



Radiology Power Pitch Session

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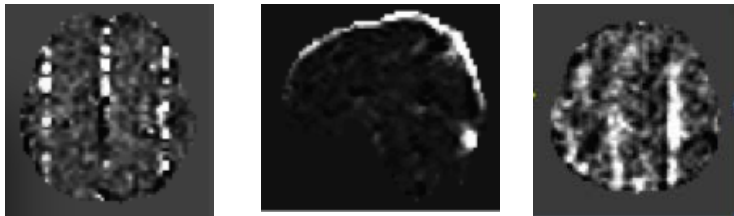
Multi-echo Simultaneous Multi-slice (MESMS) Protocol

UC San Diego
SCHOOL OF MEDICINE

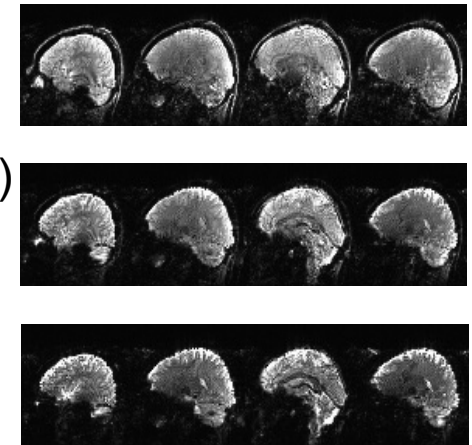
Center for Functional MRI

In the Department of Radiology

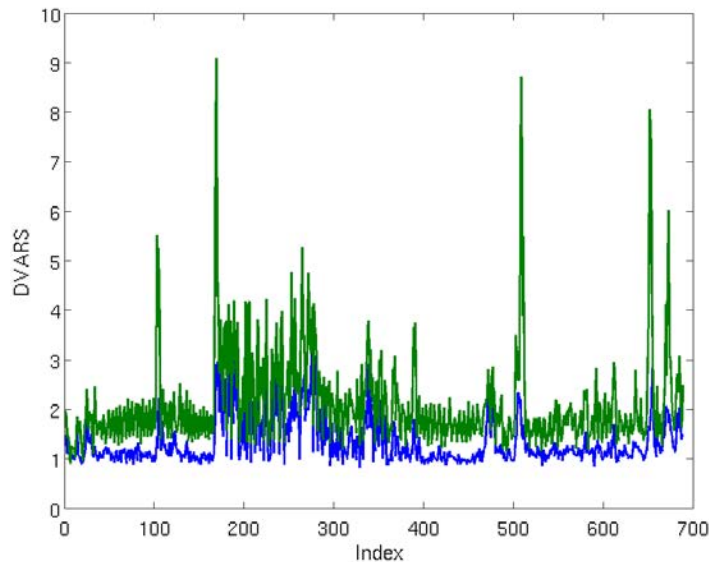
Automatically identifies non-BOLD
artifactual components



Multiband factor of 3
3 echoes (14, 32, 51ms)
Whole brain coverage
TR = 0.87s



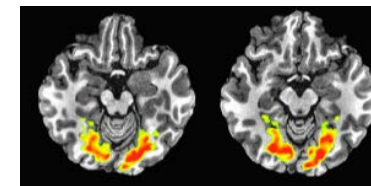
Enables fully automated denoising
of fMRI time series



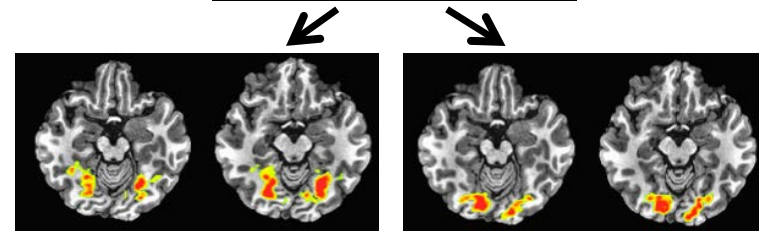
DVARS
Before
denoising

DVARS
After
denoising

Offers 80% improvement over
conventional TR scans in ability to
detect BOLD-like components



