Center for Sensorimotor Neural Engineering

PRESENTS

"Neural Engineering to Replace, Repair, and Rehabilitate the Central Nervous System"

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Brain-machine interfaces (BMI) and neuroprosthetic technology have the potential to dramatically improve quality of life after paralysis resulting from spinal cord injury, stroke or traumatic brain injury. We have recently demonstrated that brain activity can be used to control Functional Electrical Stimulation (FES) delivered to muscles and reanimate simple movements of an otherwise paralyzed wrist. Monkeys rapidly learned to modulate the activity of individual neurons in motor areas of the brain in order to control the timing and magnitude of FES delivered to temporarily paralyzed wrist muscles. In addition to direct muscle stimulation, another promising neuroprosthetic approach is intraspinal stimulation. We recently quantified the hand and arm movements evoked by cervical spinal stimulation. Movements of the digits, wrist and arm were readily evoked by intraspinal stimulation in the cervical cord of sedated monkeys. In addition to directly restoring movements, intraspinal stimulation may also aid in guiding recovery and promoting regeneration after injury to the spinal cord. Recent work in our lab work demonstrates that stimulation delivered below an incomplete spinal injury leads to functional recovery. Such a regenerating BMI may have the capacity to direct synaptic strength in spared pathways, either alone or in collaboration with stem cell therapies. Rehabilitating neural interfaces may also improve quality of life after brain injury. We have preliminary evidence that virtual feedback of muscle activity, routed through a computer game interface, can improve hand function following stroke, traumatic brain injury, or for children with cerebral palsy.

Wednesday, March 14, 2012
3:30 PM – 4:30 PM
SDSU will connect via videoconference from SDSU, room E203e

Space is limited, please arrive early; contact Dr. Kee Moon, kmoon@mail.sdsu.edu for questions

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