An efficient synaptic learning rule that facilitates goal-oriented behavior

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A central area of studies in cognitive science and neuroscience is to understand how the brain supports behavior in complex environments, which often involves memory and decisions based on goals. Top-down, theoretical approaches attempt to explain the process, but it is a fundamental challenge to link any of those formative frameworks to the cellular, circuital and/or neurophysiological underpinnings of the brain. In this talk, I will present our finding of a very efficient synaptic plasticity that generates choice-related spatial code in the hippocampus. In particular, I will try to introduce it in the context of a recently developed formalism that treats the hippocampus as a predictive map. Complementing methods of single-cell patch-clamp recording in acute brain slices and in awake, behaving mice with computational techniques, our work aims to reveal the mechanistic basis of flexible behavior by examining novel cellular learning rules, building models and testing specific predictions in an intact and more ethologically relevant setting.