TR =
2.61s

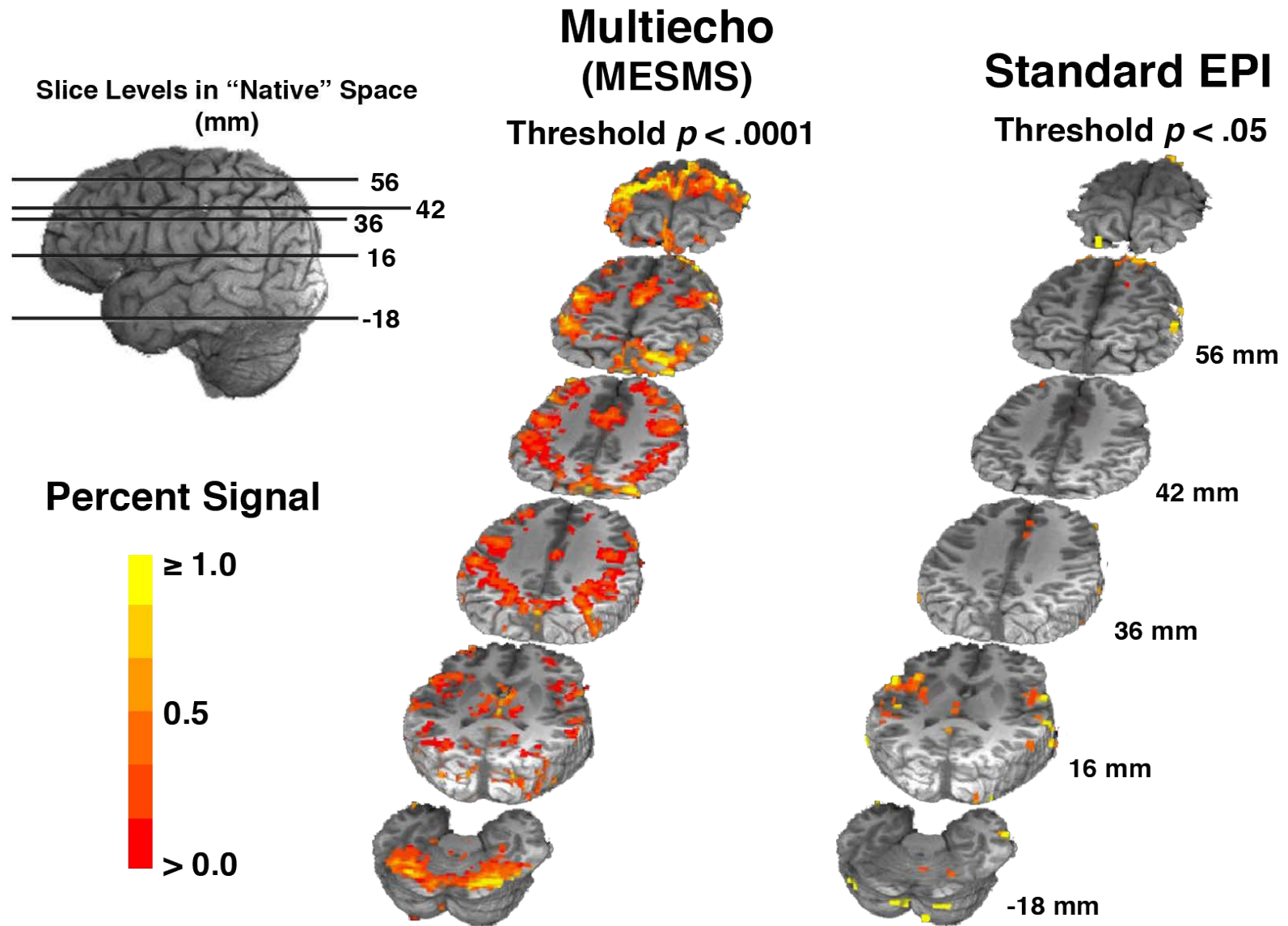


TR =
0.87s

Higher temporal resolution enables
automated identification of network
sub-components

