

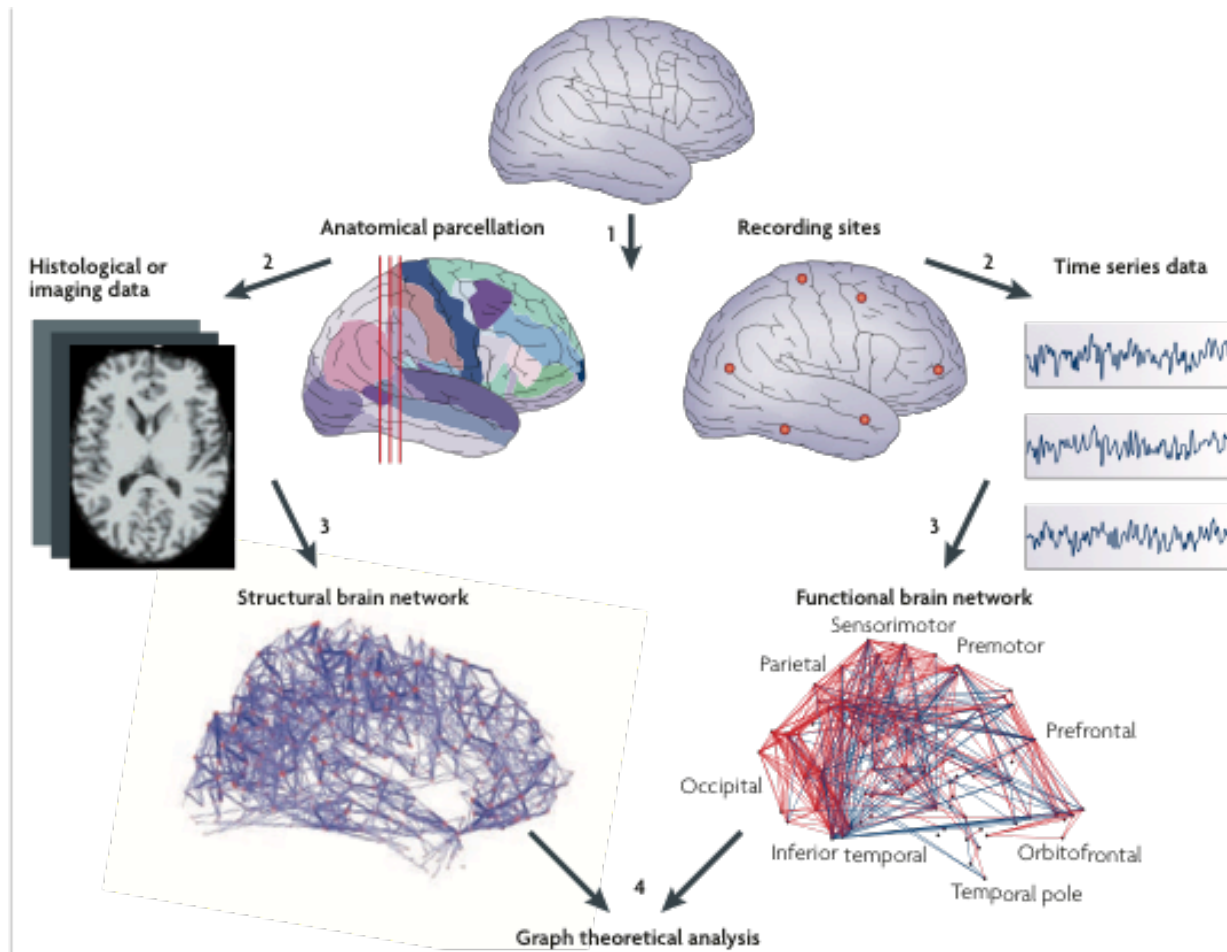
PROPOSAL FRENA

**PREDICTING BEHAVIOUR OF COMPLEX
SYSTEMS**

FRENA: SYSTEMS, ACTIONS AND QUESTIONS

- ▶ Encountering signals as the response of a system.
- ▶ Analysing records by using advanced methods.
- ▶ What is the correct question to be set?
- ▶ For each case we need the best suited bio-index.
- ▶ A deep understanding of the system is required.
- ▶ Machine learning techniques can be used and/or developed.

