

**IEEE Engineering in Medicine and Biology Society (EMBS)
UK and Republic of Ireland Chapter (UKRI)**

have the pleasure of inviting you to a

Special Seminar

by

Professor Bin He (EMBS President)

and

Professor Nigel Lovell (EMBS VP Conferences)

University of Glasgow ♦ Fore Hall ♦ Tuesday 15th June at 3:30pm
(Tea/Coffee from 3:00pm in the Ferguson Room at One A, The Square)

Entry is free but please register attendance with Karen Docherty, Department of EEE, University of Glasgow, Glasgow G12 8QQ. Tel: 0141 330 5977, Email: k.docherty@elec.gla.ac.uk

Functional Neuroimaging: Opportunities and Challenges
Professor Bin He (University of Minnesota at Twin Cities, USA)

Functional neuroimaging is an interdisciplinary research area bridging neuroscience, imaging science, and engineering. We will review state of the art on multimodal functional neuroimaging integrating electrophysiological and hemodynamic measurements to significantly enhance the spatio-temporal resolution of imaging brain activity. Our recent work indicates that, the event-related BOLD fMRI and electrophysiological data can be integrated in a principled way, leading to high-resolution spatio-temporal functional imaging of the dynamic brain activation. Co-localization of BOLD fMRI and electrophysiological signals associated with motor imagery in human subjects suggests the underlying neuroscience mechanisms for brain-computer interface applications. Existing grand challenges will also be discussed.

Professor Bin He is a Distinguished McKnight University Professor and Professor of Biomedical Engineering, Electrical Engineering, and Neuroscience at the University of Minnesota at Twin Cities, where he serves as the Director of Center for Neuroengineering and Director of NIH Training Program in Neuroimaging. Dr. He's major research interests include neuroengineering, functional biomedical imaging, and bioelectromagnetism. He has pioneered the development of functional electric source imaging, and made significant contributions to multimodal neuroimaging, brain-computer interface, cardiac electrical tomography, and magnetoacoustic tomography. He is the Editor of the book entitled "Neural Engineering", and serves as an associate editor or editorial board member of multiple international journals including IEEE Transactions on Biomedical Engineering, IEEE Transactions on Neural Systems and Rehabilitation Engineering, IEEE Spectrum, Journal of Neural Engineering, Clinical Neurophysiology, and Brain Topography. Dr. He was the recipient of NSF CAREER Award, American Heart Association Established Investigator Award, and is a Fellow of IEEE, American Institute of Medical and Biological Engineering, and Institute of Physics.

Wearable and Implantable Bionics: from Managing Chronic Disease to Therapies for Blindness
Professor Nigel Lovell (University of New South Wales, Australia)

The role of telemetry and communications technology will be explored in a number of medical devices developed at the Graduate School of Biomedical Engineering, University of New South Wales. Topics discussed will include clinical measurement devices used for telehealth, triaxial accelerometers for personal alarming in the elderly, and vision prostheses. A second medical device technology, a retinal neurostimulator – or so-called "bionic eye" – will also be described. Development has been carried out by a multi-disciplinary consortium named Bionic Vision Australia (BVA), and the work of the BVA towards developing a vision prosthesis will be discussed - including the general principle of operation, design challenges and potential benefits for implant recipients. Advanced materials and micro-technology research has led to a novel method of electrode array construction and feedthrough designs for safely encapsulating the custom-designed electronics that acts as the core of the device. Surgical approaches and results from experimental and human psychophysics studies will also be discussed.

Professor Nigel Lovell Nigel Lovell received the B.E. (Hons) and Ph.D. degrees from the University of New South Wales (UNSW), Sydney, Australia. He is currently Professor of Biomedical Engineering with the Graduate School of Biomedical Engineering, UNSW and holds an Adjunct Professorship in the School of Electrical Engineering and Telecommunications, UNSW. He has authored 300+ refereed journals, conference proceedings, book chapters and patents, and been awarded over \$67 million in R&D and infrastructure funding. His research work has covered areas of expertise ranging from cardiac modeling, telehealth technologies, biological signal processing, and visual prosthesis design. Through a spin-out company from UNSW, TeleMedCare Pty. Ltd., he has commercialised a range of telehealth technologies for managing chronic disease and falls in the older population.