Category: Neuromodulation
Workshop Title: Empowering Balance Control Through Non-Invasive Neuroenhancement Approaches
Organizer(s): Cristina Bayón, Aaron J. Young, Eduardo Rocon
Speaker(s): Eveld, Maura, Shriners Children's Hospital
Fey, Nick, University of Texas at Austin
Young, Aaron J, Georgia Institute of Technology
Kooij,Herman van der, University of Twente
Workshop Time: 16:00 - 17:30
Attendee Engagement: The compelling questions stated in the abstract will be addressed along the speakers presentations. After each presentation, two theses will be exposed in an interactive discussion with the audience, who will vote via an online real-time response system. Additionally, the last 10 min of the workshop will be dedicated to a round table where speakers and audience can contribute together.
Abstract: The effective control of human upright posture during standing and walking is crucial for performing everyday activities. Specifically, individuals with neurological disorders face challenges in maintaining balance, directly impacting their walking ability and increasing the risk of falls. Therefore, enhancing balance control in these patients is essential to ultimately improve their quality of life.
Humans control balance by controlling their center of mass (COM), with the central nervous system integrating information from various sensory inputs, including visual, vestibular, and somatosensory signals. Due to impairments in processing one or more of these sensory inputs, individuals with neurological disorders often rely excessively on the remaining intact sensory pathways to compensate. This can facilitate balance but also result in exaggerated responses, inappropriate modulation of muscle activity, and delayed balance reactions.
In this specialized session, we will explore various non-invasive methods aimed at augmenting the response of impaired sensory inputs to empower balance control. Distinguished experts will present novel advancements in neuroenhancement strategies designed to optimize the function of the (sensory)motor system in controlling balance, covering in their talks several pivotal aspects: What are the main alterations of the sensorimotor processes that lead to a compromised balance control in neurological disorders? Which biofeedback techniques offer the most effective compensation for sensory deficiencies based on the specific neurological impairment? How can advancements in biofeedback strategies be combined and tailored to address the diverse sensory deficits, ultimately aiding in improved balance control and quality of life?
Together, we will provide a better understanding on the underlying balance control problems and propose innovative solutions to improve the awareness and thus the balance reaction in affected individuals.