

**UNIVERSITY OF SOUTH FLORIDA
DEPARTMENT OF PHYSICS**

COLLOQUIUM

Friday, October 19, 2007

4:00 pm

PHY 130

**Brain Circuits and Breathing: Mapping Functional
Connectivity and Computational Modeling**

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ABSTRACT

The goal of our research is to define brain neural circuits that generate and modulate the respiratory motor pattern. Our hypothesis is that neurons in two brainstem regions - the pons and the medulla - cooperate to modulate breathing in response to several stresses, including changes in blood pressure and stimulation of chemoreceptors that monitor oxygen and carbon dioxide in the blood. We use advanced multi-array recording technology and computational methods to measure the responses and dynamic associations of many simultaneously recorded neurons. We also use computational models and network simulations to integrate current knowledge and to provide a framework to test and predict the consequences of defined perturbations. Associated experiments test model-based hypotheses and predictions on the reconfiguration of respiratory circuits during behaviors such as coughing and the transition between resting breathing and gasping.