

What can EEG measure?

1 Alertness

2 Attention

3 Anxiety

4 Anticipation

5 Affect

6 Awareness

7 Agency

8 Aha!

Uses for EEG?

What can EEG measure?

1 Alertness

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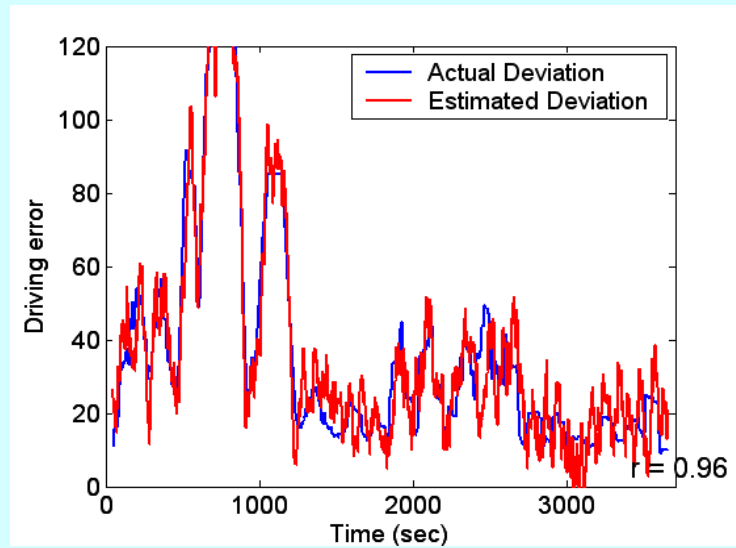
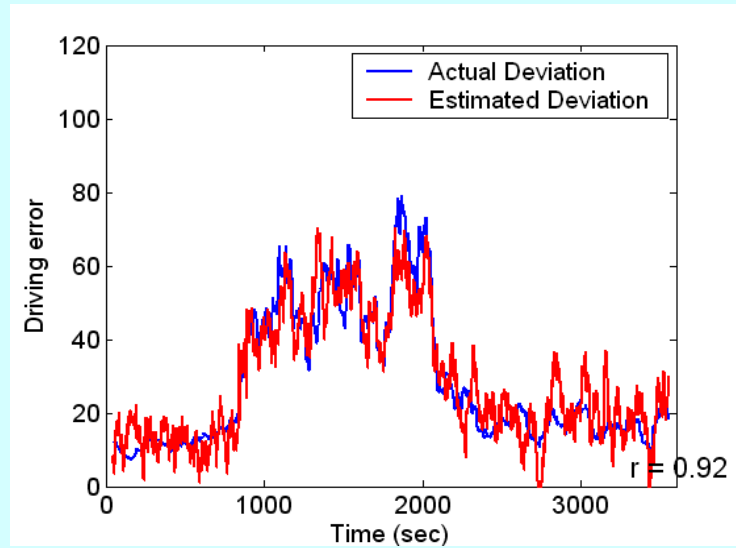
EEG-based Cognitive-State Monitoring

