IGSN CONFERENCE
25 Years of Neuroscience Excellence

April 21-22, 2026

Session 2: Bridging Engineering and Neuroscience: Advances in Neuromodulation, Psychosis Research, and Haptic Technology

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PARAMETRIZATION IN NEUROMODULATION – CURRENT CHALLENGES AND FUTURE DIRECTIONS

Neuromodulatory techniques that non-invasively influence the physiology of the human brain such as transcranial magnetic and electrical stimulation have been in use for many decades now. Currently, these two techniques have received approval from the US FDA for the treatment of some pharmaco-resistant neuropsychiatric disorders. Their efficacy is however critically dependent on stimulation parameters such as the stimulation pulse/current amplitude, pulse waveform, current direction, frequency, phase, polarity etc. This large parameter space makes it difficult to properly dose stimulation for research and treatment purposes. This is further complicated by the presence of other influencing variables specific to the population/individual. Over the last decade, many attempts have been made to systematically optimize the neuromodulatory effects of these techniques at the individual and group levels. In this talk, I explore the importance of TMS, tDCS/tACS parameters, how optimization can help address many issues with efficacy, and what challenges remain. I conclude by discussing some recommendations for the selection of parameters in neuromodulation studies.