

"Spatio-temporal EEG patterns in wakeful rest and sleep, from oscillations and spectra to a cortical weather report"

Speaker: Dr Frederic von Wegner, SoMS, UNSW.



Frederic von Wegner studied Medicine at the University of Heidelberg (Germany) and the University Complutense, Madrid (Spain). He received his license to practice medicine in 2004 and a doctorate in Physiology in 2007 from the University of Heidelberg, followed by postdoctoral research in the Dept. of Physiology and the Max Planck Institute for Medical Research in Heidelberg. He then had a combined researcher-clinician position at the Goethe University in Frankfurt (Germany), receiving his board certification as Neurologist in 2015, and subspecialty in Neurointensive Care in 2019. He moved to Sydney to join UNSW in October 2019. His research includes simultaneous EEG-fMRI of wake-sleep transitions in humans, and the characterization of spatio-temporal EEG patterns in wakefulness, sleep and epilepsy.

Synopsis:

Surface electroencephalography (EEG) is one of the most frequently used clinical tools to assess the electrical activity of the cerebral cortex, and to classify healthy and pathological vigilance states (wake, sleep, epilepsy, coma). EEG activity commonly appears in the form of oscillations in well characterized frequency bands and with typical spatial topographies. Routine clinical analyses mostly focus on either spatial or temporal/spectral properties of the signal, while research questions also take into account measures such as phase coupling to measure functional connectivity between different cortical areas.

In this talk, he will give an overview of approaches aiming to combine temporal and spatial EEG properties, resulting in an image of standing wave activity patterns. Cortical activity patterns recur periodically and this periodicity changes during the transition to sleep. Using different signal processing and data visualization techniques, Frederic will illustrate how to combine multi-channel EEG data into an approximate "weather report" of ongoing cortical activity and cross-regional coupling.

All welcome!

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