

CHALLENGES

Health, demographic change and well-being

The Industrial Problem

Exploration of the possibility of improvements in an emerging technology for the treatment of the epileptic patients resistant to medication (comprising 30% of all).

HU-MATHS-IN SZTAKI



The group has been formed within the major Hungarian research institute in computer science and control.

Company name



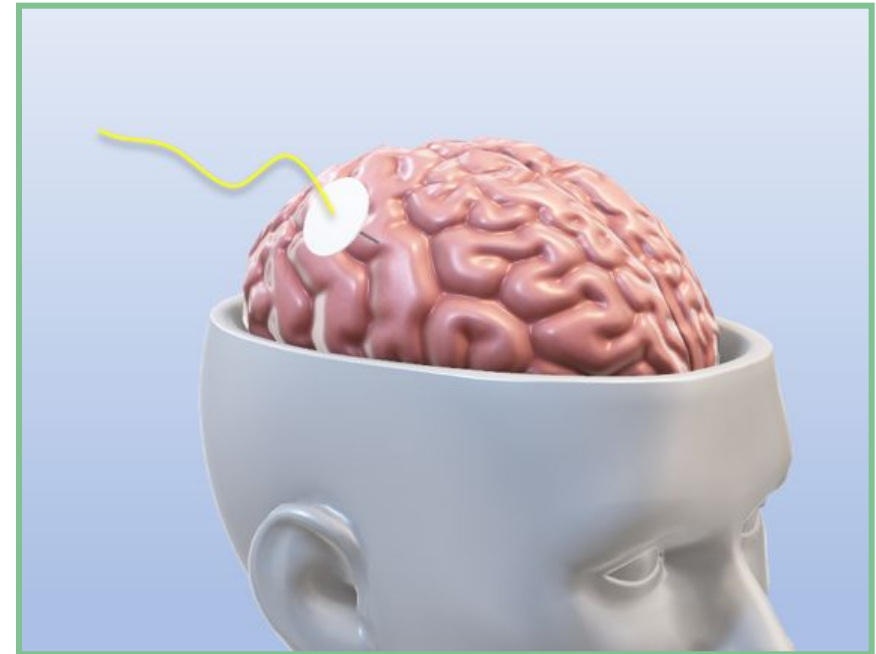
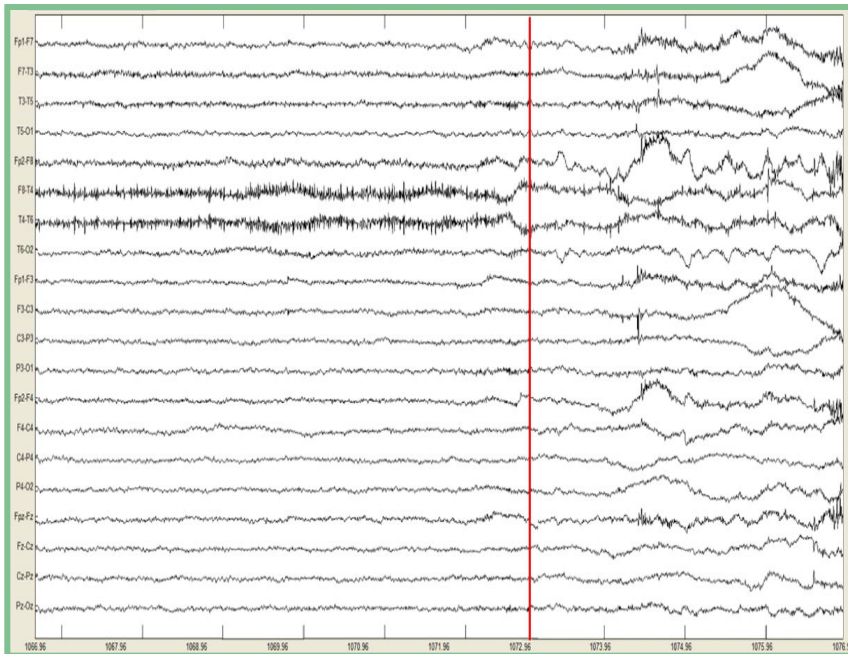
The third largest neurosurgical centre of Europe and regional epilepsy center with a commitment to better healthcare.