Estimating Cognitive states of the drivers



DSP and Display module
2.5 x 1.5 in

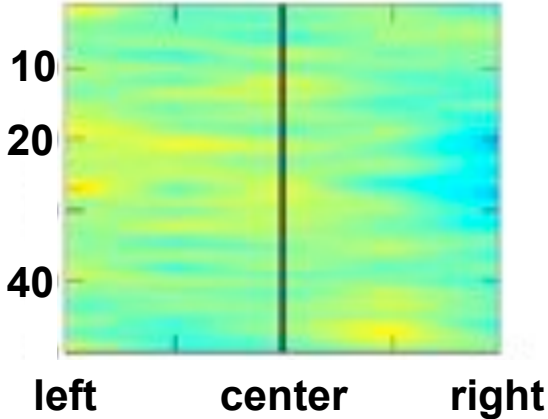
Sample Results



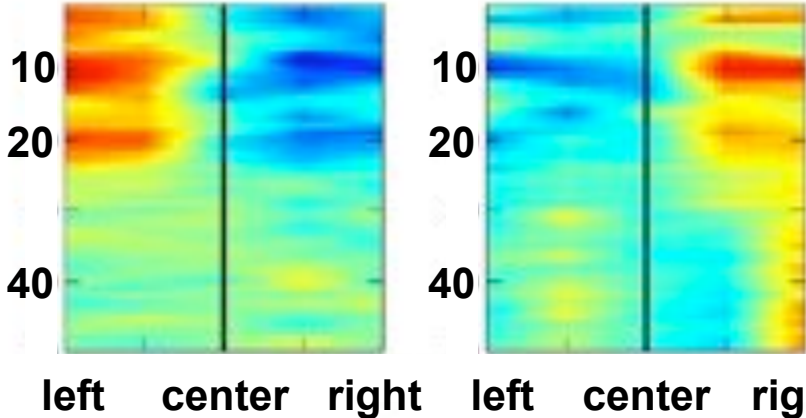
EEG and Attention



Frontocentral



