

# Brain Mapping Center SEMINAR SERIES

Sponsored by the UCLA Brain Mapping Center Faculty

The focus of these talks is on advancing the use of brain mapping methods in neuroscience with an emphasis on contemporary issues of neuroplasticity, neurodevelopment, and biomarker development in neuropsychiatric disease.

Hosted By: Shantanu Joshi, PhD, Neurology, UCLA

## “Understanding excitation-inhibition balance in AD pathology: a neuroimaging perspective”



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The criticality hypothesis of the brain states that brain dynamics self-organize into a critical configuration that balances excitatory and inhibitory interactions to achieve maximal adaptivity. Further, recent evidence suggests that synaptic hyperexcitation due to the loss of inhibitory interneurons in the hippocampus may represent some of the earliest changes of Alzheimer's disease (AD).

In this talk, I will discuss how our research team attempts to measure Excitation-Inhibition (E/I) balance using neuroimaging data, both in a mouse model of AD and in humans. For the latter, I will discuss the use of a mixed-spin Ising model to infer connectome-level E/I balance by co-leveraging both resting-state functional and diffusion-weighted MR imaging.

Then, I will highlight relevant findings that help explain the recognized sex differences in AD in this context. In particular, results from our group and others suggest an APOE- $\epsilon$ 4-by-sex interaction as female carriers exhibit higher degrees of hyperexcitation even when they are otherwise cognitively normal.

**June 2, 2022 11:00am - 12:00pm PDT**  
**Zoom and Neuroscience Research Building (NRB 132)**  
**Charles E. Young Dr. South**

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