Cognitive Science Seminar

Thursday, Nov. 14th (17:00), Institute of Psychology, 6 Ingardena St., room 2.15

Dr Ewa Beldzik
(Dept. of Cognitive Neuroscience and Neuroergonomics,
Jagiellonian University)

Searching for gamma in simultaneous EEG-fMRI

There is a growing interest in human gamma-band oscillatory activity due to its direct link to neuronal populations, its associations with many cognitive processes, and its positive relationship with fMRI BOLD signal. Visual gamma has been successfully detected using high contrast (inward-moving gratings) stimuli in concurrent EEG-fMRI recordings and linked to activity in the visual cortex. In this research seminar, I will present and discuss the results from our recent simultaneous EEG-fMRI study, in which gamma activity was induced by the colour discrimination task and linked to task-related fMRI networks activity. Advanced denoising strategies and multitaper spectral decomposition were applied to EEG data to detect gamma oscillations, and group independent component analysis was performed on fMRI data to identify. Despite using only trials without motor response (50% of the trials), the two neural measures were successfully coupled. One of the six task-related networks, the occipito-parietal network, exhibited significant trial-by-trial covariations with gamma oscillations. Besides presenting these recently published results (Psychophysiology: Vol. 56, No. 12, Dec 2019), I will discuss the difficulties in analysis, the limitations of the study, and reviewers' skeptical comments.