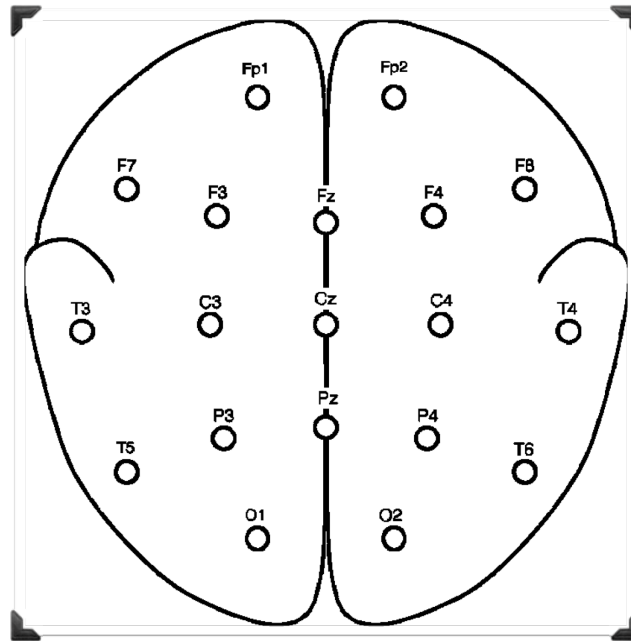
DECODING BRAIN ACTIVITY



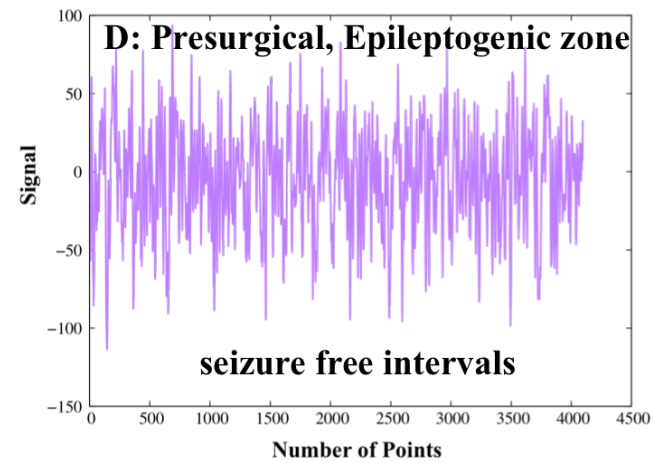
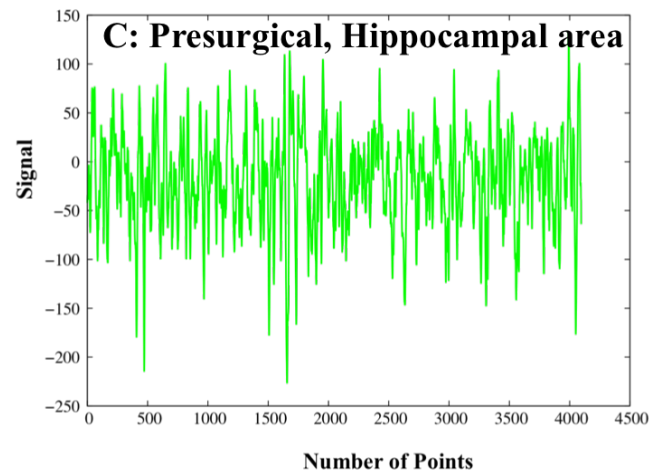
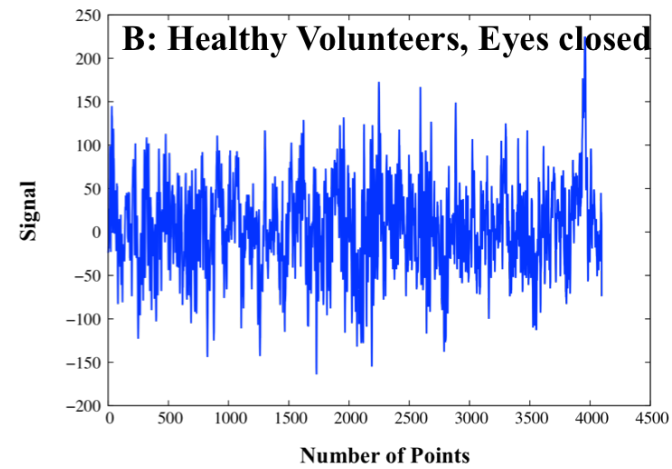
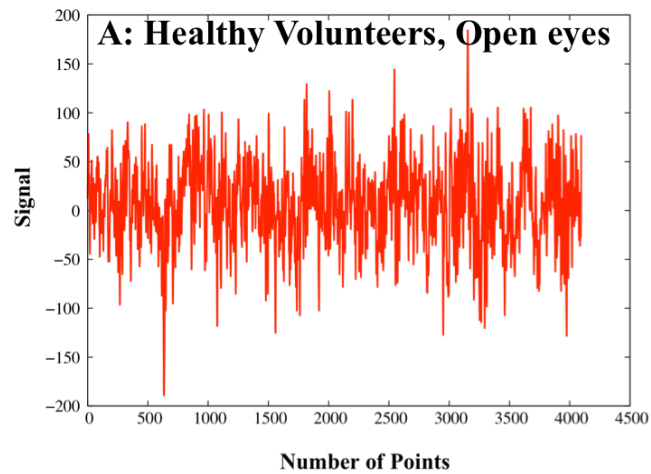
Structural and functional brain networks can be explored using graph theory through the following four steps (see the figure):

