Name of Organizer: Reggie Edgerton and Monica Perez

Affiliation: UCLA and University of Miami **Phone:** 305-243-7119 **Email:** perezmo@miami.edu

Title of Symposium: Where, When, and How to Target Residual Sensorimotor Pathways in Humans with Spinal Cord Injury?

Description of submitted symposium: An increasing number of studies support the view that tailored stimulation protocols might play a key role in the recovery of somatic and autonomic function following spinal cord injury (SCI). The aim of this symposium is to discuss Where, When, and How to target residual sensorimotor pathways to maximize functional recovery after SCI. Where to stimulate? The brain, spinal cord, and peripheral nerve have been targets to induce plasticity in sensorimotor pathways projecting to spinal motoneurons. Dr. Edgerton will discuss recent findings demonstrating that transcutaneous electrical stimulation of multiple sites over the spinal cord is more effective in inducing robust locomotor behavior than stimulation of single sites alone in both animal and humans. Stimulation along the rostrocaudal axis of the lumbosacral enlargement might result in a more selective topographical recruitment of different muscles groups. Dr. Perez will discuss how the timing of arrival of descending and peripheral volleys at corticospinal-motoneuronal synapses as well as the organization of early and late corticospinal volleys might represent strategies to enhance voluntary motor output following SCI. Maximizing the summation of late (I-waves) corticospinal descending volleys at the spinal cord may be crucial to improve function after human SCI. When to stimulate? Drs. Edgerton and Perez will discuss recent findings indicating that tailored stimulation protocols can benefit individuals at different stages following SCI. However, the functional state of the spinal cord following SCI likely influence the ability not only to induce but also to detect plasticity. How to stimulate? Drs. Edgerton and Perez will discuss how interactive and synergistic effects on sensorimotor pathways at multi-segmental levels is critical for successful therapeutic effects. Long-term potentiation and spike timing-dependent plasticity of residual synapses might represent avenues to improve function after SCI.

Length of time required for symposium?: 60 to 75 min

Additional Presenters: Reggi Edgerton, Ph.D. Distinguished Professor Department of Integrative Biology UCLA Vice Chairman and Distinguished Professor Department of Neurobiology Distinguished Professor Department of Neurosurgery Member of the Brain Research Institute. Chief Research Scientist, Neural Plasticity and Movement Monica A. Perez, P.T., Ph.D. Associate Professor, Department of Neurological Surgery The Miami Project to Cure Paralysis University of Miami

What is the role of each presenter?: Introduction of speakers and symposia outline/format: 1 – 2 minutes Speaker 1: Reggie Edgerton, Ph.D. “Guiding Activity-Dependent Plasticity following Spinal Cord Injury: From animals models to humans” (20 Minutes) Moderator Q & A : 10 minutes Speaker 2: Monica Perez Ph.D. “Targeted Plasticity in the Corticospinal System: In humans with different degrees of spinal cord injury” (20 min) Moderated Q & A : 10 minutes

Objective 1: Participants will learn about principles of adaptive plasticity in cortical and spinal cord pathways following SCI in both animal and humans.
Objective 2: Participants will learn about current methodologies to induce or investigate the neuronal plasticity at different sites of the CNS.
Objective 3: Participants will learn about interactions between where, when, and how to target residual sensorimotor pathways to improve recovery of function after SCI.