

## KOSOMBE/IBES Plenary Talk

Advances in Health Technology and its Translation in COVID-19 Times

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As a response to the increasing burden of chronic disease and the ageing population on health care expenditure, considerable focus has been placed on appropriate technologies for promoting self-care and for supporting ageing-in-place. Such technologies are even more critical in the face of emerging health threats such as the COVID-19 pandemic. More so, the impact of COVID-19 has heralded and, in many cases, necessitated the development and introduction of remote monitoring, diagnostics and therapeutics.

A number of medical device technologies aimed at relieving the burden of disease and improving quality of life will be explored, with a particular focus on the management of cardiovascular disease. These devices were developed at the Graduate School of Biomedical Engineering (GSBmE), UNSW with co-design input from clinicians over the past two decades. They include telehealth monitoring and decision support systems for chronic disease management; wearable ambulatory technologies based around triaxial accelerometry for estimating risks of falling and for automatically detecting falls; and a range of neural interface technologies for restoring and potentially augmenting sensory loss. A variety of implantable bionic devices from bionic eyes to rotary blood pumps will also be described, focusing on aspects of the interface between the technology and the biology, be it the physiological controller in the case of rotary pumps, or the neural interface in the case of sensory prostheses. Device design has been informed by computational multi-physics modelling.

The talk will highlight the potential for convergence of implantable, wearable and telehealth technologies in holistic models of patient care and health service delivery, especially in the current global pandemic. It will also describe how a new Institute of health Engineering (IHealthE) has been established to help multidisciplinary research groups manage medical technology translation.

Bio:

Nigel Lovell received the B.E. (Hons) and Ph.D. degrees from UNSW Sydney, Australia. He is

currently at the Graduate School of Biomedical Engineering UNSW Sydney where he holds a position of Scientia Professor and Head of School. He is also inaugural Director of the Tyree Institute of health Engineering. He has authored 600+ journal papers and conference proceedings and been awarded over \$100 million in R&D funding. Over his career he has mentored 70 PhD students and delivered more than a 150 keynote presentations. He is a Fellow of seven learned academies throughout the world including the IEEE and AIMBE.

His research work has covered areas of expertise ranging from cardiac and retinal modeling, medical informatics and data analytics especially related to physiological monitoring, control of implantable heart pumps, biological signal processing, and visual prosthesis design. He has successfully commercialised a range of telehealth technologies and holds more than a dozen patents. For 2017 and 2018 he was the President of the world's largest biomedical engineering society – the IEEE Engineering in Medicine and Biology Society.

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