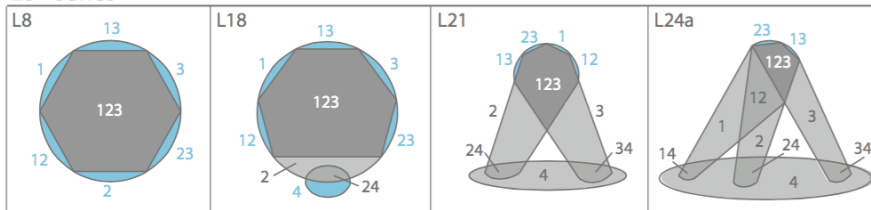


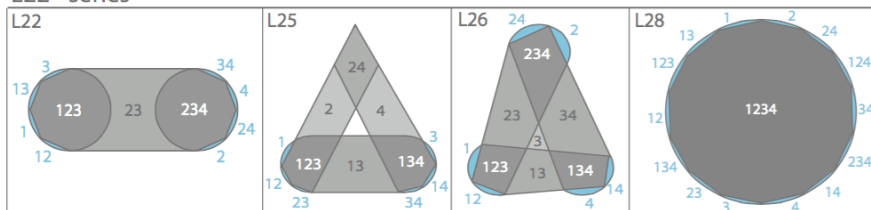
## Department of Mathematics Colloquium

# Which neural codes are convex?

L8 - series



L22 - series



February 17, 2017  
3:30 - 4:30pm  
DERR 329

Prof. Anne Shiu  
Texas A&M University

This talk focuses on combinatorial and algebraic problems motivated by neuroscience. Neural codes allow the brain to represent, process, and store information about the world. Combinatorial codes, comprised of binary patterns of neural activity, encode information via the collective behavior of populations of neurons. A code is called convex if its codewords correspond to regions defined by an arrangement of convex open sets in Euclidean space. Convex codes have been observed experimentally in many brain areas, including sensory cortices and the hippocampus, where neurons exhibit convex receptive fields. What makes a neural code convex? That is, how can we tell from the intrinsic structure of a code if there exists a corresponding arrangement of convex open sets? This talk describes how to use tools from combinatorics and commutative algebra to uncover a variety of signatures of convex and non-convex codes. No background in algebra, combinatorics, or biology will be assumed.

This is joint work with Carina Curto, Elizabeth Gross, Jack Jeffries, Katie Morrison, Mohamed Omar, Zvi Rosen, and Nora Youngs.