

**University of California, Irvine
Statistics Seminar**

***Characterizing Complex, Multi-scale Neural Phenomena
Using State-space Models***

**Uri Eden
Professor, Department of Mathematics & Statistics
Boston University**

**4 p.m., Thursday, May 27, 2021
Join via Zoom: <https://uci.zoom.us/j/93841331474>**

In the past few decades, neuroscientists have seen a massive expansion in their ability to record neural activity - from many more cells, from multiple brain areas, and across multiple spatial and temporal scales. This has led to a concomitant increase in the complexity of neural coding and communication properties that neuroscientists have sought to explore. Understanding the neural code requires the ability to integrate information from multiple sources across neural ensembles, brain regions, and scales. Experimental neuroscientists are often limited in the statistical and data analysis tools available to deal with such multimodal data. The state-space paradigm provides a natural statistical modeling approach for integrating information across multiple sources and scales, for discovering low dimensional representations of behavioral and cognitive states, and for expressing confidence about estimates and inferences. In this talk, I will review the fundamental features of the state-space paradigm, discuss successful applications of the paradigm to various neural data analysis problems, and discuss a new extension of these methods to better understand the phenomenon of hippocampal replay.