Title: **EEG/MEG source imaging of transient and oscillatory epileptic brain activity using the maximum entropy on the mean framework**

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Summary: Accurate delineation of the epileptogenic zone (EZ) during presurgical workup of focal drug-resistant epilepsy patients can be challenging. Stereo-electroencephalography (SEEG) recordings, considered as the gold-standard for the localization of the EZ, might be the step towards mapping the seizure-onset zone (SOZ) and determining surgical candidacy. However, a successful investigation requires a strong pre-implantation hypothesis on the localization of the EZ, which can be derived from non-invasive investigations such as EEG or Magnetoencephalography (MEG) source imaging. The purpose of this talk is to introduce the Maximum Entropy on the Mean (MEM) source imaging framework, as a Bayesian approach to solve the ill-posed inverse problem of localizing the generators of EEG and MEG signals along the cortical surface. We will first review the time-domain version of MEM, which is sensitive to the spatial extent of the underlying generators, notably when localizing transient epileptic discharges. The localization accuracy of the MEM method and its ability to recover the spatial extent of the generators was quantitatively validated using SEEG (Abdallah et al Neurology 2022) or surgical cavity and postsurgical outcome as ground truth. In the second part of the talk, we will introduce the time-frequency wavelet-based extension of MEM (wavelet MEM) as a source image method of interest to localize transient oscillations, such as ictal oscillations localizing the seizure onset zone, transient high frequency oscillations and also resting state ongoing oscillations. The accuracy of wavelet-based MEM to recover oscillatory power spectra from resting state MEG data was validated using the MNI SEEG atlas of normal brain activity as ground truth (Afnan et al Neuroimage 2023).