**Name of Organizer:** Laurie King

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**Title of Symposium:** Changes in neural activity with novel exercise approaches in Parkinson's disease

**Description of submitted symposium (please limit to 2000 characters):** This symposium explores several novel approaches to exercise for people with Parkinson's disease (PD) with particular attention to neural activity changes after exercise. Exercise has gained attention as a viable treatment for motor and non-motor symptoms in PD. Mixed results for exercise may be due to traditional exercise overlooking important specifications to optimize success. Emerging evidence suggests that the exercise mode (i.e. skill-based, aerobic) is critical to achieve beneficial effects. Such findings may be due to specific underlying neural changes. Dr. Laurie King will introduce the topic. One possible limitation of exercise as treatment in PD is their difficulty to exercise at sufficiently high rates to trigger the endogenous release of the neurotrophic factors, thought to underlie global improvements in motor function. Dr. Jay Alberts will summarize the effects of assisted vs. voluntary exercise on changes in cortical and subcortical activation in motor and non-motor regions in the brain. A second factor that may limit efficacy of exercise for gait and balance in PD is the lack of cognitive challenge in motor exercises. The underlying hypothesis is that frontal lobe connectivity with basal ganglia and brainstem posture-locomotor centers may contribute to gait and balance deficits in PD. Dr. Katrijn Smulders will discuss how integrating cognitive challenges to an agility-based exercise program may result in changes in fronto-locomotor neural networks. The third factor discussed is the role that skill-based vs. aerobic exercise may play in effecting change in underlying neural circuitry. While preliminary studies support the role of exercise on cognitive function in PD, there remain fundamental gaps in knowledge. Dr. Giselle Petzinger will explore the basic research and clinical studies examining the potential differential role of exercise type (aerobic versus skilled- based exercise) on cognitive function in PD and underlying neural circuitry.

**Length of time required for symposium?:** 90

**Additional Presenters:** Giselle Petzinger, MD - petzinge@med.usc.edu Jay Alberts, PhD - albertj@ccf.org Katrijn Smulders, PhD - smulders@ohsu.edu

**What is the role of each presenter?:** Each presenter will discuss a novel approach to exercise for people with PD and will discuss associated changes in neural circuitry. Please see description of symposium.

**Objective 1:** Participants will describe novel additions to traditional exercise for PD.

**Objective 2:** Participants will be able to explain why differing modes of exercises may have different outcomes related to neural circuitry.

**Objective 3:** Participants will discuss how neural imaging may play a role in uncovering mechanisms of change after exercise.