

Workshop II:

**Transcranial electric and Magnetic stimulation in Behavioral and Neuroimaging studies:
Theoretical and Practical considerations**

Lugar: Universitat Jaume I (Castelló de la Plana); Facultad de Ciencias de la Salud (aula MD1111AA)

Fecha de celebración: 24 y 25 de noviembre de 2022 (modalidad presencial)

Profesorado: Prof. Dr. Markus Junghöfer

Idioma en el que se impartirá el curso: Inglés

Brief CV:

Markus Junghöfer is Professor for Affective and Cognitive Neuroscience at the University of Münster (Germany), and Senior Scientist in the Biomagnetism and Biosignalanalysis Institute (IBB), Münster University Hospital, with an extensive scientific productivity and numerous special mentions. His research interest has focused on neural correlates of emotion and attention, emotional communication and the impact of stress on emotional perception. Dr. Junghöfer is currently an expert in the modulation of human neuronal activity during emotional processing using a variety of electric and magnetic brain stimulation techniques, such as repetitive Transcranial Magnetic Stimulation (rTMS), Theta Burst Stimulation (TBS), transcranial Static Magnetic Stimulation (tSMS), transcranial Direct Current Stimulation (tDCS), transcranial Alternating Current Stimulation (tACS) and Electro-Convulsive Therapy (ECT). The readout neuroimaging methods were magneto- and electroencephalography (MEG, EEG) and functional magneto resonance imaging (fMRI), focusing on the dorsolateral and ventromedial prefrontal cortex in different pathologies, such as Major Depressive Disorder.

https://scholar.google.com/co/citations?hl=en&user=5qvzqxwAAAAJ&view_op=list_works&sortby=pubdate
https://www.researchgate.net/profile/Markus_Junghoefer/research
<https://www.uni-muenster.de/OCCMuenster/members/markus-junghoefer.html>

Workshop description:

Bioelectromagnetism has contributed some of the most commonly used techniques to human neuroscience such as magnetoencephalography (MEG), electroencephalography (EEG), transcranial magnetic stimulation (TMS), and transcranial electric stimulation (TES). The considerable differences in their technical design and practical use give rise to the impression that these are quite different techniques altogether. In this workshop we will first discuss the fundamental principle of Helmholtz reciprocity that provides a common ground for all four techniques. We will then focus on different electric and magnetic neuro-stimulation techniques, discuss their underlying principles and exemplified studies. In hands-on sessions participants will learn how to use transcranial Direct Current Stimulation (tDCS) as an electric and transcranial Static Magnetic Stimulation (tSMS) as a magnetic example for brain stimulation in behavioral and neuroimaging studies. We will also discuss safety issues, possible side effects as well as ethical considerations. There will be tDCS and tSMS equipment for the hands-on sessions. I am looking very much forward to meeting you.

Schedule:

Thursday 24 November: Session I (9:30h -14h); Session II (16h-20:30h).

Friday 25 November: Session III (9h-14h)

Suggested literature:

Gross J, Junghöfer M, Wolters W (2021) Bioelectromagnetism in human brain research: New applications, new questions. *The Neuroscientist*. doi: 10.1177/10738584211054742

Junghöfer M & Winker C, Rehbein MA & Sabatinelli D (2017) Noninvasive stimulation of the medial prefrontal cortex enhances pleasant scene processing. *Cerebral Cortex* 27(6):3449-3456 doi: 10.1093/cercor/

Notzon S, Steinberg C, Zwanzger P & Junghöfer M (2018) Modulating Emotion Perception: Opposing Effects of Inhibitory and Excitatory Prefrontal Cortex Stimulation. *Biological Psychiatry- Cognitive Neuroscience and Neuroimaging* 3(4):329-336. doi.org/10.1016/j.bpsc.2017.12.007