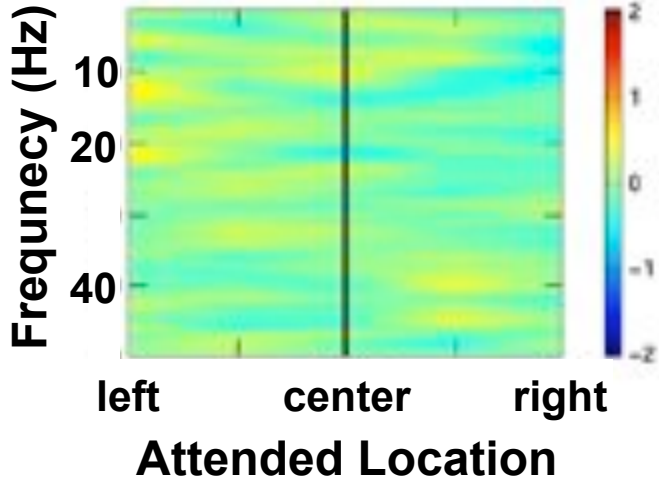
Left Alpha



Right Alpha Component

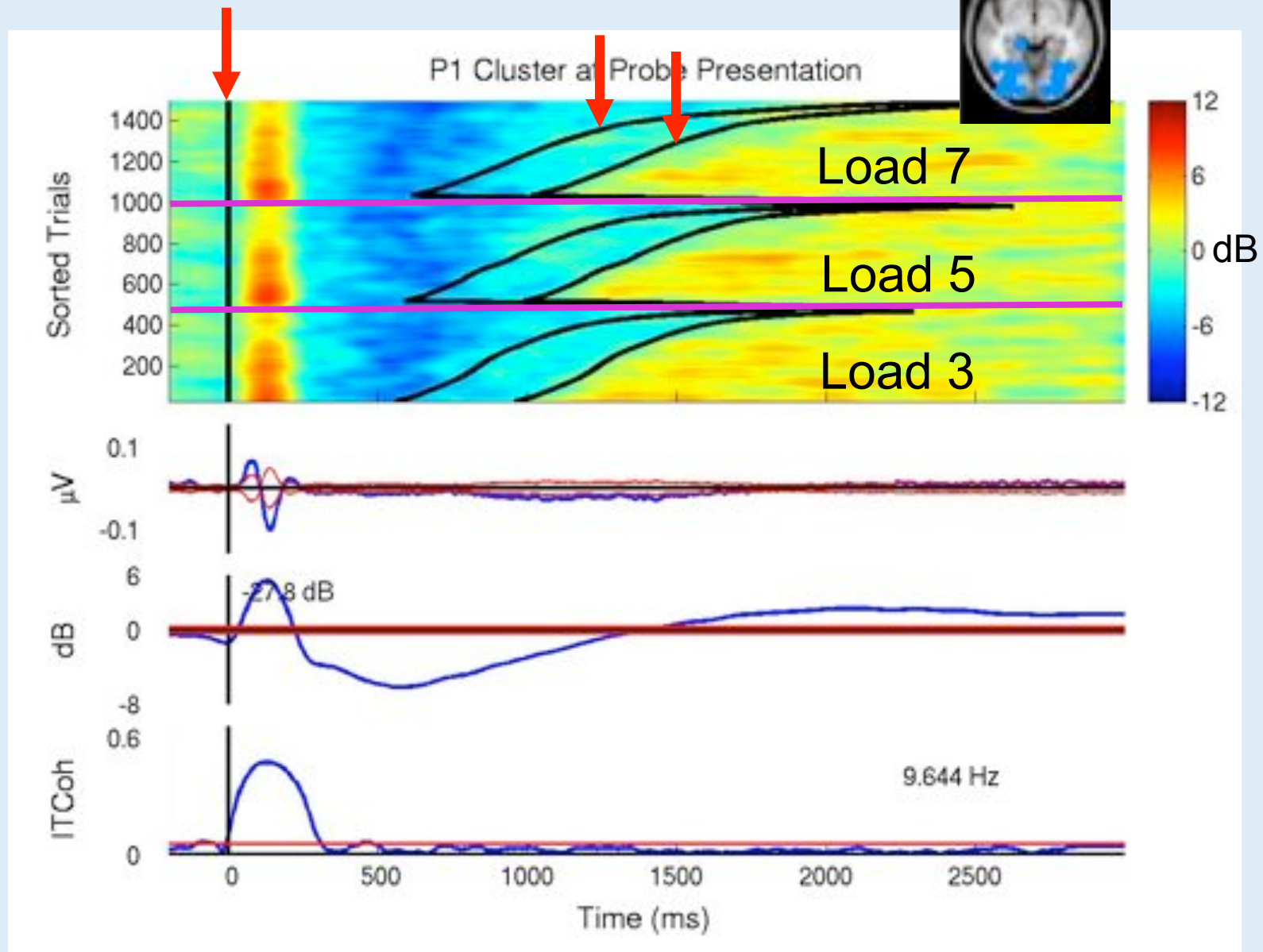


Central Alpha

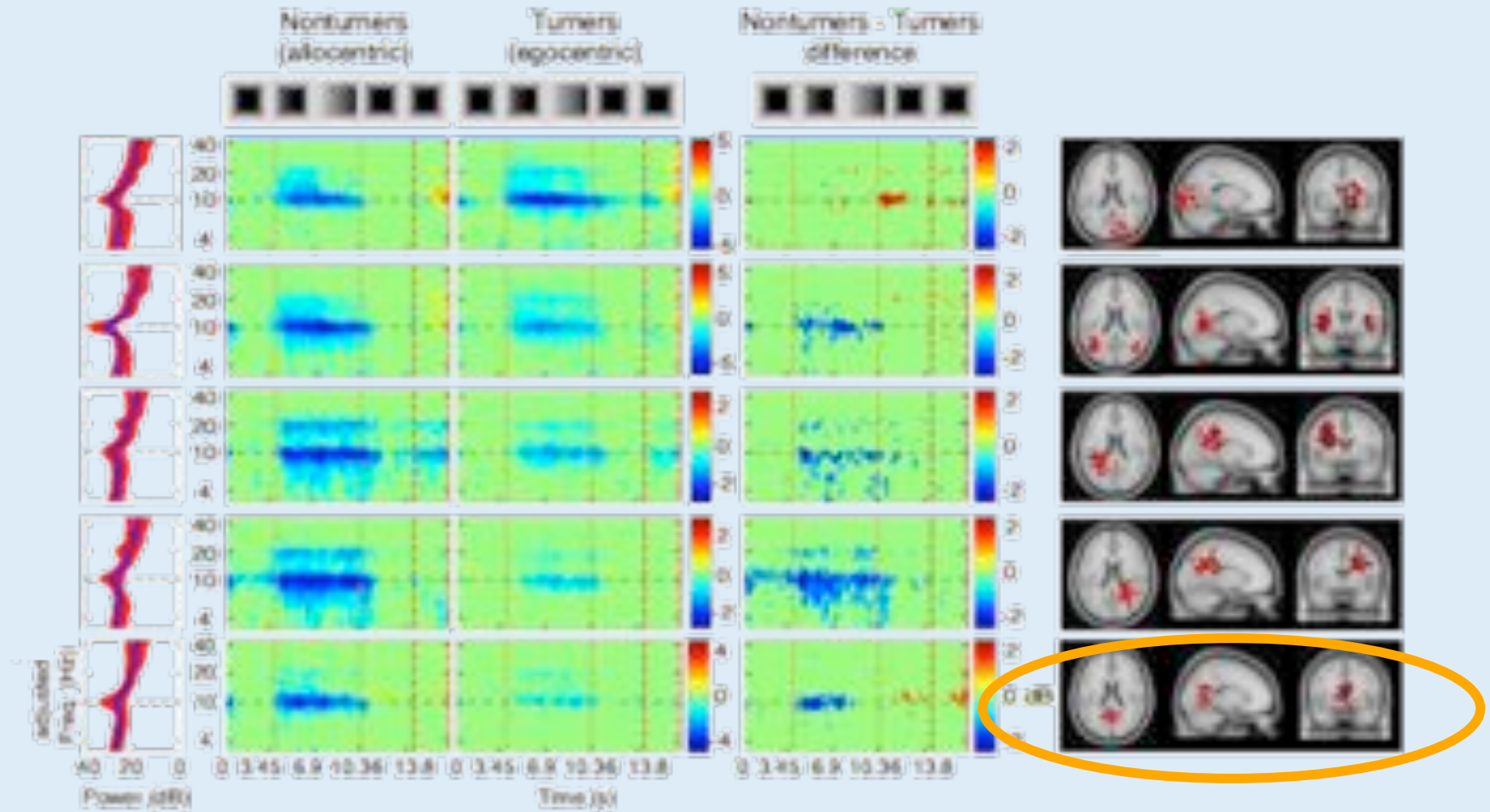


Baseline Spectrum
