Talk 2: Solving The Neuroimaging Puzzle: The Multimodal Integration Of Neuroelectromagnetic And Functional Magnetic Resonance Recordings

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In this presentation, advanced methods for the modeling of human cortical activity from combined high-resolution electroencephalography (EEG) and functional magnetic resonance imaging (fMRI) data are reviewed. These methods include a subject□s multicompartment head model (scalp, skull, dura mater, cortex) constructed from magnetic resonance images, multidipole source model, and regularized linear inverse source estimates. Determination of the priors in the resolution of the linear inverse problem was performed with the use of information from the hemodynamic responses of the cortical areas as revealed by block-designed (strength of activated voxels) and event-related (coupling of activated voxels) fMRI. As an example, these methods were applied to EEG (128 electrodes) and fMRI data, which were recorded in separate sessions while normal subjects executed voluntary right one-digit movements.