Scientific/Educational Workshop

Workshop title

High-Density EMG Neurobiomarkers for improving rehabilitation therapies

Workshop responsible

Francesco Negro, Laura McPherson, Christopher Thompson

Speakers

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Laura McPherson;
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Allison Hyngstrom;
Dirk Czesnik,
Clark Dickerson,
Tea Lulic,
Ivan Vujaklija

Workshop goals

- To describe the high-density EMG technologies, its application for the estimation of the neural drive to muscle, and its role in rehabilitation research
- To show recent applications of this technology in translational studies
- To provide hand-on examples of high-density EMG recordings, motor unit decomposition, and extraction of reliable neural information

Abstract

Motor impairments resulting from stroke, spinal cord injury, neuropathies, and cancer have a profound impact of the quality of life of the survivors. In order to maximize functional outcomes of rehabilitation and improve quality of life, the neural and muscular mechanisms underlying both the disorder and the therapy must be established. For this purpose, innovative neuromarkers of motor disability that may be estimated quickly, reliably and non-invasively in clinical settings are essential. In this workshop, the speakers will discuss multiple recent applications of high-density EMG recordings and motor unit decomposition approaches to quantify alterations in the motor command underlying motor impairment. The recent progresses in both animal and human investigations demonstrate the feasibility and utility of this novel technology in clinical neurorehabilitation protocols. The workshop will start with a general overview of the technique and its application in experimental recordings. The following presentations will focus on recent animal and human studies targeting neuromuscular diseases as stroke, spinal cord injury, neuropathy, cerebral palsy, and breast cancer. In the last part of the workshop, the speakers will show hand-on examples of recording and processing of high-density EMG signals and answer questions regarding the design of clinical protocols for the neuromuscular evaluation of patients using this technology.