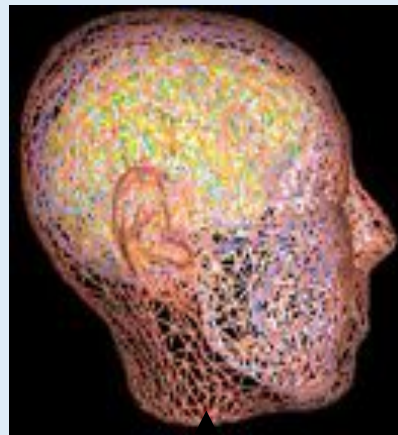


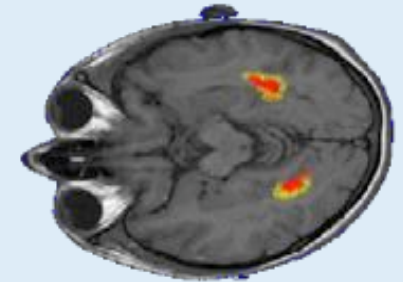
Electromagnetic source localization

Solve the forward problem using realistic head models (BEM)



Mesh generation

Simple Map



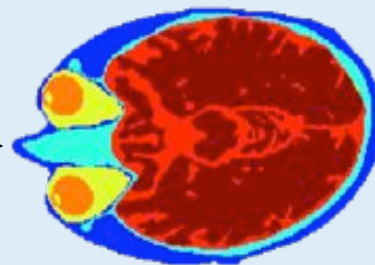
Source Image

Sensor Localization

Signal Processing



MRI



Segmentation



EEG/MEG

Brain Electrophysiology ?

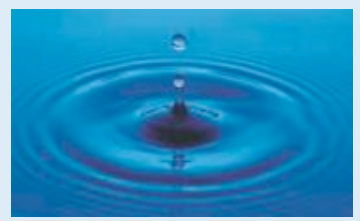
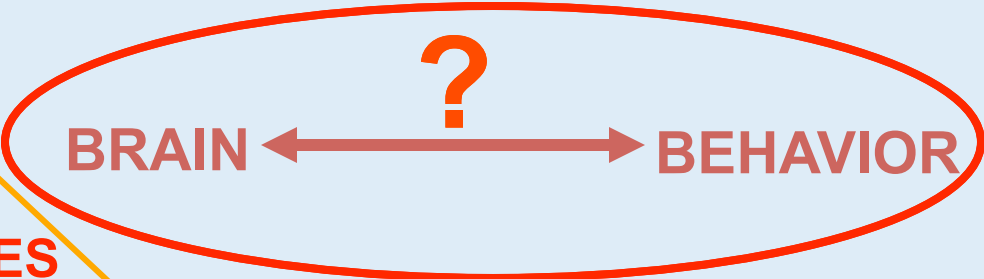
1960 →
Response
averaging

~~ERP ↔ EEG ↔ LFP ↔ #Spikes~~

1993 →

2000 →

M I C R O



SPIKES

LFP

ECOG

EEG

MACRO

ERP

RT

~1 Hz

Recorded !?

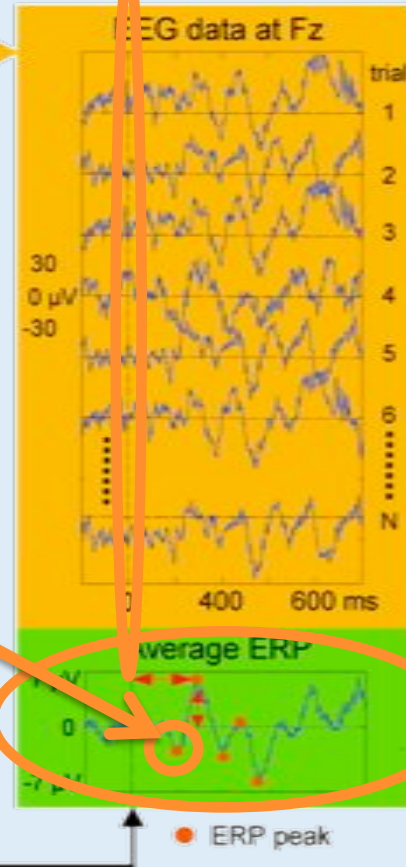
~1,000,000 GHz

~1 MHz

Studying 'cognitive perception' using ERPs



Typical EEG experiment



The response averaging model:

EEG	ERP	EEG “noise”
Data	≡ Average	+ “Background”
BOLD	ERB	BOLD “noise”

But, this linear decomposition is veridical
if & only if:

Not True / Not Defined

1. The **Average** appears in each trial.

2. The **“Background”** is not perturbed
in other ways by the time locking events.

Not True

Conceptual legacies of single sensor response/rate averaging

- Reduction of the time series data at each channel to a **single average response time series**.
- Reduction of the data collected at each channel to an **isolated spatial point process**.

How to capture more of the event-related brain dynamics contained in high-density EEG data?