1138-92-263 **Elizaveta Latash*** (elatash1@student.gsu.edu), elatash1@student.gsu.edu, and **Hangue Park**, **William Barnett**, **Alexander N Klishko**, **Boris I Prilutsky** and **Yaroslav Molkov**.

Frontal plane dynamics of quadrupedal locomotion on a split-belt treadmill.

Dynamic stability of human locomotion in the frontal plane was investigated using an inverse pendulum model and notion of center of mass (COM). The goal of this study was to determine if an inverted pendulum model could be used to accurately describe the frontal plane dynamics of cat COM during split-belt locomotion and to examine if the model can explain previously obtained experimental results.

We developed a mathematical model of the balance control system based on inverted pendulum model dynamics, controlled by shifting the pendulum pivot point when the COM approached thresholds of dynamic stability. These thresholds were computed using Bayesian inference based on data from different experimental conditions. Experimental data included 3D full body cat kinematics and ground reaction forces recorded during split-belt locomotion at different speeds and anesthesia of ipsilateral paws (Park et al., 2016).

The inverted pendulum model described the experimental dynamics of the cat COM in the frontal plane with high accuracy. The model revealed a mechanism of controlling dynamic stability in the frontal plane. This mechanism produces frontal plane oscillations of the COM during locomotion that are synchronized with transitions between specific locomotor phases. (Received February 14, 2018)