

Joint Condensed Matter  
and  
Center for Soft Matter and Biological Physics  
Seminar

**Jacob Carroll**

**Dept. of Physics, Virginia Tech**

**“The effects of inhibitory neuron fraction on the dynamics of an avalanching neural network”**

Monday, October 15, 2018

4:00pm – 5:00pm

304 Robeson Hall

The statistical analysis of the collective neural activity known as avalanches provides insight into the proper behavior of brains across many species. In this paper we present a neural network model based on the work of Lombardi, Herrmann, de Arcangelis et al. that captures the relevant dynamics of neural avalanches, and we show how tuning the fraction of inhibitory neurons in this model removes exponential cut-offs present in the distributions of avalanche strength and duration, and transitions the power spectral density of the network into an epileptic regime, as well as effecting the evolution of the network structure over time. We propose that the brain operates away from this regime of low inhibitory fraction to protect itself from the dominating avalanches present in these extended distributions.