

Scientific/Educational Workshop

Workshop title

Therapeutic FES Based on Motor Control Principles for Stroke Rehabilitation

Workshop organizer

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Speakers

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Workshop goals

As a therapeutic technology, FES designed for post-stroke rehabilitation has met with controversial results. This workshop will discuss the recent progress confronting the challenges of applying FES in clinical settings. Focus will be given to the motor control principles underlying therapeutic FES, the technological developments of new devices, and evidence of clinical benefits for FES in post-stroke rehabilitation.

Abstract

The past decades have witnessed remarkable progresses in neural technologies such as functional electrical stimulation (FES) and their applications in neuro-rehabilitation and neuromodulation. These advances are powered by new neuroscientific understandings of the organization and compositionality of neuromuscular control illuminating how muscle groups may be activated together as discrete units known as muscle synergies. These parallel developments have promoted novel approaches to clinical rehabilitation for neurological disorders that are insurmountable to current treatments. One such breakthrough is the evolution of FES as a therapeutic tool in post-stroke rehabilitation with an interventional strategy particularly inspired by the concept that muscles in humans may be purposefully coordinated through neuromotor modules known as muscle synergies. This workshop attempts to cover recent advances in multi-channel FES technology, its potential applications in post-stroke rehabilitation, new findings that support the neurological basis of the muscle synergies for generating natural motor tasks, and the application of the muscle-synergy concept in post-stroke assessment and rehabilitation of motor impairment. Speakers will also discuss future directions of development in relation to assistive FES and synergy-driven adaptive training for post-stroke rehabilitation.