Contribution ID: **1** Type: **not specified**

Criticality and ghosts in natural computations

Wednesday 8 November 2023 09:00 (45 minutes)

A fundamental characteristic of living systems is sensing and integrating multi-dimensional sensory signals with memory in order to generate complex self-organized behaviors in continuously changing environments. Using computations on the level of signaling networks in single-cells, we have identified that cells utilize dynamical ghost states as a memory-generating mechanism in order to integrate information from time-varying signals, and verified experimentally that ghost states are an emergent feature of cell-surface receptor networks organized at criticality. I will discuss a development of theoretical framework for biological computation with ghost states, and explore to which extent we can expand the findings from signaling networks in single cells to computations performed by neuronal networks in general.

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Session Classification: Session 1