

# Cognitive Science Talk:

Wednesday, August 3rd, 2022

at 12:00pm

Room CSB 003 or via [Zoom](#)

[Meeting ID:](#) 981 5014 4625

Sponsored by Prof. Douglas Nitz

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# A Simulation- Selection Model of the Hippocampus



### Abstract

Despite many years of effort, the neural circuit mechanisms underlying hippocampal mnemonic processing remain unclear. My group proposed a new model of the hippocampus—the simulation-selection model—based on recent experimental findings and neuroecological considerations. Under this model, the mammalian hippocampus evolved to simulate and evaluate arbitrary navigation routes. Specifically, we suggest that CA3 evolved to simulate unexperienced navigation sequences in addition to remembering experienced ones, and CA1 evolved to select from among these CA3-generated sequences, reinforcing those that are likely to maximize reward. We argue that the simulation-selection organization of the hippocampus has evolved in mammals, but not in birds, because of the unique ecological and navigational needs of land animals. In this scenario, memory consolidation is a process of actively selecting and reinforcing high-value actions and events rather than passively storing incidental events. Although solid empirical evidence is missing for many aspects of the model, it may account for why the mammalian hippocampus has evolved not only to remember, but also to imagine future episodes, and how this might be implemented in its neural circuits.