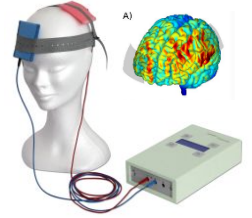
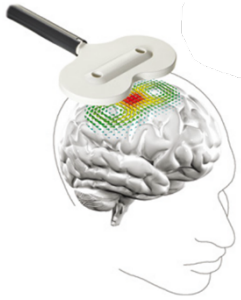


# Transcranial Brain Stimulation: From Basics to Advanced Applications

Oct. 10.-12. 2022 (3-day workshop)

**Prof. Til Ole Bergmann & Dr. Tulika Nandi**

*Neuroimaging Center (NIC), University Medical Center Mainz*



Non-invasive brain stimulation techniques such as transcranial magnetic stimulation (TMS), transcranial electrical stimulation (tES), and since recently also transcranial ultrasound stimulation (TUS), are important tools in cognitive neuroscience and human neurophysiology. The ability to experimentally manipulate local neural activity allows the investigation of causal structure-function relationships that complement the correlative approach of neuroimaging and electrophysiology. "Online" approaches, assessing the immediate neural response to stimulation, can be used to (i) quantify neuronal network properties such as excitation, inhibition, or connectivity, (ii) interfere with ongoing spontaneous or task-related activity and thereby affect behavioral performance, or (iii) modulate the level and timing of neuronal activity. In contrast, "offline" approaches can be utilized to either (iv) inhibit or (v) facilitate local neuronal excitability via synaptic plasticity, assessing its subsequent effects on neural activity and behavior. This workshop consists of lectures and discussions covering the theoretical background on stimulation techniques, physiological mechanisms, experimental paradigms, and combination with neuroimaging/electrophysiology, as well as practical demonstrations and hands-on experience.

## Tentative Programme

**Day 1 – TMS**

**Day 2 – tES, TUS and lab visit**

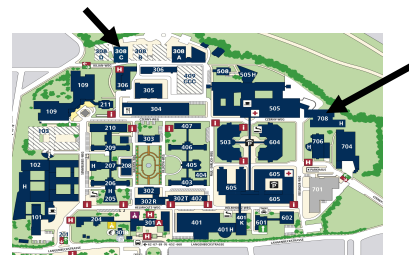
**Day 3 – Advanced approaches**

Physics & Fundamentals  
Approaches, Protocols, Paradigms  
How to Determine Stimulation Site and Intensity  
Neurophysiological Mechanisms  
Safety  
Lab Visit and Hands-on Experience  
Clinical Neurophysiology & Treatment  
Neuroenhancement & Ethical Considerations  
Combining Brain Stimulation with Neuroimaging  
TMS-EEG Recording & Analysis  
TMS-fMRI Recording & Analysis  
Brain State-dependent Brain Stimulation

## Information

**Time:** Oct. 10.-12.2022, 10:00 – 17:00 h

**Location:** "Großer Hörsaal" (building 708) for all lectures, and Neuroimaging Center (building 308c) for the lab visit in the afternoon of day 2



**Registration:** [tulika.nandi@uni-mainz.de](mailto:tulika.nandi@uni-mainz.de)

**Credits:** 3 CP

**Fee:** none (the workshop is only available for members of institutes participating in the *Rhine-Main Neuroscience Network*; [www.rmnn2.de](http://www.rmnn2.de))