CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, October 6
3:00 – 4:00 PM
Maria Sanford, Room 101

GEOMETRIC ANALYSIS
OF SYNCHRONIZATION
IN NEURONAL NETWORKS
WITH SYNAPTIC COUPLING DELAYS

HWAYEON RYU
UNIVERSITY OF HARTFORD

Abstract: We study synaptically coupled neuronal networks to identify the role of coupling delays in network's synchronized behaviors. We consider neurons in a globally inhibitory network where two distinct, one excitatory and one inhibitory, populations of neurons are coupled and interact with each other. A geometric singular perturbation analysis yields existence and stability conditions for synchronization states under different firing patterns between two population. Numerical simulations are conducted to supplement and validate analytical results, and to analyze recent models for spindle sleep rhythms in thalamocortical networks, which have biologically motivated our study. In this talk, I will first introduce the network architecture and synaptic delays, and then describe how the geometric singular methods are used to construct the synchronous solutions. At the end of talk, the role of delays in producing synchronization will be discussed, which is supplemented by numerical simulation results.