AN EXAMPLE: RECORDING SEIZURE AND NON SEIZURE ACTIVITY WITH EEG

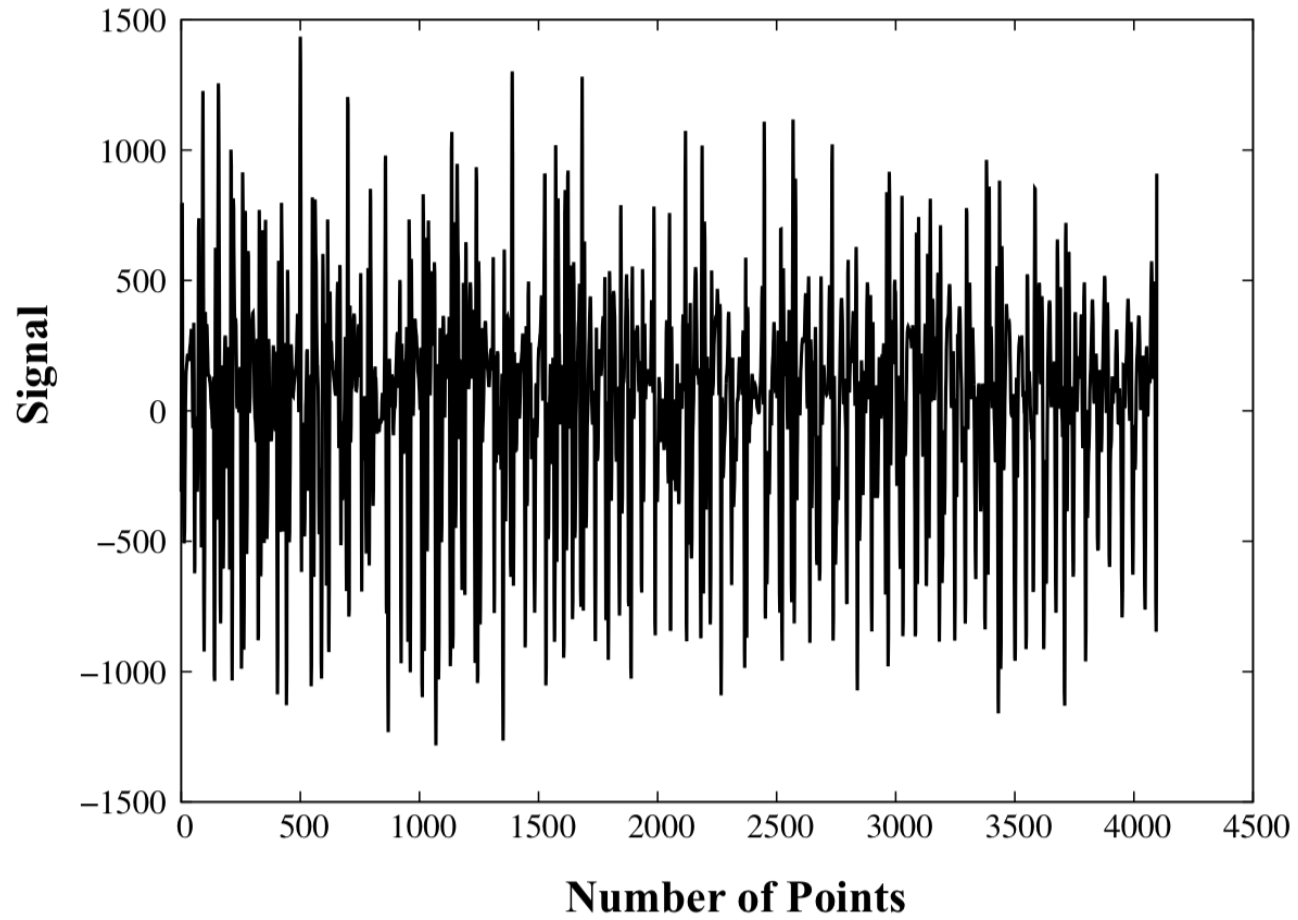
- ▶ Recorded data from ElectroEncephaloGram (EEG) for a number of healthy and non-healthy people. Measurements have been taken from different areas of the skull. One of them, E-dataset, contains seizure activity.