(1 s before stimulus)

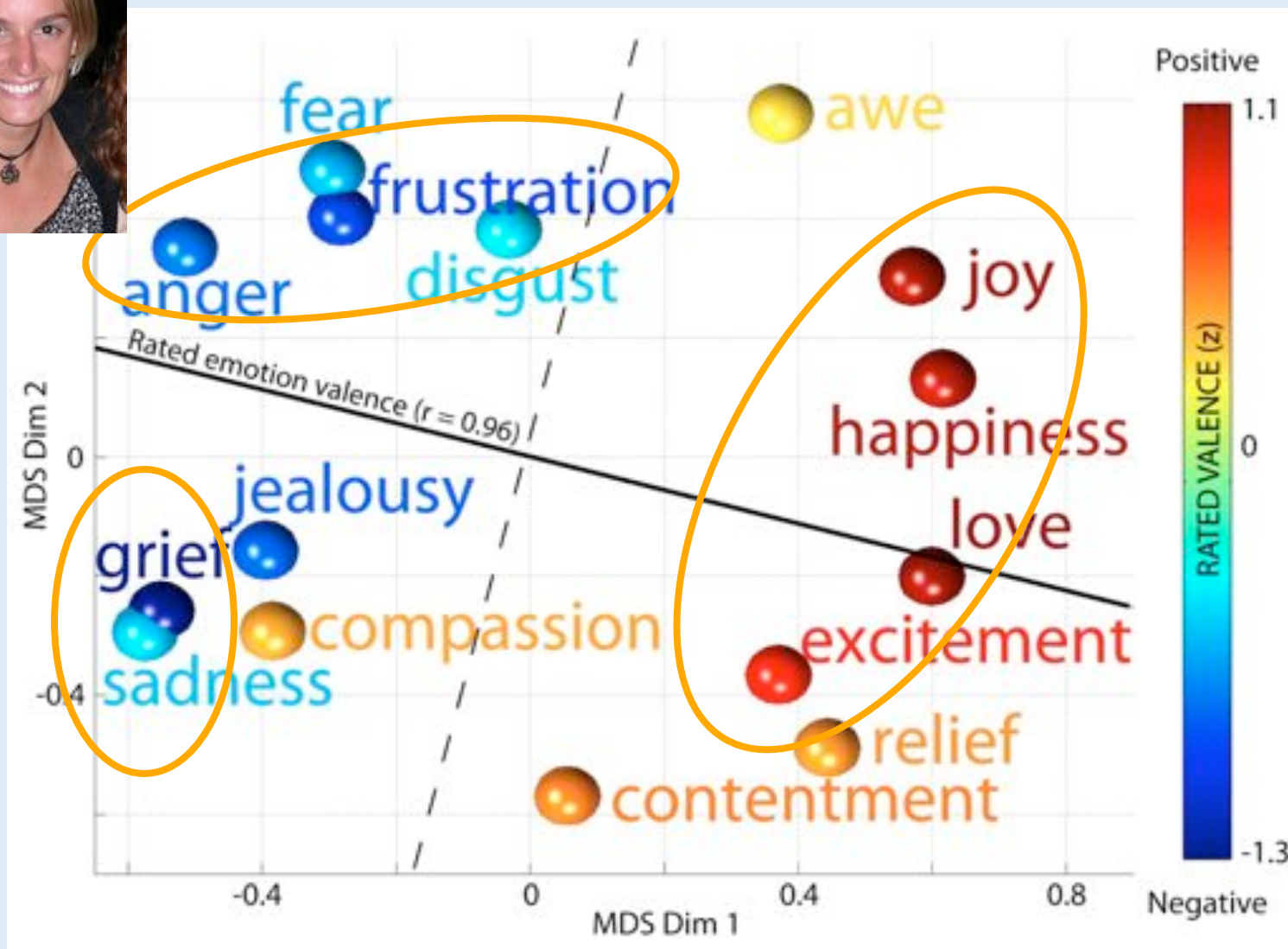
EEG and Attention



Clusters distinguishing Turners & Nonturners



Changes in distribution of broadband high-frequency EEG power with imagined emotion





