

The group constitutes an interdisciplinary team that bridges the fields of medicine, physics, psychology, engineering and mathematics.

### Main scientific interest:

Translating the most advanced neuroscientific research findings in innovative interventions, treatments and practices that will enhance cognitive, physical and emotional functioning of both healthy population as well as patients. Using methodologies like Electroencephalography (EEG), Neurofeedback (Nf), Magnetoencephalography (MEG), Magnetic Resonant Imaging (MRI) and combining their outcome with behavioral and computer based interventions, the aim of the group is to promote cognitive health and emotional wellbeing throughout the life span.

### Key-areas of Expertise:

- Affective computing modelling and feedback to avatar and other intelligent engines
- Affective stimuli development and presentation
- Experimental design of brain and peripheral recordings
- Brain signal processing and algorithm development
- Brain data mining
- Brain source analysis using different localization methods
- Functional connectivity analysis techniques
- Functional neuroimaging analysis techniques
- ICU modelling of the weaning processes
- Acquisition and handling of neurophysiological, psychological data and ICU signals.
- Data unimisation and warehousing
- Interictal epileptic activity tracking and modelling
- Brain plasticity
- Human emotion recognition
- Developmental and attention disorders
- Brain training of specific cognitive functions across the life span
- Brain studies of alcohol and substance abuse
- Neurofeedback training
- Music training
- Education and training provision (lectures, workshops, seminars) in all above areas.

## Funded Research Projects

*Long Lasting Memories Project (LLM), Neuroscientific analysis of brain training effects in the elderly (www.longlastingmemories.eu). Funded by EC-PSP-CIP*

*WHAAM, Web Health Application for ADHD Monitoring, build tools to monitor ADHD (www.whaamproject.eu), Funded by EC- Lifelong Learning Programme*

*ALCOOHOL, Affective neuroscience of alcohol consumption, Funded by Greek Ministry of Health*

*STHENOS, Affective computing and the neuroscience of emotion (www.sthenos.gr). Funded by Greek Ministry of Education*

*AFFECTION, Detecting and imaging human emotion. Funded by Greek Secretariat of Research and Development*

## Key Publications

- Bamidis PD, Vivas AB, Styliadis C, Frantzidis C, Klados M, Schlee W, Siountas A, Papageorgiou SG. A review of physical and cognitive interventions in aging. *Neurosci Biobehav Rev.* 2014 doi: 10.1016/j.neubiorev.2014.03.019.
- Gruzelier J, Bamidis P, Babiloni F, de Ridder D. Editorial. *Neurosci Biobehav Rev.* 2014 May 13. doi: 10.1016/j.neubiorev.2014.05.003
- Paraskevopoulos E, Kuchenbuch A, Herholz SC, Foroglou N, Bamidis P, Pantev C. Tones and numbers: A combined EEG-MEG study on the effects of musical expertise in magnitude comparisons of audiovisual stimuli. *Hum Brain Mapp.* 2014 doi: 10.1002/hbm.22558.
- Frantzidis CA, Ladas AK, Vivas AB, Tsolaki M, Bamidis PD. Cognitive and physical training for the elderly: Evaluating outcome efficacy by means of neurophysiological synchronization. *Int J Psychophysiol.* 2014 doi: 10.1016/j.ijpsycho.2014.01.007.
- Styliadis C, Ioannides AA, Bamidis PD, Papadelis C. Amygdala responses to valence and its interaction by arousal revealed by MEG. *Int J Psychophysiol.* 2013. doi: 10.1016/j.ijpsycho.2013.05.006.
- Klados MA, Kanatsouli K, Antoniou I, Babiloni F, Tsirka V, Bamidis PD, Micheloyannis S. A Graph theoretical approach to study the organization of the cortical networks during different mathematical tasks. *PLoS One.* 2013, 8(8):e71800. doi: 10.1371/journal.pone.0071800
- Lithari C, Klados MA, Pappas C, Albani M, Kapoukranidou D, Kovatsi L, Bamidis PD, Papadelis CL. Alcohol affects the brain's resting-state network in social drinkers. *PLoS One.* 2012;7(10):e48641. doi: 10.1371/journal.pone.0048641.
- Styliadis C, Papadelis C, Konstantinidis E, Ioannides AA, Bamidis P. An MEG compatible system for measuring skin conductance responses. *J Neurosci Methods.* 2013, 212(1):114-23. doi: 10.1016/j.jneumeth.2012.09.026.
- Frantzidis CA, Bratsas C, Klados MA, Konstantinidis E, Lithari CD, Vivas AB, Papadelis CL, Kaldoudi E, Pappas C, Bamidis PD. On the classification of emotional biosignals evoked while viewing affective pictures: an integrated data-mining-based approach for healthcare applications. *IEEE Trans Inf Technol Biomed.* 2010;14(2):309-18. doi: 10.1109/TITB.2009.2038481.
- Lithari C, Frantzidis CA, Papadelis C, Vivas AB, Klados MA, Kourtidou-Papadeli C, Pappas C, Ioannides AA, Bamidis PD. Are females more responsive to emotional stimuli? A neurophysiological study across arousal and valence dimensions. *Brain Topogr.* 2010, 23(1):27-40. doi: 10.1007/s10548-009-0130-5.
- Papadelis C, Kourtidou-Papadeli C, Bamidis P, Albani M. Effects of imagery training on cognitive performance and use of physiological measures as an assessment tool of mental effort. *Brain Cogn.* 2007 Jun;64(1):74-85.
- P.D. Bamidis, C. Papadelis, C. Kourtidou-Papadeli, C. Pappas, A. Vivas, "Affective computing in the era of contemporary neurophysiology and health informatics", *Interacting with Computers*, 2004, 16(4):715-721