



THE UNIVERSITY OF CHICAGO

COMPUTATIONAL AND APPLIED MATHEMATICS
STUDENT SEMINAR

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“Topological methods in the theory of convex neural codes”

THURSDAY, November 9, 2017, at 1:00 PM
Jones 226, 5747 South Ellis Avenue

ABSTRACT

Given regions cut out by a collection of open sets in Euclidean space, does there exist an arrangement so that the open sets are convex? This question is combinatorial and topological in nature, but surprisingly has applications as a mathematical model for spatial cognition motivated by neuroscience research on certain neurons called “place cells.” We will introduce the motivation and basic theory of neural codes and then discuss some recent results that 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 the best known necessary criterion for a neural code to be convex by borrowing some ideas from discrete Morse theory. (Joint work with Anne Shiu).