Credit: Olafsson, Kundu et al, In preparation

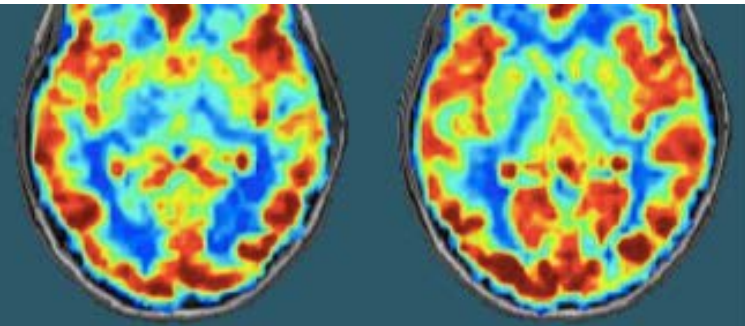
MESMS vs. Traditional EPI



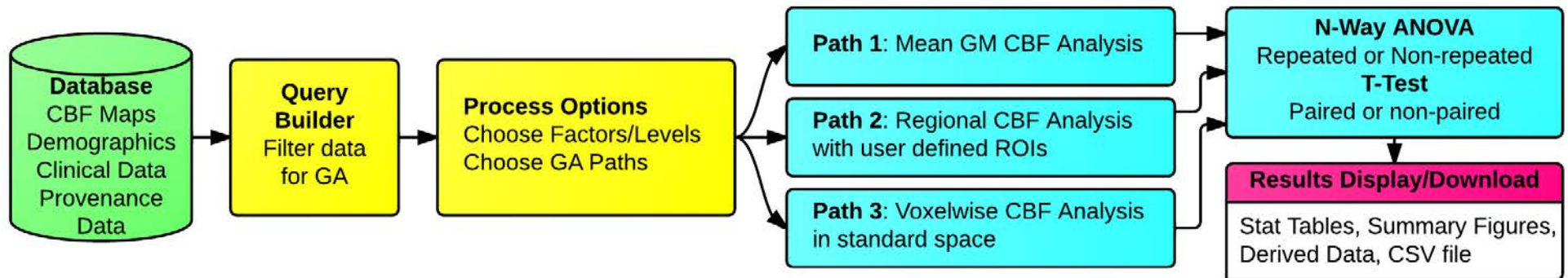
Courtesy of Frank Haist at UCSD

CBFBIRN

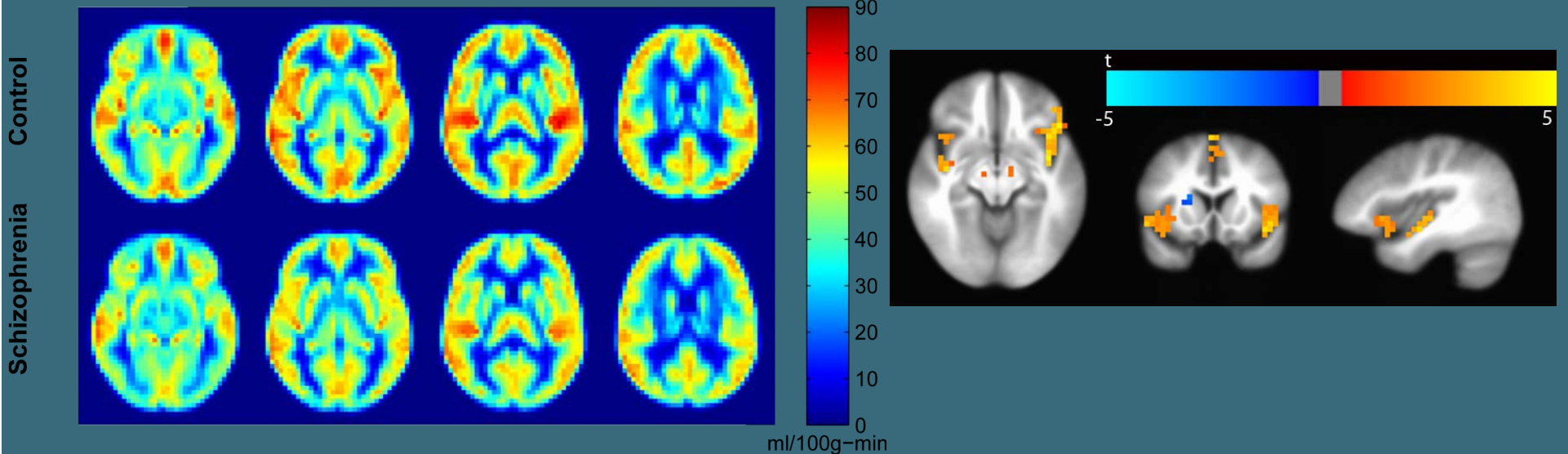
Cerebral Blood Flow
Biomedical Informatics Research Network



