

# IGSN - SYMPOSIUM

Monday, February 26<sup>th</sup> 2024 • 15.00 (3 pm)

FNO – 01 / 117

## Deeper underground: opportunities and challenges of noninvasive or minimally invasive deep brain stimulation techniques

### NIR GROSSMAN

Department of Brain Sciences, Faculty of Medicine and UK Dementia Research Institute centre, Imperial College London, London, UK

### Non-invasive Temporal Interference Deep Brain Stimulation

Deep brain stimulation (DBS) via implanted electrodes has been used worldwide to treat patients with severe movement and affective disorders. However, the risk associated with inserting electrodes into the brain makes exploring different brain targets difficult and limits the therapeutic impact. We developed a technology to modulate neural activity in deep brain structures without surgery. The technology is based on temporal interference (TI) of multiple kHz electric fields, which are too high to recruit effective neural firing but for which their difference frequency is sufficiently low to drive neural activity (Grossman, Science 2018). I will describe the principles of TI brain stimulation and the series of tests we conducted to validate it in rodents (Grossman et al, Cell 2017) and humans (Violante et al., Nature Neuroscience, in press). Finally, I will outline our recent insights into the biophysical mechanisms of TI neural stimulation and our ongoing efforts to translate it into therapy for Alzheimer's disease.

#### Host:

VUK MARKOVIC

Department of Psychology and Neurosciences, Leibniz Research Centre for Working Environment and Human Factors, Dortmund