Latent States of Brains and Behavior

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New recording technologies are transforming neuroscience, allowing us to measure the spiking activity of hundreds to thousands of neurons in freely behaving animals. These technologies offer exciting opportunities to link brain activity to behavioral output, but they also pose serious statistical challenges. Neural and behavioral data are noisy, high-dimensional time-series with complex dynamics. Dr. Linderman will present their work on state space models (SSMs) for neural and behavioral measurements. The key idea is that these high-dimensional data reflect the evolution of low-dimensional latent states, which shed light on how neural circuits compute and how natural behavior is organized. First, Dr. Linderman will present new models that decompose natural behavior into sequences of discrete, stereotyped, and reusable actions called "syllables," while simultaneously allowing for continuous variations in speed or vigor. By disentangling discrete and continuous variability, you obtain parsimonious representations of moment-to-moment behavior that correlate with fluctuations of dopamine in the striatum. Next, he will show how the same simple building blocks can be composed into flexible and expressive models for continuous, whole-lifespan behavioral recordings. Together, these lines of work highlight how advances in machine learning and statistics offer powerful new tools for linking brain activity and behavior.

Thursday, September 7, 2023, 3:30-4:30PM Eastern

133 Rosenau Hall

Zoom Link: **https://unc.zoom.us/j/95131277245**

Meeting ID: 951 3127 7245

Passcode: 203117

BIOSTATISTICS SEMINAR

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