AN EXAMPLE: RECORDING SEIZURE AND NON SEIZURE ACTIVITY WITH EEG

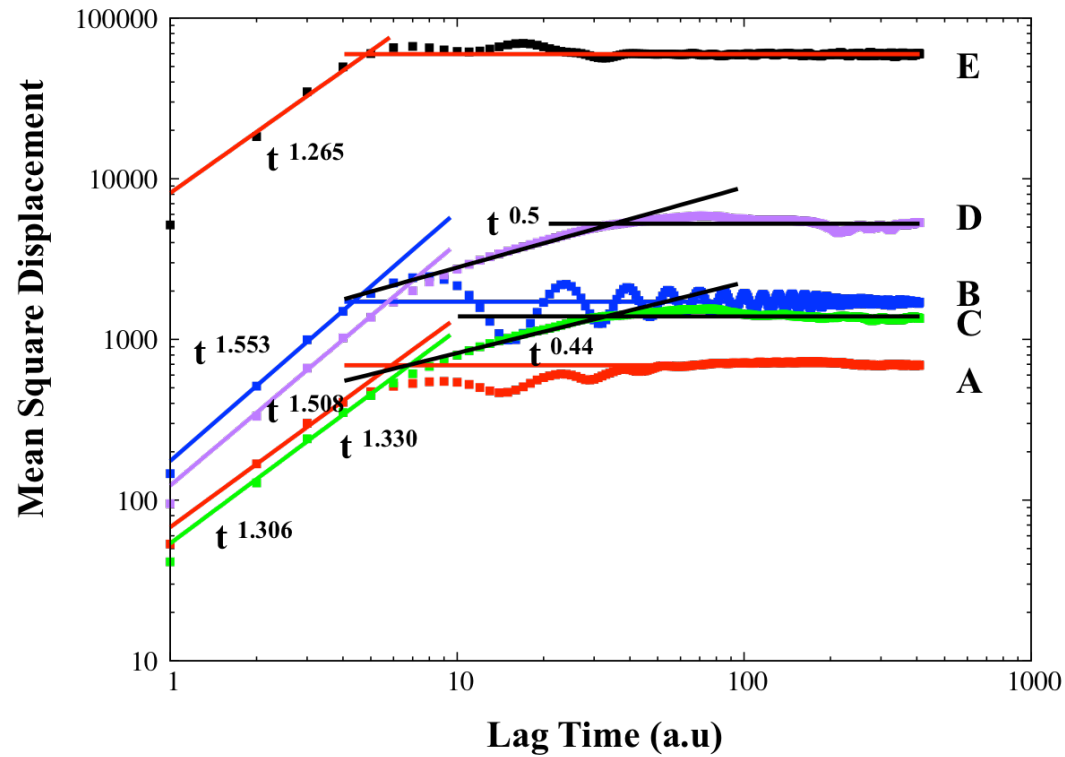


AN EXAMPLE: RECORDING SEIZURE AND NON SEIZURE ACTIVITY WITH EEG



MATHEMATICAL ANALYSIS OF TIME SERIES AND DEFINITION OF BIO-INDEX

- ▶ Analysis of the time series: Generalised Moments Method (GMM) AND MSD



MATHEMATICAL ANALYSIS OF TIME SERIES AND DEFINITION OF BIO-INDEX

► Structure Function: A quick way to diagnose mono or multi fractal events.

