Bionics Institute Special Lecture

Friday May 18th, 4:00-5:00 pm

Location: Michael Chamberlin lecture theatre, Aikenhead Wing, St Vincent's Hospital Melbourne, Fitzroy. (corner Victoria Parade and Nicholson St, enter from Victoria Parade).

Registration: Limited seating available (165 people). Please register your attendance at: https://reg.eventarc.com/event/view/8485/bionics-institute-special-lecture

Professor Randolph J Nudo

Title: The role of neural reorganization in stroke rehabilitation.

Abstract: The cerebral cortex adapts to changing environmental demands throughout an individual's life. Dendrites and spines branch and proliferate, synapses form and degenerate, and the efficacy of synaptic contacts is modulated within a complex network of intracortical connections. Thus, it is not surprising that after an injury to the cerebral cortex, such as occurs in clinical stroke, the structure and function of sensory and motor regions is drastically altered. Post-injury plasticity has been documented not only at the molecular, synaptic, cellular, network and systems levels in experimental animals, but many of these events have been correlated with alterations in cortical function using various neuroimaging and stimulation techniques in humans. The field has progressed substantially since the mid-1980s when it was discovered that after peripheral nerve injury, the deprived somatosensory cortex is not silent, but instead, becomes responsive to inputs from adjoining skin fields. We are now at a point when basic phenomenology is giving way to hypotheses regarding the precise mechanisms in which motor function is re-acquired after injury. Further, new approaches to modifying post-injury plasticity are now emerging. These include device-oriented approaches that are rapidly being developed into effective treatments for post-stroke disability. We are now combining neurobiological tools with state-of-the-art implantable device technology to develop a novel electronic microsystem that will be used to build functional bridges between disconnected brain regions, potentially guiding post-injury axonal sprouting. Initial results in a rodent model of focal motor cortex injury have demonstrated rapid recovery of motor abilities using such brain-machine-brain interfaces. We anticipate that such smart prosthetic devices will be useful in optimizing recovery potential after acquired brain injuries.

Randolph Nudo is the Marion Merrell Dow Distinguished Professor in Aging and the Director of the Landon Center on Aging at the University of Kansas Medical Center in Kansas City, Kansas, USA. He is a Professor in the Department of Molecular and Integrative Physiology and adjunct professor in the Department of Physical Therapy and Rehabilitation Sciences. After receiving a doctoral degree in psychology from Florida State University, Dr. Nudo received postdoctoral training in physiology at the University of California (San Francisco). He was on the faculty of the University of Texas Health Sciences Center, Houston for 10 years, prior to joining the University of Kansas Medical Center in 1997. Dr. Nudo’s research focuses on neural mechanisms of functional recovery after stroke and traumatic brain injury. He has received numerous awards, including the Outstanding Neurorehabilitation Clinician Scientist Award by the American Society of Neurorehabilitation. His research published in Science was cited as one of the top 100 science stories of 1996 by Discovery magazine.