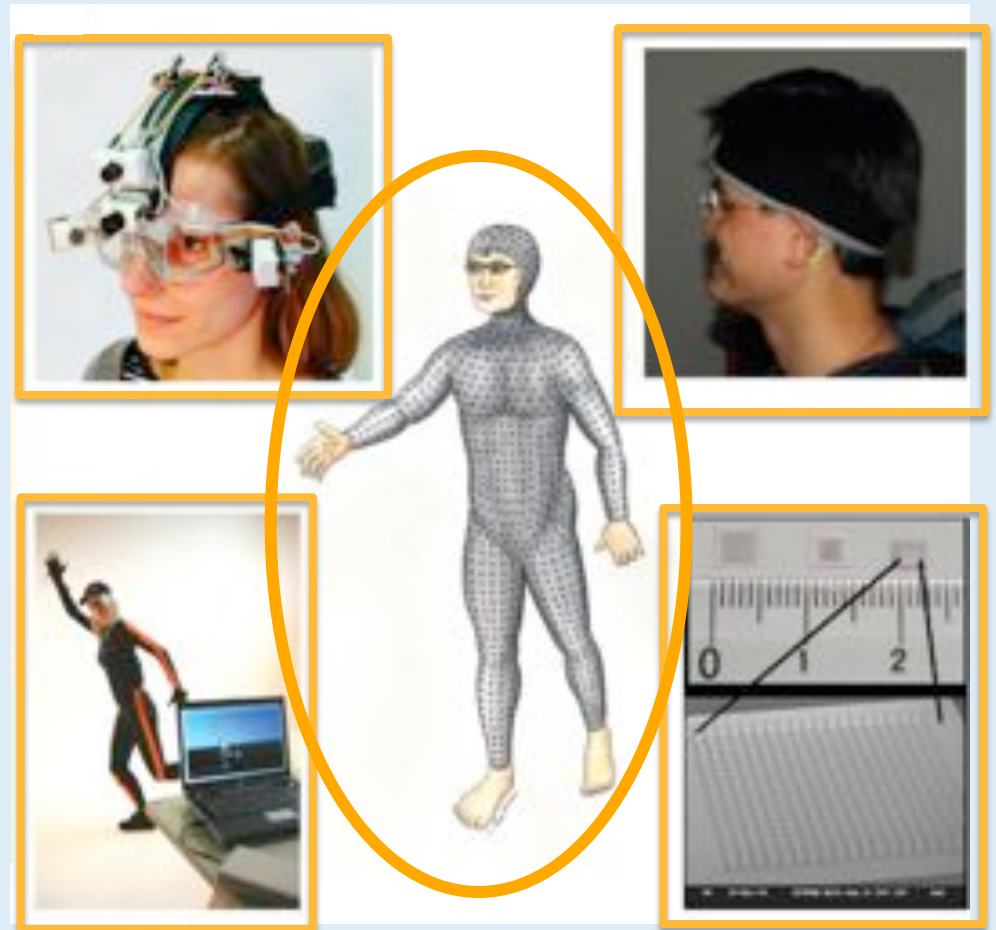
BCILAB: A toolbox for building brain-computer interface models



Fourth International BCI Meeting
Asilomar Meeting Grounds, Pacific Grove, CA
June, 2010

Mobile Brain/Body Imaging Technology

- Current EEG, eye tracking, and motion capture systems **are portable.**
- In a few years, *wearable* microelectronic **MoBI systems** will be feasible.



Paradigm shift
ALERT !!

**“EEG is something to use,
not just something to study...”**

New dimensions of EEG research and application

Although traditional EEG analysis methods have used relatively little of the abundant information about distributed brain dynamics contained in EEG data ...

... new recording technology, and new analysis methods based in brain physiology allow mining much more of this information, and make possible the analysis of new experimental paradigms.

New feasible applications of EEG include:

- for EEG feedback for attention training
- for High-definition fEEG imaging for clinical research
- for X-high-definition electrocortical source imaging
- for Mobile brain/body imaging (MoBI)