Challenges & Goals

- To model brain electrical activity
- To adapt methods from seismology
- To simulate and identify Hawkes processes
- To provide theoretical justification

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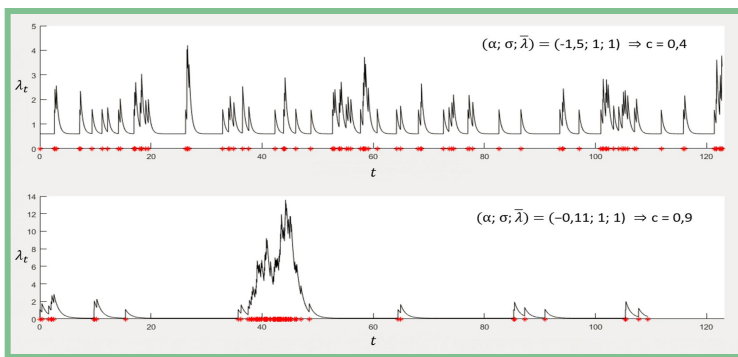
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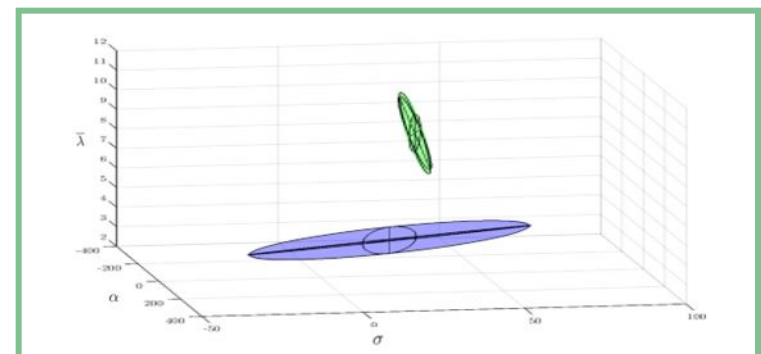
Schematic image of a thumbtack type laminar multielectrode inserted in the brain.

Mathematical and computational methods and techniques applied

- Mathematical modelling based on the theory of point processes.
- Applying maximum likelihood estimation.
- Testing with simulated and real data.



Intensities of simulated Hawkes processes



Confidence ellipsoids for two Hawkes processes

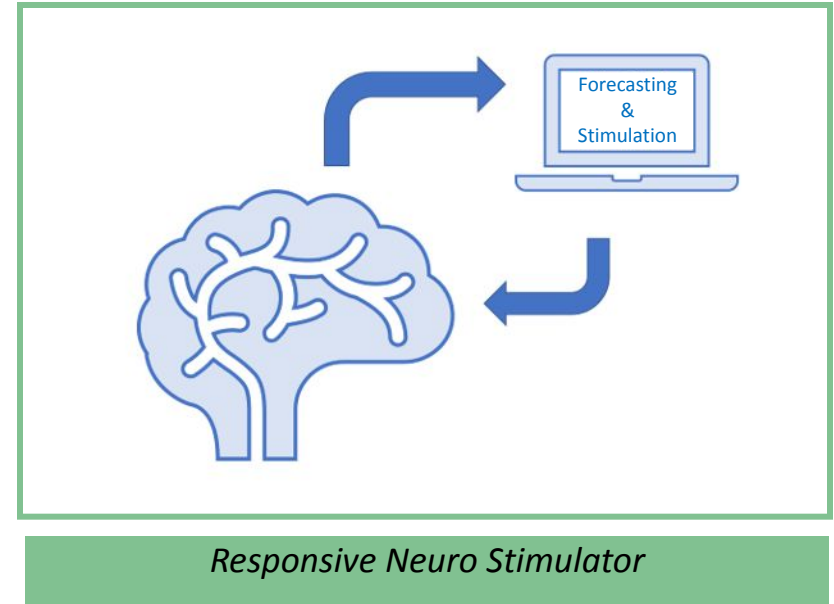
Results & Benefits to the company

- Results

Published results of the project serving as mathematically rigorous and computationally tested components for future joint research.

- Benefits

Front-line mathematical technologies and services made accessible to the company.



Front line mathematical technology and services for new therapies in epileptology