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INTERDISCIPLINARY GRADUATE PROGRAMME in the
BRAIN and MIND sciences
leading to Master's degree

Studying neuronal oscillations in the primate brain: from simplified static stimuli to virtual reality

Eleni Psarou, MSc, PhD

Postdoctoral Fellow,

Zero-Noise Lab, Ernst Strüngmann Institute (ESI) of the Max Planck Society, GERMANY

Thursday, February 19, 2026

14:00-15:00

Alumni of the BRAIN and MIND Sciences Seminar Series ZOOM LINK
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Info: Vassilis Raos, 4512, raos@uoc.gr

The speaker:

Eleni Psarou

BSc in Psychology, Panteion University, Athens, 2014; **MSc** in Brain & Mind Sciences, University of Crete, 2017; **PhD**, Donders Institute for Brain, Cognition and Behaviour, Nijmegen, Netherlands, 2025; **Thesis**: "Neural recordings, implant refinement, and rethinking sample sizes in non-human primate research"; **Postdoctoral Fellow** at Zero-Noise Lab, Ernst Strüngmann Institute (ESI) gGmbH of the Max Planck Society, 2024–present.

My research focuses on the role of neuronal oscillations in primate cognition. I am particularly interested in the new opportunities that virtual reality (VR) offers for cognitive neuroscience, as it enables controlled yet naturalistic behavioral paradigms.

Summary of the presentation:

In this talk, I will present our efforts to study neuronal oscillations in the primate brain using visual stimuli of varying complexity, ranging from simplified static stimuli to immersive virtual reality (VR).

We begin by examining the neuronal effects of stimulus repetition using simplified stimuli. Under natural conditions, we often stay in a given environment for some time. During such periods, our visual input often repeats. Such repeated exposure gives the cortex the opportunity to optimise its processing. In fact, previous work has shown that repeated visual stimuli lead to reduced spike rates and increased gamma-band synchronisation.

Building on these earlier findings, we set out to quantify the stimulus specificity of the repetition effects. We used gratings that allow precise control over a few stimulus dimensions. We kept all grating parameters constant and systematically manipulated their orientation. In this way, we could repeat a grating of a given orientation and examine repetition effects across a range of other orientations. Do the repetition effects in gamma-band activity and spike rates generalize to other similar orientations?

While this reductionist approach was essential for assessing stimulus specificity, in real life, perception unfolds in highly dynamic and complex visual environments. In the second part of my talk, I will present my current work, which aims to bridge the gap between highly controlled paradigms and the complexity of natural behaviour. To this end, we use virtual reality (VR), which provides experimental control while allowing naturalistic conditions. I will describe our efforts to develop a VR setup for magnetoencephalography (MEG) recordings, and how it can be used for across-species comparisons.