1165-05-265 **Christopher Langdon*** (langdon@cshl.edu), Cold Spring Harbor Laboratory, 1 Bungtown Road, Cold Spring Harbor, NY 11724. *Combinatorial Geometry of Threshold-Linear Networks.*

The architecture of a neural network constrains the potential dynamics that can emerge. Some architectures may only allow for a single dynamic regime, while others display a great deal of flexibility with qualitatively different dynamics that can be reached by modulating connection strengths. In this work, we use ideas from combinatorial geometry to study the dynamic constraints imposed by different network architectures in the context of competitive threshold-linear networks (TLNs). Any given TLN is naturally characterized by a hyperplane arrangement, and the combinatorial properties of this arrangement determine the pattern of fixed points of the dynamics. This observation enables us to recast the question of network flexibility in the language of oriented matroids, allowing us to employ tools and results from this theory in order to characterize the different dynamic regimes a given architecture can support. These results provide a framework for studying the possible computational roles of various motifs observed in real neural networks. (Received January 19, 2021)