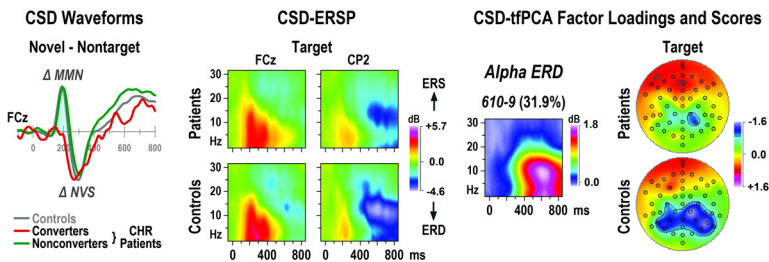


- ❑ The Psychophysiology Laboratory uses electrophysiological measures to study psychiatric disorders.
- ❑ The lab is a recognized leader in the field of cognitive electrophysiology.
- ❑ The group has developed advanced techniques for EEG/ERP processing and analysis.
- ❑ Their combined CSD-PCA approach provides reference-free measures with improved spatial resolution that directly represent neuronal generator activity.
- ❑ Publications describing and using these methods are available at the lab's [web site](#).

- ❑ **Dr. Bruder**, the director of the laboratory, is a scholar of cognitive processing and brain laterality in psychopathology and its relation to clinical features, including treatment response.
- ❑ **Dr. Tenke** has a strong background in neurophysiological (intracranial) animal research and is an Associate Editor of the journal *Clinical Neurophysiology*, the most esteemed outlet for basic and clinical EEG research and methods.
- ❑ **Dr. Kayser** has broad expertise in quantitative research methods for experimental psychology. He is an Associate Editor of the *International Journal of Psychophysiology* and on the editorial board of *Clinical Neurophysiology*.



Graphical abstract of Kayser et al (2013). Auditory event-related potentials and alpha oscillations in the psychosis prodrome: Neuronal generator patterns during a novelty oddball task. *Int J Psychophysiol*. doi: [10.1016/j.ijpsycho.2013.12.003](https://doi.org/10.1016/j.ijpsycho.2013.12.003)

## Highlights

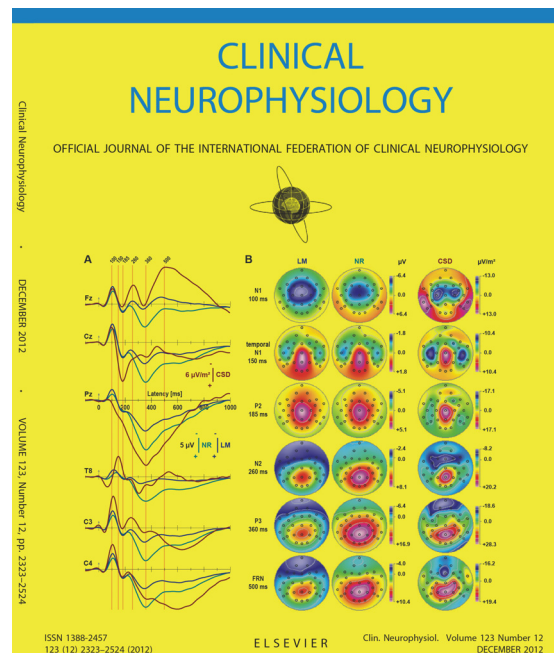
- NIH-funded > 30 yrs
- successful collaborations in academic research & industry
- state-of-the-art equipment and methodology
- innovative & novel research approaches
- high-resolution EEG (BioSemi® Active2, up to 72 channels)
- quantitative EEG (qEEG) measures
- event-related brain potentials (ERPs)
- P300 discovered by the lab founder, the late Sam Sutton

## Standard auditory/visual sensory/cognitive tasks

- tonic EEG at rest (eyes open/closed)
- oddball (two-tone, novelty)
- mismatch negativity (duration, pitch)
- loudness dependency
- working/recognition memory (continuous, serial position)

## Paradigms tailored to a specific research objective

- olfactory stimulation (odor detection) via olfactometer
- visual half-field paradigm and dichotic listening tasks
- parametric stimulus manipulation (tonal/phonetic, face/word, male/female voice)
- cognitive control (ignore/suppress)
- skin conductance (tonic/phasic, bilateral)



Invited review cover page for Tenke CE, Kayser J (2012). Generator localization by current source density (CSD): Implications of volume conduction and field closure at intracranial and scalp resolutions. *Clin Neurophysiol* 123(12):2328-2345. doi: [10.1016/j.clinph.2012.06.005](https://doi.org/10.1016/j.clinph.2012.06.005)

## Advanced EEG/ERP acquisition and analysis

- sound-attenuating and electrically-shielded IAC booths
- stimulus control (NeuroScan® Stim2, Presentations®)
- efficient ('pipelined') data processing
- rigid data quality control (artifact detection and removal)
- EEG power in classical frequency bands ( $\delta$ ,  $\theta$ ,  $\alpha$ ,  $\beta$ ,  $\gamma$ )
- ERP amplitudes (P1, N1, MMN, P2, N2, P3, N400, SW)
- current source density (CSD) transformation
- animated ERP/CSD topographies
- multivariate data reduction via PCA
- non-parametric randomization tests for unbiased statistics
- time-frequency measures of EEG oscillations (event-related de-/synchronization)