

Room. SA106.
Date. 5th March 2020.
Time 1pm.

Title. Soft Wet X-rays for 3D Biological Cell Imaging

Speaker. Fergal O'Reilly (UCD).

Abstract. Biological cells are 3D micro-machines with nano-cogs that demonstrate massive complexity, of which scientists are only beginning to scratch the surface. Soft x-ray imaging techniques have been developed which provide 3D nano absorption maps of cells, which complement the incomplete information available from fluorescence and electron microscopies, but these are so far restricted to large synchrotron facilities. In this talk I will outline the development at UCD/SiriusXT of a benchtop laser plasma based soft x-ray source with an average brilliance comparable to a synchrotron bending magnet, and the cryo-soft x-ray cell imaging microscope which it illuminates as a first application.

Bio. Fergal O'Reilly is currently the Research and Innovation Officer in the UCD School of Physics and has been a researcher at UCD since 2005. His research forms part of a deep ongoing collaboration with Pdraig Dunne, Emma Sokell, Tom McCormack, Paddy Hayden and Gerry O'Sullivan, in the Atomic, Molecular and Plasma Physics (Spectroscopy) Group. He completed his PhD in VUV/soft x-ray spectroscopy in the UCD Spectroscopy Group, supervised by Gerry and Pdraig, and then spent 6 years working in two university spin out companies as a development scientist. His research expertise is in the area of soft x-rays, EUV optics and source development and his outputs to date include 5 granted patents. Two patents on liquid optics that he invented were licensed to SiriusXT, which he co-founded in 2015 with Dr Kenneth Fahy, Dr Paul Sheridan and Tony McEnroe. SiriusXT has created the first commercial, laboratory-based, soft x-ray microscope which can produce high resolution 3D images of cells and tissue that cannot be produced any other way. The microscopes are being marketed primarily to researchers working in disease research and drug discovery. The company has secured over €5 million in funding to date, and there are currently 13 full time scientists and engineers working on product development and marketing in the SiriusXT Sandyford HQ.