nanoscience, and photonics to help understand life at the molecular level. I will discuss next-generation technologies developed in our Centre for probing, imaging and interacting with the living systems. These address the key challenges of ultrasensitive detection of key analytes in real complex environments and molecular complexity, and they support both novel therapies and diagnostics. By retooling a microscope with modern light emitting diodes and powerful software, we have been able to exploit a commonly ignored trait inherent to all cells: their individual colour expression and its patterns. The hyperspectral imaging technique pioneered by our team allows precise quantification of the native fluorescent colour of cells and tissues. Through this approach, and by using the "big data" approach and the high processing speeds of modern computers, we are now able to non-invasively image aspects of biomolecular composition of cells and tissues including those relevant to metabolism. Biomolecules such as NADH, flavins, retinoids, cytochrome C and many others can now be non-invasively monitored. As metabolic dysregulation is common across the spectrum of diseases, this next-generation methodology has impact across a broad range of biomedical scenarios, including diagnostics of various health conditions such as neurodegeneration and cancer. I will provide further examples from the area of reproductive medicine and ophthalmology, as well as fundamental biological science. Our approaches yield real-world translational outcomes that will support clinicians in making improved diagnoses and health decisions for patients. We seek partnerships with industry to help create innovative technology platforms that add value to society.

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