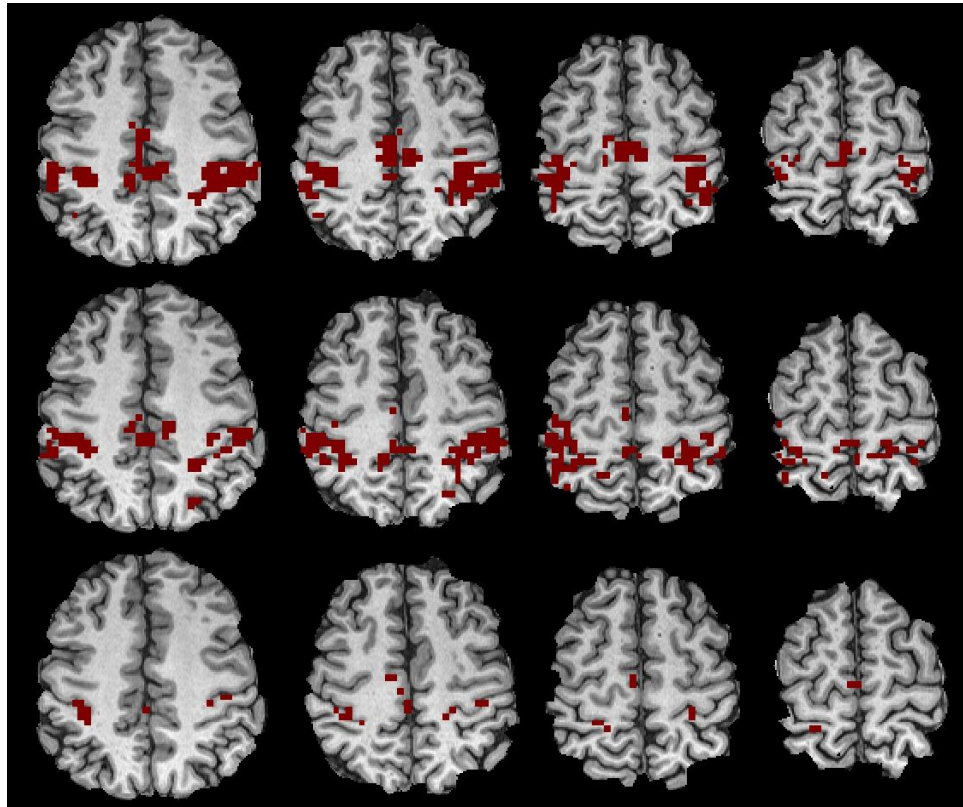
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Group Differences in resting CBF



