UNIVERSIDAD POLITÉCNICA DE MADRID — POLITÉCNICA

CTB centro de tecnología biomédica

SEMINAR

Alexander Pisarchik
Ageing-UPM, Center for Biomedical Technology

"Decoding Sustained Selective Attention by Unveiling Brain Response to Ambiguous Visual Stimulus"

14th June 2023
11:00 – 12:00

Venue: Conference Hall, Center for Biomedical Technology (CTB) Universidad Politécnica de Madrid (UPM), Campus Montegancedo M-40 km. 38, 28223 Pozuelo de Alarcón, Madrid.

How to arrive: http://www.ctb.upm.es/contact/

Zoom link: https://upm.zoom.us/j/82683462959

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PROGRAM

Abstract: Sustained selective visual attention is a remarkable cognitive ability that enables us to concentrate on specific visual stimuli for extended periods, effectively ignoring irrelevant or distracting information. This ability plays a crucial role in tasks demanding continuous concentration, such as reading, studying visual materials, and analyzing complex visual data. In this study, we devised a novel method for assessing sustained visual attention using bistable images as a paradigm. Our approach revolves around the human imaginative perception of the Necker cube orientation. Through careful analysis of MEG and EEG signals, we successfully identified frequency tags in the visual cortex that correlated with participants' attention performance. Interestingly, we made a fascinating discovery – a positive correlation between heightened attention and increased brain noise, challenging conventional notions of brain function. These findings not only deepen our understanding of attentional processes but also hold great promise for future research and interventions aimed at enhancing visual attention abilities. Furthermore, our refined approach holds tremendous potential for the development of groundbreaking brain-computer interfaces and brain-to-brain interfaces that leverage ambiguous visual stimuli, facilitating the mental control of external devices and enabling seamless communication between individuals.

Dr. Alexander Pisarchik is Distinguished Researcher, Chair of Computational System Biology at the Center for Biomedical Technology, Universidad Politécnica de Madrid. He made significant contributions to modelling real-world systems using physical-mathematical and computational approaches. In particular, he applied concepts from nonlinear science to understand brain activity and neuronal dynamics. Pisarchik also developed novel methods for neurophysiological data analysis and applications to brain-computer and brain-to-brain interfaces. He is the author of 5 monographs, 17 book chapters, 10 patents, and more than 300 papers in peer-reviewed scientific journals. He presented more than 60 invited and plenary lectures at international scientific conferences, supervised 12 PhD students, and coordinated 30 research projects. Pisarchik is Associate Editor of Applied Sciences and Frontiers in Network Physiology, Academic Editor of PLoS One, Section Editor of Open Life Sciences, Editor-in-Chief of Advances in Biology, Biotechnology and Genetics, and Editorial Board Member of various journals.