Paul Stoddart, Swinburne University of Technology, Australia

Bio:

Paul Stoddart graduated with BSc (Honours) in physics and PhD in laser spectroscopy from the University of the Witwatersrand, South Africa. After working on industry-focused surface science and microanalysis problems in a national lab for three years, he joined Swinburne University of Technology in 2001. He is currently the Director of Swinburne's Australian Research Council Training Centre in Biodevices, for which he received the Vice-Chancellor's Engagement Award in 2014. As a Professor of Biomedical Engineering at Swinburne, his research interests include applied optics, biophotonics and medical devices, with a particular focus in the areas of optical nerve stimulation, optical fibre sensors and Raman spectroscopy.

Presentation Title:

Pushing the Boundaries in Neuromodulation

Abstract:

Optical modulation techniques are generating increasing interest in neuroscience as a means to avoid some of the limitations of electrical stimulation. Techniques such as optogenetics and infrared neural modulation show great potential to provide more selective stimulation, higher spatial resolution and reduced invasiveness of the device, while also avoiding the electrical artefacts that complicate recordings of electrically stimulated neuronal activity. Techniques involving photoactive molecules, hybrid optical-electrical stimulation, nanoparticle enhanced modulation and optoelectric methods will also be reviewed. Despite the promise of these methods, a number of challenges remain to be overcome before they can deliver their full potential, including the development of techniques to accurately deliver the light to the target tissue.