

# NEUROCAMPUS AARHUS LECTURE BY HONORARY SKOU PROFESSOR, ULF ZIEMANN 9 OCTOBER 2026



## Non-invasive Therapeutic Brain Stimulation: The Vision of Closed-loop Approaches

State-of-the-art therapeutic non-invasive brain stimulation using transcranial magnetic stimulation (TMS) technology is applied following the one-size-fits-all concept. Stimulation protocols are fixed and non-adaptive. This non-individualized approach limits therapeutic efficacy. I will present a novel concept that utilizes instantaneous electrophysiological brain state information derived from real-time analysis of EEG signals to determine which brain states should be targeted for maximizing treatment effects. Also, the even more advanced development of adaptive closed-loop TMS protocols will be discussed, and preliminary data will be presented. Closed-loop brain stimulation may become a disruptive technology for highly effective individualized therapeutic modification of dysfunctional brain networks in a broad variety of neurological and psychiatric disorders.



**Ulf Ziemann**

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Honorary Skou Professor, Aarhus University

**Coffee and cake will be served after the lecture, providing an opportunity for networking and informal discussions.**