Project Idea: Can stimulus saliency modulates the spiking activity of visual cortex?

小组成员：程宇昂 陈健柏 林逍屹 梅子杰

Neocortical spiking activity is permeated with spontaneous endogenous fluctuations. These fluctuations, previously thought to reflect overall arousal levels, were recently found to be coordinated across brain areas along the reverse visual hierarchy, and can even be modulated by top-down selective attention. However, the brain not only pays attention to task-relevant objects according to the current goal, but also visually salient objects due to the long-term evolution, and how these dynamics are modulated by stimulus saliency remains a mystery. In order to study the fluctuations, we will characterize the dynamics using a Hidden Markov Model (HMM), since most studies demonstrated that the cortical state fluctuations are marked by periods of vigorous (On) and faint (Off) spiking activity. Further, we would like to study the mechanism of how stimulus saliency modulates the temporal dynamics of the visual cortex and even the response behavior using the HMM. Based on previous studies, we hypothesize that the transition probability will correlate with the contrast difference between the stimulus, and the phase of On-Off dynamics will correlate with the task accuracy or response time.