



TECHNISCHE UNIVERSITÄT  
IN DER KULTURHAUPTSTADT EUROPAS  
CHEMNITZ

# Institut für Physik

## Physikalisches Kolloquium



**Donnerstag, 16.01.2025, 15:30 Uhr**

Ort: Reichenhainer Str. 90;  
Zentrales Hörsaal- und Seminargebäude, Raum C10.013

**Dr. Nadine Jacobsen**

Carl-von-Ossietzky-Universität Oldenburg

## From Artifacts to Insights: Mobile EEG for Gait Studies

Understanding how the brain supports walking in natural settings is key to advancing neuroscience and rehabilitation. Mobile electroencephalography (EEG) allows us to study brain activity during outdoor overground walking but brings unique challenges in managing artifacts and ensuring data quality. This talk presents findings from three studies addressing the cortical demands of walking, the extent of gait-related artifacts, and an exploration of preprocessing strategies in mobile EEG.

First, we investigated how the brain adapts to walking on different terrains, and while multitasking. In a study with 19 participants, we found that walking on uneven surfaces or performing a simultaneous task altered both gait patterns and brain activity, shedding light on how the brain balances motor and cognitive demands during real-world movement.

Second, we introduced a framework, the multidimensional footprint of gait-related artifacts, to assess gait-related artifacts in mobile EEG data. This approach may help researchers select suitable methods for artifact reduction or compare systems.

Finally, we systematically reviewed preprocessing strategies used in mobile EEG studies of walking. We identified common practices and gaps, such as inconsistent reporting of critical parameters. To improve transparency and reproducibility, we developed a web app enabling researchers to compare their preprocessing choices with existing literature and expert recommendations. Understanding how these choices impact results will improve mobile EEG reproducibility and reliability.

This work combines insights into cortical correlates, artifact management, and preprocessing practices of mobile EEG captured during walking. It opens opportunities to apply mobile EEG to use cases beyond the lab, from understanding movement control to improving rehabilitation.



Alle Zuhörer sind ab 15:15 Uhr zum Kaffee vor dem Hörsaal eingeladen.

Informationen zum Vortrag erteilt:  
Prof. Dr. Alexandra Bendixen, Tel.: 531 31681

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