1146-13-302 **Robert Davis*** (rdavis@hmc.edu), 320 E. Foothill Blvd., Claremont, CA 91711. *Using State Polytopes to Construct Diagrams of Combinatorial Neural Codes.*

Combinatorial neural codes are 0/1 vectors that are used to model the co-firing patterns of a set of place cells in the brain. One wide-open problem in this area is to determine when a given code can be efficiently drawn in the plane as a Venn diagram-like figure. A sufficient condition to do so is for the code to have a property called 2-inductively pierced. Gross, Obatake, and Youngs recently used toric algebra to completely identify this property for codes on three neurons, but making a similar classification for more neurons has been significantly harder. In this talk, we will discuss an approach for extending their result and the current progress in this direction. In particular, we compute the state polytopes of the corresponding toric ideals, from which all distinct initial ideals obtained via weight vectors may be computed efficiently. Moreover, we show that the state polytopes are combinatorially equivalent to the more well-known stellohedron. (Received January 25, 2019)