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SPEAKER

Dr. Ananth Vedururu Srinivas

TOPIC

Bifurcations in the Brain: Exploring Neurons as Dynamical Systems

DETAILS

5 July 2024

5 p.m. to 6 p.m. IST

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Bifurcations in the Brain: Exploring Neurons as Dynamical Systems

ABSTRACT

The brain is one of the most complex organs in the human body. Despite significant advancements in neuroscience, many aspects of its function and structure remain poorly understood. Researchers continue to uncover new insights, but the intricate nature of neural networks and brain activity presents ongoing challenges. Neurons, the fundamental units of the brain, are excitable cells that exhibit complex electrical activities, which can be modeled and understood through the principles of dynamical systems. In this talk, I will provide an overview of how the field of computational neuroscience evolved from the pioneering neuron model by Hodgkin and Huxley to the modeling of realistic neurons as dynamical systems. Using specific examples from my lab's work on neurons in the hippocampal formation, I will demonstrate how different experimentally observed spiking activities can be explained through bifurcations in dynamical systems theory. Understanding the mechanisms of neurons in a healthy brain is crucial for developing interventions for neurological disorders characterized by abnormal firing patterns. Computational models play a vital role in shedding light on potential causes of irregular firing patterns in such disorders.

SPEAKER

Dr. Ananth Vedururu Srinivas
LSU Health, New Orleans, USA

BIO

Ananth is a Postdoctoral Fellow working in Computational Neuroscience at LSU Health Sciences Center, New Orleans, USA. He earned his bachelors, masters and Ph.D. from SSSIHL. He moved to the US in 2022 and he has been working with Dr. Carmen C. Canavier since then. He is working on theoretical and computational modeling of neurons in the medial Entorhinal cortex, in collaboration with experimentalists from Boston University. During his Ph.D., he worked on prey-predator dynamics and optimal control problems. He was also involved with optimal control aspects of COVID-19 within host models studied by the mathematical modeling group at SSSIHL. He takes immense pride in mentioning that he is the first graduate from the Mathematical Modeling group at SSSIHL, that is the foundation for CEMB today. He received the academic gold medal and the Sathya Sai All-rounder gold medal during his bachelors. He also received the CSIR Direct Senior Research Fellowship during his research at SSSIHL.