Resting-State BOLD Connectivity

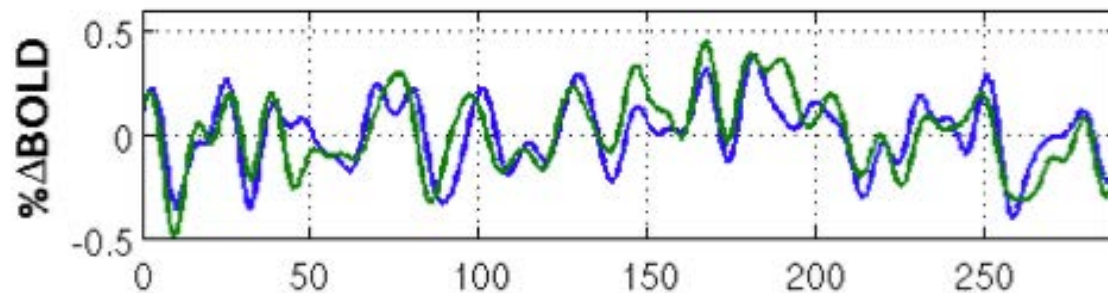


Task-Related
Motor Activation Map

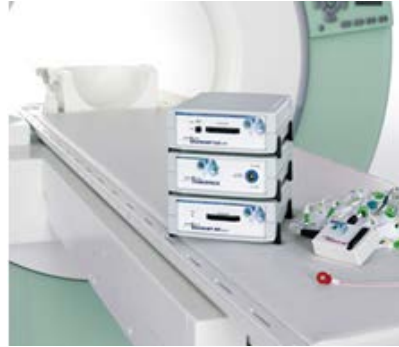
Resting State
Correlation Map



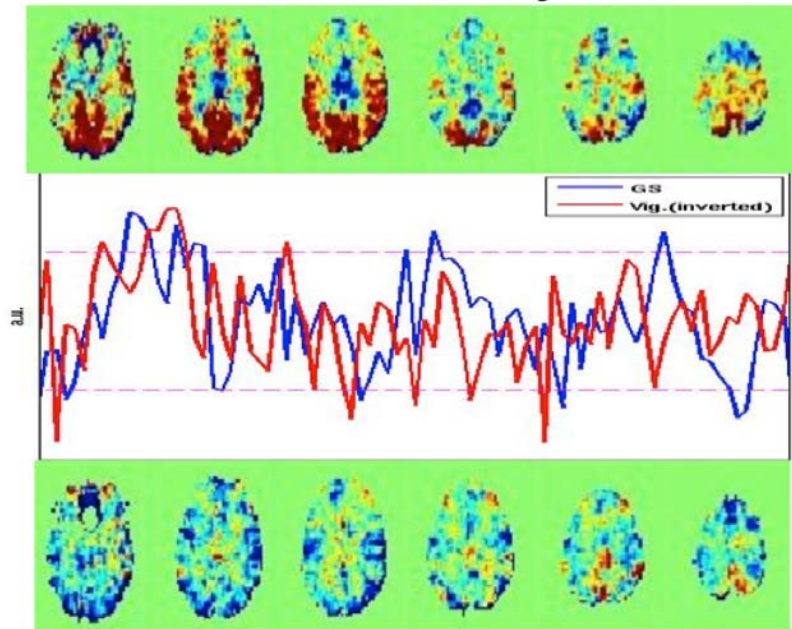
Resting State fMRI Signals
From Left and Right Motor
Cortices



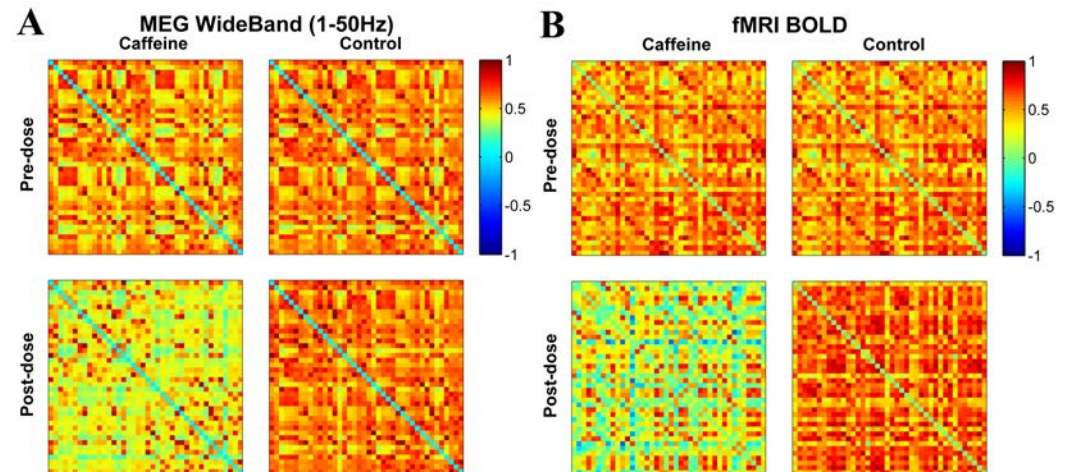
Multimodal Imaging (fMRI/EEG/MEG)



