

Medical Bionics: Engineering interfaces to the human body

Professor Rob Shepherd, Director Bionic Ear Institute

Medical bionics is the replacement or monitoring of damaged organs through engineered devices that interface with the body to improve health outcomes. In this presentation I will concentrate on medical bionic devices designed to restore or supplement function of the nervous system lost during disease or injury.

A number of commercially available neural prostheses will be described – including the remarkably successful bionic ear and deep brain stimulation for movement control.

I will then review some of the current research performed around the world – including recent developments in brain-machine interface that will ultimately allow patients to control prosthetic limbs and wheel chairs; developments in functional electrical stimulation for gait and standing in paraplegia; and research to develop a prosthetic balance system.

Finally I will give an overview of the work being performed by the Bionic Ear Institute and our collaborators in four exciting areas of research – Bionic ear; Bionic eye; Intelligent central nervous system implants; and Nanomedicine – research we anticipate will be delivered to the clinic using a model of translational research centred around multidisciplinary collaboration.