Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

TRINITY CENTRE FOR BIOENGINEERING SEMINAR SERIES 2019

Optical elastography – imaging the micro-scale mechanical properties of tissue

Speaker: **Dr Brendan Kennedy**
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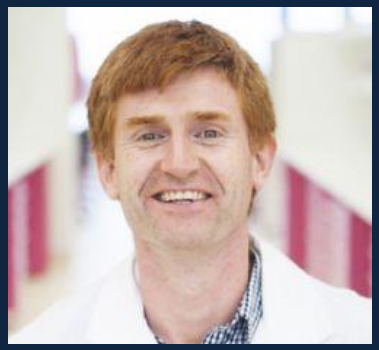
Senior Research Fellow, School of Engineering, The University of Western Australia
Chief Scientific Officer, OncoRes Medical
When: **4pm on Tuesday 16th of April 2019**
Where: **B2.72-B2.74, Trinity Biomedical Sciences Institute**

As the importance of mechanical properties in the origin and progression of disease becomes ever clearer, new elastography tools are required to probe the mechanical properties on the micro-scale, intermediate between that of cells and tissues.
Elastography and related methods have been developed for a wide range of spatial scales, from the cellular, for example, using atomic force microscopy, through to the whole organ, using ultrasound elastography and magnetic resonance elastography. However, existing techniques are not capable of probing tissue mechanical properties on the intermediate micro- to milli-scale: a scale critical in the onset and progression of many diseases. Optical coherence elastography (OCE) aims to bridge the scale gap in elastography techniques. Through the utilization of optical coherence tomography (OCT) to measure tissue motion, OCE is endowed with spatial resolution as high as 1-10 mm, much higher than is possible using ultrasound or magnetic resonance imaging, and a sensitivity to tissue displacements on the nanometer-scale, providing the prospect to detect much finer changes in mechanical properties.
In this seminar, I will provide perspectives on emerging OCE techniques and, in particular, focus on our work at The University of Western Australia. I will focus on our group's efforts to apply OCE to tumour margin assessment in breast cancer; the development of handheld OCE probes for in vivo imaging; methods we have developed to quantify tissue elasticity and the development of optical coherence microscopy-based elastography for imaging cell mechanics.



Brendan Kennedy graduated with a Bachelor degree in Electronic Engineering and a PhD from Dublin City University, Ireland, in 2001 and 2006, respectively. His PhD thesis focussed on the development of all-optical signal processing for optical communication systems. From 2006-2007, he held a teaching and research position in the Electrical Engineering Department at the University of Santiago, Chile, where his research focus remained in optical communications systems. In 2008, he moved to The University of Western Australia (UWA) and began working in the area of biomedical optics. In August 2016, he created BRITElab at the Harry Perkins Institute of Medical Research and holds a joint appointment with the School of Engineering. His research interests include the development of wearable biomedical optics devices, intraoperative surgical techniques, optical elastography and the measurement of tissue and cell mechanics. In addition, Brendan is Chief Scientific Officer of OncoRes Medical, a venture capital-backed start-up company developing novel imaging tools for use during surgery. Brendan has won a number of awards including a West Australian top 40 under 40 and a West Australian Tall Poppy Award.