Temple University Mathematics Colloquium

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will speak on

A topological approach for uncovering hidden structure in neural activity

ABSTRACT: Experimental neuroscience is achieving rapid progress in the ability to collect neural activity and connectivity data. This holds promise to directly test many theoretical ideas, and thus advance our understanding of "how the brain works." How to interpret this data, and what exactly it can tell us about the structure of neural circuits, is still not well-understood. A major obstacle is that these data often measure quantities that are related to more "fundamental" variables by an unknown nonlinear transformation. We find that combinatorial topology can be used to obtain meaningful answers to important questions about the structure of neural activity. In this talk I will first introduce a new method, using tools from computational topology, for detecting structure in correlation matrices that is obscured by an unknown nonlinear transformation. I will then illustrate its use by testing the "coding space" hypothesis on neural data.

Monday, February 10, 2014
Lecture at 4:00 pm
Coffee, tea, and refreshments from 3:40 pm
Room 617, Wachman Hall
Department of Mathematics