

Micro-technologies for New Neural Interfaces: Current Status and Future Prospects

Prof. Eduardo Fernández, Bioengineering Institute and CIBER-BBN, University Miguel Hernandez, Spain

Rehabilitation of sensory and/or motor functions in patients with neurological diseases is more and more dealing with artificial electrical stimulation and recording from populations of neurons using biocompatible chronic implants. For example deep brain stimulators have been implanted successfully in patients for pain management and for control of motor disorders such as Parkinson's disease; cochlear implants are being used for restoring auditory function, micro-array type devices have been implanted in rudimentary artificial vision systems and a wide variety of devices have been developed to control respiration, activate paralysed muscles or stimulate bladder evacuation.

Moreover advances in artificial limbs and brain-machine interfaces are now providing hope of increased mobility and independence for amputees and paralysed patients. As more and more patients have benefited from these approaches, the interest in neural interfaces has grown significantly. However, many problems have to be solved before a neural interface can be considered a viable clinical therapy or option. We will discuss some of the exciting opportunities and challenges that lie in this intersection of neuroscience research, bioengineering and information and communication technologies.