1125-VC-2154 **Aaron H Chen*** (ahc232@cornell.edu). *Neural codes, undecidability, and a new class of local obstructions.*

Given an intersection pattern of open sets in Euclidean space (which can be described precisely by a hypergraph), is it possible to tell if there is an arrangement so that the open sets are convex? This question may appear combinatorial/topological in nature, but surprisingly has applications as a mathematical model for spatial cognition motivated by by neuroscience research on certain neurons called "place cells." Using topological methods, we prove that the notions of a neural code being locally good and a good cover code are in fact equivalent, and that the corresponding decision problem is undecidable. We also present an intermediate criterion that is stronger than being locally good but still weaker than convexity by considering collapsibility of links of missing codewords. (Received September 19, 2016)