PROJECT ABSTRACT

A fundamental function of the human brain is the recognition of sensory objects and events which are dynamic and complex mechanisms underlying much of our successful interaction with the external environment. While many of the brain regions involved in perceptual and cognitive functions have been described, integrating the temporal and spatial dynamics of this processing stream has posed decades-long challenge to human neuroscience. While some loci and time courses of these processes have been described, the nature of the computations remains poorly understood. Spatio-temporal dynamics in the human brain remain largely unchartered territory, and thus the nature of the neural computations remains poorly understood.

Here the PI aims to characterize the spatiotemporal dynamics of perceived events, a crucial step towards understanding how the human brain creates mental representations, and switch between mental states. She proposes a novel brain mapping approach to combine magnetoencephalography (MEG) and functional MRI (fMRI) measurements by representational similarity analysis to yield a spatially and temporally integrated characterization of neuronal activation when people perceive or predict visual and auditory events. The approach is well suited to developing functional biomarkers to aid clinicians in diagnosing disorders, or pinpointing impairments as a precursor to therapeutic interventions. Importantly, the approach is well suited to study how to enhance or maintain a perceptual or cognitive function in the healthy brain.