

University of Miami, Physics Department Colloquium

Date: Wednesday, Jan 29, 2025
Time: 4:00 pm – 5:00 pm
Location: Wilder Auditorium – Rm 112, Knight Physics Building



The Cortex and the Critical Point

Prof. John Beggs

Department of Physics, Indiana University

Abstract

Condensed matter physics provides a framework for understanding experiments on ensembles of neurons. Within this framework, cascades of activity among cortical neurons follow the same equations that govern avalanches in granular materials, complete with power laws, an exponent relation, and a universal scaling function. These “neuronal avalanches” also show that the cerebral cortex operates near a critical point where many of its information processing functions are optimized, analogous to peaks in susceptibility and correlation length seen at a continuous phase transition. I will review progress in this field over the past 20 years and point to the new frontiers it has opened in human health and computing.

NEURONAL AVALANCHES

