

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**Hierarchy and predictability in spontaneous behavior** GORDON BERMAN, WILLIAM BIALEK, JOSHUA SHAEVITZ, Princeton University — Animals perform a complex array of behaviors, from changes in body posture to vocalizations to other dynamic outputs. Far from being a disordered collection of actions, however, there is thought to be an intrinsic structure to the set of behaviors and their temporal organization. This structure has often been hypothesized to be hierarchical, with certain behaviors grouped together into modules that interact with other modules at time scales that are long with respect to that of an individual behavior. There have been few measurements, however, showing that a particular animal's behavioral repertoire is organized hierarchically. This has largely resulted from an inability to measure the entirety of an animal's behavioral repertoire or even to define precisely what a "behavior" is. In this talk, I will apply our novel method for mapping the behavioral space of animals to videos of freely-behaving fruit flies (*D. melanogaster*), showing that the organisms' behavioral repertoire consists of a hierarchically-organized set of stereotyped behaviors. This hierarchical patterning results in the emergence of long time scales of memory in the system, providing insight into the mechanisms of behavioral control and patterning.

Gordon Berman  
Princeton University

Date submitted: 07 Nov 2014

Electronic form version 1.4