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Talk Title: The neural circuit underlying subjective perception

Abstract:

The way we perceive the world is strongly influenced by our expectations about what we are likely to see at any given moment. However, the neural mechanisms by which the brain achieves this remarkable feat have yet to be established. To understand the neural mechanisms underlying the interplay between sensory inputs and prior expectations, we need to investigate the way these signals flow at the level of cortical circuits, e.g. through the different cortical layers. Until recently, it was not possible to do this in non-invasive studies of humans, because the typical voxel size in fMRI is bigger than the full thickness of the cortex. I will discuss recent work in which we met this challenge by using fMRI at ultra-high field (7T) to obtain BOLD signals at very high resolution to disambiguate signals from the different cortical layers. This approach has allowed us to probe the neural circuitry underlying effects of expectation and subjective perception. I will also discuss the role of the hippocampus as a potential generator of top-down expectation effects in visual cortex, focusing on predictive stimulus representations in hippocampal subfields and informational connectivity with the visual cortex. Together, this work aims to shed new light on the neural circuitry underlying our perception of the world.

Biographical information:

I am a principal research fellow at the Wellcome Centre for Human Neuroimaging, at University College London. Before joining UCL, I obtained my PhD at the Donders Institute, under the supervision of Dr. Floris de Lange, and completed a postdoctoral fellowship in the lab of Professor Nicholas Turk-Browne, first at Princeton University and then at Yale University. I am interested in how prior knowledge and expectations influence how we perceive the world, and how this is realised by the brain.