# Synaptic downscaling during slow-wave-sleep-like activity *in vivo*

A major function of the brain is to allow us to interact with an ever-changing environment. This cannot be fully genetically pre-programmed, but relies on sensory experience. During the day, neuronal connections are created and strengthened in order to encode information as we interact with the world and learn. While brains have an immense storage capacity, the continuous bombardment of sensory inputs during the day and the high energetic cost of storing information make it intuitively obvious that there have to be certain rules dictating which information is relevant enough to be stored and which will be ignored or forgotten. The synaptic homeostasis hypothesis suggests that whereas sensory-experience during wake leads to the strengthening of the associated neocortical synapses, slow-wave-sleep leads to a net depression of synaptic weights. Spike-timing-dependent plasticity is considered a prime candidate for circuit remodelling; however, it is not obvious how the same synaptic plasticity rules could explain both potentiation at wake and depression during sleep. In my talk I will introduce a novel synaptic plasticity rule that could govern sleep-mediated synaptic refinement. Moreover, we will explore the computational advantages of having such plasticity rule and how sleep provides a specific dynamic network state in which synaptic weights are updated to enable more efficient storage of relevant information