

Göttingen Summer School

The Role of Neural Oscillations in Human Cognition

Venue: Landhotel Am Rothenberg, Uslar, Germany

Date: 14-17 August 2017

Description:

Oscillations are inherent feature of neuronal networks. The potential functional roles of oscillations are diverse, but contentious. Brain oscillations have been associated with perceptual, motor and cognitive processes including perceptual binding, attention, and memory. They appear in the brain in various frequency bands, which may occur simultaneously and interact with one another. The multilevel organization of brain oscillations integrates functional brain systems across multiple spatiotemporal scales, and thus implies a sophisticated solution for the highly precise temporal coordination between the fast local neuronal computations with external input and the global system state. Malfunction of the dynamics underlying oscillations and synchronization are used to explain dynamical pathological conditions such as epilepsy, schizophrenia and Parkinson disease. Further research into understanding network dynamics should provide essential information about how brain functions emerge from the intricate interactions between local and global dynamics. Although it is widely accepted that the precise coordination of different oscillatory activities plays an important role in brain functions, many aspects of the fundamental underlying mechanisms remain unknown. The main topic of the summer school is the new developments in neurophysiology and neuroscience to study the brain's ability to generate and maintain neuronal oscillations and the possibility to modulate them with the non-invasive brain stimulation.

Aim:

This summer school aims to provide to younger researchers, coming from different fields, knowledge about the recent progress in network science with the specific focus on the imaging and manipulation with underlying mechanisms that govern the brain rhythms at the various levels of organization, and their functional implications for perception, cognition and learning. We will focus on the interactions between structure, dynamics and function and we will present new emerging trends for studying the fundamental mechanisms of brain oscillations using advanced transcranial electrical stimulation and neuroimaging methods.

About the venue:

Landhotel Am Rothenberg is located in Uslar, Germany. It is nice and quiet country resort in a relaxed environment that will ensure ideal conditions for the summer school.



Registration:

The number of attendees is limited to 30 in order to ensure the vivid and inclusive discussions. The registration fee, incl. catering and accommodation for the whole event, is supported by the Volkswagen Foundation (<https://www.volkswagenstiftung.de>).

Program of the Göttingen Summer School 14-17th August, 2017

1 st day (14 th)		2 nd day (15 th)		3 rd day (16 th)		4 th day (17 th)	
10:00	Welcome Note <i>A. Antal, Z. Turi, I. Alekseichuk</i>	09:00	Transcranial Brain Stimulation Techniques <i>W. Paulus</i>	09:00	"Oscillatory" Neuronal Control Signals for Brain-Computer Interfaces <i>T. Ball</i>	09:00	Model-Based Cognitive Neuroscience <i>M. Mittner</i>
10:50	Coffee Break	10:30	Coffee Break	10:30	Coffee Break	10:30	Coffee Break
11:00	Searching for Memory in Brain Waves <i>S. Hanslmayr</i>	11:00	Tuning Brain Stimulation to Brain Oscillations to Modulate Attention and Perception <i>G. Thut</i>	11:00	Rhythms for Cognition: Communication Through Coherence <i>P. Fries</i>	11:00	Transcranial Electric Stimulation in Clinical Applications <i>A. Antal</i>
12:30	General Discussion	12:30	General Discussion	12:30	General Discussion	12:00	General Discussion
13:00	Lunch Break	13:00	Lunch Break	13:00	Lunch Break	12:30	Lunch Break
14:30	Brain Rhythms, Neural Circuits and Memory <i>L. Colgin</i>	14:30	Complex Neuronal Dynamics in the Human Brain <i>V. Nikulin</i>	14:30	Neuronal Oscillations During Sleep in Humans <i>I. Rosenzweig</i>	14:00	Final Discussion, Remarks <i>A. Antal</i>
16:00	Coffee Break	15:30	Coffee Break	16:00	Coffee Break	15:00	Coffee Break
16:30 18:30	Poster Presentations	16:00 18:30	Round Table Discussion	16:30	Dynamic Information Routing in Neural Networks <i>W.C. Chou</i>	15:30	End of the Summer School
19:00	Dinner	19:00	Dinner	19:00	Dinner		