

**Electric Neuronal Oscillations and Cognition:  
Action background and research priorities**  
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Summary

The idea for the EU/ESF COST Action “Electric Neuronal Oscillations and Cognition (ENOC)” was born during a visit of scientists from the Faculty of Medicine, University of Skopje and the Macedonian Academy of Sciences and Arts to the Faculty of Medicine, Imperial College and the Royal Society, London. Four months later, in October 2003, a Letter of Intention was sent to the COST Office in Brussels from the Department of Pediatric Psychophysiology, Faculty of Medicine, University of Skopje. As defined the main objective of the Action is “to increase the knowledge of the electric neuronal oscillations correlated to memory and attention as the basis for neuronal regulation aimed at enhancing the human performance and health”.

The complete text of the Proposal has been reviewed by nine evaluators (nominated by corresponding Technical Committees: three from Medicine and Health, four from Physics and two from Telecommunications, Information Science and Technology). Thus, the Evaluator 1 from Medicine and Health explains the complexity of the subject: "The conclusion is that the subject of the proposal is highly important in the further understanding of neurofunctionality. A revealing of the communication system in the brain would be the most remarkable discovery in our generation. The project can be grouped under basic science; however, new knowledge within the field will automatically imply new thinking in clinical fields like psychiatry, and in more general, a better understanding of the behavior of people in their daily lives".

The Action has been launched at the 161st CSO meeting on 15 March 2005 in Brussels. Soon after, eight European countries have signed the Memorandum of Understanding, and now this number is increased to 17.

The Management Committee (MC) of the Action has hold two meetings – the first in Brussels (23.05.2005) and the second in Istanbul (04.09.2005). The three working groups had their first meetings in Istanbul (03.09.2005), with three parallel sessions and two plenary sessions. The present meeting is the first of the three yearly seminars scheduled in the Timetable of the Action, with the aim to ensure a critical review of the results and mutual cross-fertilizing discussions.

The research of working groups is concentrated on:

1. Theoretical consideration (WG1) – Extending and developing new methods for EEG signal analysis, as well as chaos synchronization of different neuron models.
2. Diagnostic and treatment (WG2) – Application of biofeedback, neurofeedback and quantitative EEG for research and clinical treatment of ADHD and other cognition related disorders.
3. Experimental studies (WG3) – Investigation of memory, attention, perception and executive functions, applying various tools (EEG, ERP, MEG, single cell recordings, local field potentials, and event-related desynchronization/synchronization).

ENOC is very well tuned to the concept of the new domain “Biomedicine and molecular biosciences” (BMBS) which encourages the complexity and multidisciplinary, and encompasses nanomedicine, bioinformatics, medical physics and chemistry as well as mathematical models in medicine.

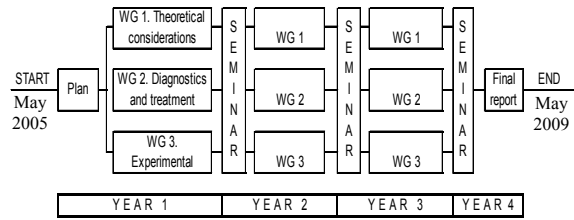
More details about the Action can be found on [www.manu.edu.mk/costb27](http://www.manu.edu.mk/costb27)

First COST B27 Seminar, Skopje 12 May 2006

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**ENOC Timetable**



*(MoU – Technical Annex)*

**Objectives**

The main objectives is to increase the knowledge of the electric neuronal oscillations correlated to memory and attention as the basis for neuronal regulation aimed at enhancing the human performance and health.

"The conclusion is that the subject of the proposal is highly important in the further understanding of neurofunctionality. A revealing of the communication system in the brain would be the most remarkable discovery in our generation. The project can be grouped under basic science; however, new knowledge within the field will automatically imply new thinking in clinical fields like psychiatry, and in more general, a better understanding of the behavior of people in their daily lives".

