

## **Neural Correlates of Emotional Processing and Electrophysiological Benchmarks for Neuromodulation in Mental Health**

Emotional processing is highly associated with our well-being, influencing mental health conditions like anxiety and depression. Understanding the neural mechanisms behind emotional face processing is crucial for developing more effective interventions for these conditions. My research explores emotional face processing in individuals with anxiety traits and depressive tendencies, as well as establishing electrophysiological benchmarks for transcranial magnetic stimulation (TMS) treatment in treatment-resistant depression (TRD). By examining facial expression processing through paradigms emotion recognition tasks with ambiguous faces, emotional perception bias was shown in individuals with anxiety traits and depressive tendencies. EEG oscillatory activity provides neural correlates clue for emotional irregularities, while TMS studies will explore the causal roles of specific brain regions in modulating emotional responses. Additionally, another ongoing research into establishing electrophysiological benchmarks for TMS in TRD. Using advanced analytical methods like Holo-Hilbert Spectral Analysis (HHSA) to decompose nonlinear and nonstationary EEG signals, we aim to identify specific neural oscillations that can be modulated with TMS to enhance treatment outcomes. These findings are expected to contribute to optimizing TMS effects through more personalized approaches, potentially advancing neuromodulation in mental health interventions.

Keywords: emotional face processing, anxiety traits, depressive tendency, electrophysiological marker, transcranial magnetic stimulation