

Postgraduate student: Meropi Topalidou

Thesis Title:

## **Analysis of the periodicity of brain activity recordings from local field potentials (LFPs)**

### Abstract

We developed a methodology for the analysis of electrical signals from electrophysiological recordings of brain activity over time (cluster analysis, cross-correlation analysis, time-series analysis). The raw material for this thesis comes from recordings made by researchers at the Laboratory of Neurophysiology Institute for Biomedical Research, Academy of Athens (BRFAA).

Generally, brain activity is characterized by complex signals with high complexity and seemingly chaotic behavior. To study this very important network effect, methods were developed to allow time signal analysis in order to identify signal patterns linked to the experimental activation patterns of brain regions.

Specifically, algorithms were applied to each recording in order to extract the period which explains in the best possible way, i.e., the minimum error, the occurrence of the events. We then examined if statistical differences exist between the groups using Kolmogorov – Smirnov test.

Our findings indicate that for the age categories, there are statistically significant differences mostly between the older of 90 days mice and the younger of 35 days. While in case of different sex relative to their genotype and age, the categories that differ are those of sex type of elderly mice.

**SUBJECT AREA:** SIGNAL PROCESSING, BIOLOGICAL SIGNAL PROCESSING

**KEYWORDS:** RECORDING LOCAL FIELD POTENTIALS, BRAIN ACTIVITY, PERIODICITY

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