

Fundamentals and Applications of EEG

Lars Meyer

Research Group Language Cycles

Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, DE

Fundamentals and Applications of EEG introduces the electroencephalogram (EEG) and summarizes the state of the art in psycho- and neurolinguistic EEG research. Participants will study the neuronal substrate, recording, and analysis of scalp-level EEG data. They will learn about the timeline of event-related brain potentials (ERPs) from auditory perception to higher-level language comprehension—focusing on those ERPs that relate to sentence processing, highlighting the potential of the ERP methodology for experimental syntax research. In addition to ERPs, students will learn about complimentary research on the role of neural oscillations in speech perception and language comprehension, pointing out the vast fallow potential for the psycho- and neurolinguistic study of higher-level language comprehension.

1) Electrophysiology

- Generation and propagation of electrical potentials in neurons
- Local and global electrophysiological networks
- Recording of electrophysiological activity; technicalities and practicalities of EEG

2) ERPs of language comprehension

- Event-related brain potentials: principles, nomenclature, and caveats
- From sound to speech to language—from the brainstem to cortical networks
- 3,000 ms of language ERPs—from word recognition to syntax

3) Neural oscillations of language comprehension

- Electrophysiological bases of neural oscillations
- Oscillations of syntactic structure formation: chunking, storage, and retrieval
- Oscillations of predictive coding: prediction, diagnosis of fit, and accommodatio