1135-AA-1677 **Katie Morrison*** (katherine.morrison@unco.edu), 501 20th St CB 122, Greeley, CO 80639.
Emergent dynamics from neural network connectivity.

Even in the absence of changing sensory inputs, many networks in the brain exhibit *emergent dynamics* – that is patterns of activity that are shaped by the intrinsic structure of the network rather than modulated by an external input. Such dynamics are believed to underlie central pattern generators (CPGs) for locomotion, oscillatory activity in both hippocampus and cortex, and the complex interplay between sensory-driven responses and ongoing spontaneous activity. To isolate the role of network connectivity alone in shaping these dynamics, we introduce the *Combinatorial Threshold Linear Network* (CTLN) model, a minimal model with binary synapses, simple perceptron-like neurons, and flat external input, whose dynamics are controlled solely by the structure of an underlying directed graph. By varying only the underlying graph, we observe the full variety of nonlinear dynamics: multistability, limit cycles, chaos, and even quasiperiodic behavior. The simplicity of the model makes these dynamics amenable to mathematical analyses, allowing us to connect various properties of the emergent dynamics to the connectivity structure of the underlying directed graph. (Received September 24, 2017)