*(Evaluator 1)*

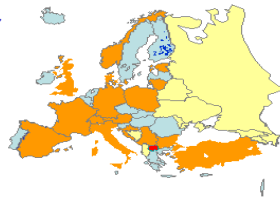


B27: «ELECTRIC NEURONAL OSCILLATIONS AND COGNITION »(ENOC)

Approved:  
EU/ESF, Brussels  
15.03.2005

Participating COST Countries: 17  
Chair: MK

AT, BG, HR, DK, EE,  
FR, DE, IT, LT, NO, PL,  
CS, ES, CH, TR, UK



Other countries:  
CA, JP, NZ,  
RU, US

Economic Dimension: € 24 Million  
Duration: 4 years

**Research topics in WG1  
“Theoretical Considerations”**

- EEG signal analysis (8 institutions)
  - Extending and developing new methods and codes for EEG signal analysis
  - Conducting practical EEG signal analysis
- Chaos synchronization (10)
  - General theoretical models of synchronization
  - Synchronization of different neuron models

### Research topics in WG2 “Diagnostics and Treatment”

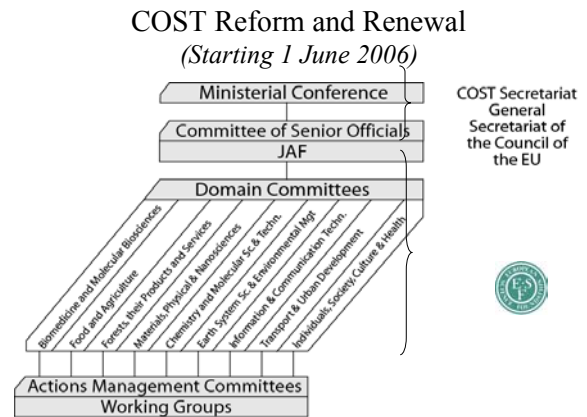
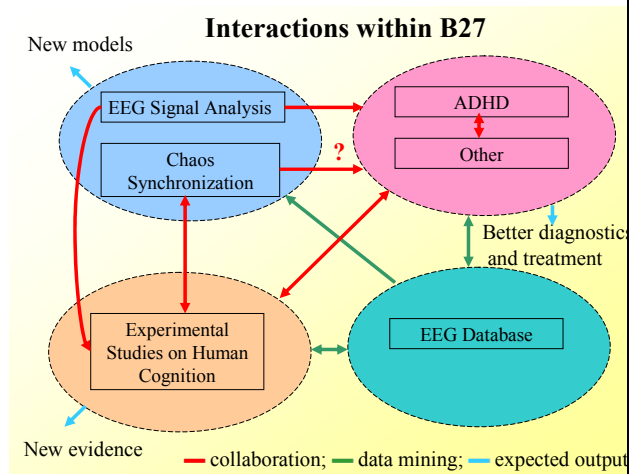
Application of biofeedback, neurofeedback and quantitative EEG (qEEG) for research and clinical treatment of:

- ADHD (9)
- Other cognition related disorders (5)

### Research topics in WG3 “Experimental Studies”

Investigation of : memory, attention, perception and executive functions (10)

Tools: EEG, ERP, MEG, single cell recordings, local field potentials, neurochemistry, and event-related desynchronisation/synchronisation



### The new BMBS domain encompass:

- “ study of Central Nervous System and neuronal connections”
- “ bioinformatics, medical physics and chemistry, mathematical models in medicine”
- “ micro-and nanomedicine”
- “ high degree of complexity and multidisciplinary”

### Special type of COST Actions

“Young Investigators Networks” (YIN):

- Exclusively for young scientists at postdoc level, (PhD + max. 5 years); min. 8 young scientists with international experience from 5 COST member states
- Eligible activities: meetings, Short Term Scientific Missions, seminars, conferences, outreach activities, plus: centrally organised & funded special “YIN Conferences” and research management training
- Support: 90 k € p.a. as annual grant for up to 4 years
- Pilot Call for YINs expected in summer 2006 to test the demand