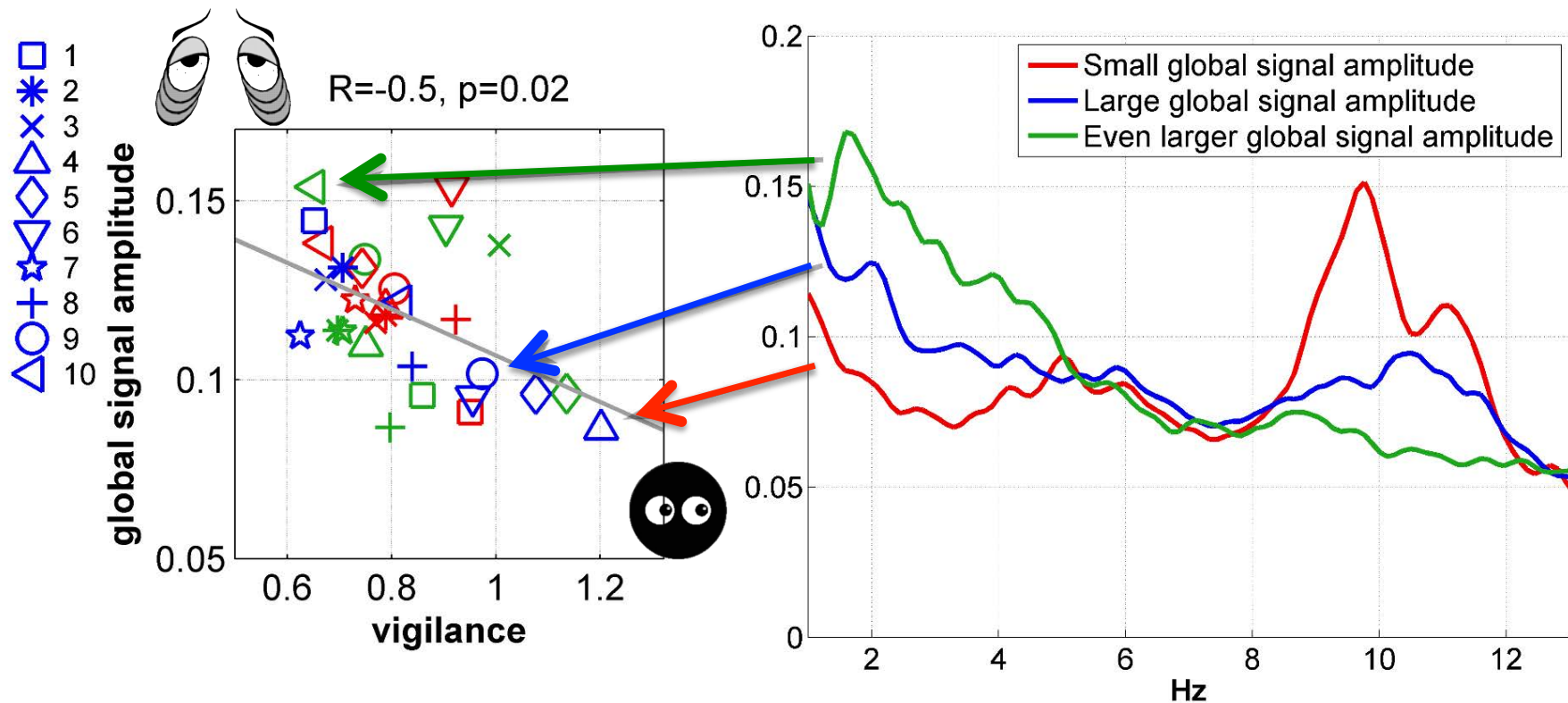
Pattern of low EEG vigilance



Pattern of high EEG vigilance



Global fMRI Signal and EEG Vigilance



Caffeine session pre-dose (blue), control session pre-dose (red) /post-dose sections (green)

EEG spectra for three representative subjects.