Category: Clinical Application of Technology, Upper Limb

Workshop Title: Upper limb robotics and their influence on functional connectivity and motor network changes after stroke: an evidence based practice framework.

Workshop Organizer(s): Jose Lopez

In person Speaker(s):

- Lopez, Jose, European Neurosciences Center
- Vazquez Cristina, European Neurosciences Center
- Leong, Chen Onn, Fourier Intelligence

Virtual Speaker(s): TBA

Workshop Time: 10:30 - 12:00

Attendee Engagement: We will divide the attendees into groups where they will discuss the main 3 components of evidence based clinical practice applied to robotics for rehabilitation of the upper limb. We'll have also hands-on time with the devices.

Abstract:

Brain plasticity and functional reorganization are mechanisms behind functional motor recovery of patients after a stroke. The study of resting-state motor network functional connectivity by means of EEG proved to be useful in investigating changes occurring in the information flow and find correlation with motor function recovery. Biomarkers derived from neural activity of the brain present a vital tool for the prediction and evaluation of post-stroke motor recovery, as well as for real-time biofeedback opportunities.

On this presentation we show data collected from able body and stroke individuals, showing the effects on the functional connectivity pre and post using a robotic device, designed to train specifically and intensively the upper extremity. Based on the concept of Inter hemispheric competition, the intensive practice of the affected arm could increase the activation of the affected hemisphere and therefore regulate the Inter hemispheric activity, which is one of the neurophysiological aspects related to good recovery.

The analysis of functional connectivity will inform us about the immediate changes in the individual's brain, from a neurophysiological perspective, as a basis for the behavioral changes we expect to see after an intensive and regular training.

On this interactive workshop we'll discuss in groups the neurophysiological basis of robotics in neurorehabilitation for the upper limb as well as the other main components of the evidence based clinical practice, professionals expertise and patient's perspective, to give a framework for the study and application of advanced technologies in rehabilitation.