

Dept of Physics and Astronomy invites you to

COLLOQUIUM SPEAKER SERIES

Fall 2015

Friday • Nov 20

SB 142

Lecture begins at 4 PM

Refreshments provided
ALL ARE WELCOME

John M. Beggs

Indiana University Reactor
Associate Professor of Biophysics



THE PATTERN OF INFORMATION FLOW IN NETWORKS OF CORTICAL NEURONS

The performance of complex networks, like the brain, depends on how effectively their elements communicate. Despite the importance of communication, it is virtually unknown how information is transferred in local cortical networks, consisting of hundreds of closely-spaced neurons. We used a microelectrode array adapted from particle collider experiments to detect electrical activity and information transfer in hundreds of neurons simultaneously. Even though each cortical neuron has roughly the same number of synaptic contacts, we found that about 70% of information transfer passes through only 20% of the neurons, forming a highly non-democratic network. We will discuss the implications of this result on performance of cortical networks.

BIOGRAPHY

Associate Professor of Biophysics, Indiana University John Beggs is an associate professor of Physics at Indiana University. He received his B.S. and M.Eng. in Engineering Physics from Cornell University. He then taught math and science at Samoa College while in the U.S. Peace Corps. He later obtained a Ph.D. from Yale University, and did postdoctoral research at the National Institutes of Health. His lab group investigates how hundreds of brain cells cooperate to process information. He is the co-discoverer of "neuronal avalanches," a new form of neuronal activity that suggests the brain tunes itself to optimize information processing.



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