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From synaptic plasticity rules to network dynamics

Models of synaptic plasticity capture experimental data on plasticity with increasing accuracy, but it is still unclear how realistic synaptic plasticity rules shape network dynamics, and information storage in such networks.

In this talk, I will first review approaches for inferring learning rules from data in cortical synapses. The first consists in fitting a biophysical model based on calcium influx in the post-synaptic spine to a set of in vitro experiments.
The second consists in inferring the learning rule from in vivo data, using experiments that compare the statistics of responses of neurons to sets of novel and familiar stimuli.
I will then show how the inferred learning rules shape the network dynamics, and in particular how it can lead to attractor dynamics.