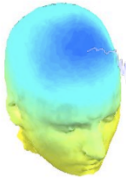


# STUDY plot menu



## **Task 1**

Plot cluster summaries

## **Task 2**

Plot individual ICs

## **Task 3**

Plot using statistical thresholds

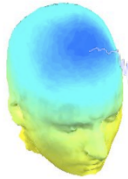
## **Task 3**

Eliminate/reassign ICs

**Exercise...**



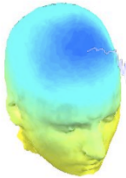
# View and edit clusters



STUDY set: AT	
Study filename:	
Study task name	
Nb of subjects	
Nb of conditions	
Nb of sessions	
Nb of groups	
Epoch consistency	yes
Channels per frame	31
Channel locations	yes
Clusters	27
Status	Pre-clustered
Total size (Mb)	32.7



# View and edit clusters



**LEFT SIDE:**  
Plot measures  
of full clusters

View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

Select cluster to plot	Select component(s) to plot
All cluster centroids	'outlier 2' comp. 1 (S12 IC12)
ParentCluster 1 (181 ICs)	'Cls 3' comp. 1 (S01 IC1)
outlier 2 (1 ICs)	'Cls 3' comp. 2 (S05 IC11)
Cls_3 (5 ICs)	'Cls 3' comp. 3 (S06 IC15)
Plot scalp maps	Plot scalp map(s)
Plot dipoles	Plot dipole(s)
Plot ERPs	Plot ERP(s)
Plot spectra	Plot spectra
Plot ERSPs	Plot ERSP(s)
Plot ITCs	Plot ITC(s)
Plot cluster properties	Plot component properties

Params Params Params

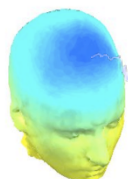
Create new cluster Reassign selected component(s)  
Rename selected cluster Remove selected outlier comps.  
Merge clusters Auto-reject outlier components

Save STUDY set to disk /home/julie/WorkshopSD2007/STUDY ...

Cancel Help Ok

**RIGHT SIDE:**  
Plot measures  
of individual  
components

# Plot clusters



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

Select cluster to plot

- All cluster centroids
- ParentCluster 1 (181 ICs)
- outlier 2 (1 ICs)
- Cls 3 (5 ICs)

Select component(s) to plot

- 'outlier 2' comp. 1 (S12 IC12)
- 'Cls 3' comp. 1 (S01 IC1)
- 'Cls 3' comp. 2 (S05 IC11)
- 'Cls 3' comp. 3 (S06 IC15)

Plot scalp maps

Plot dipoles

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Plot cluster properties

Params

Params

Params

Create new cluster

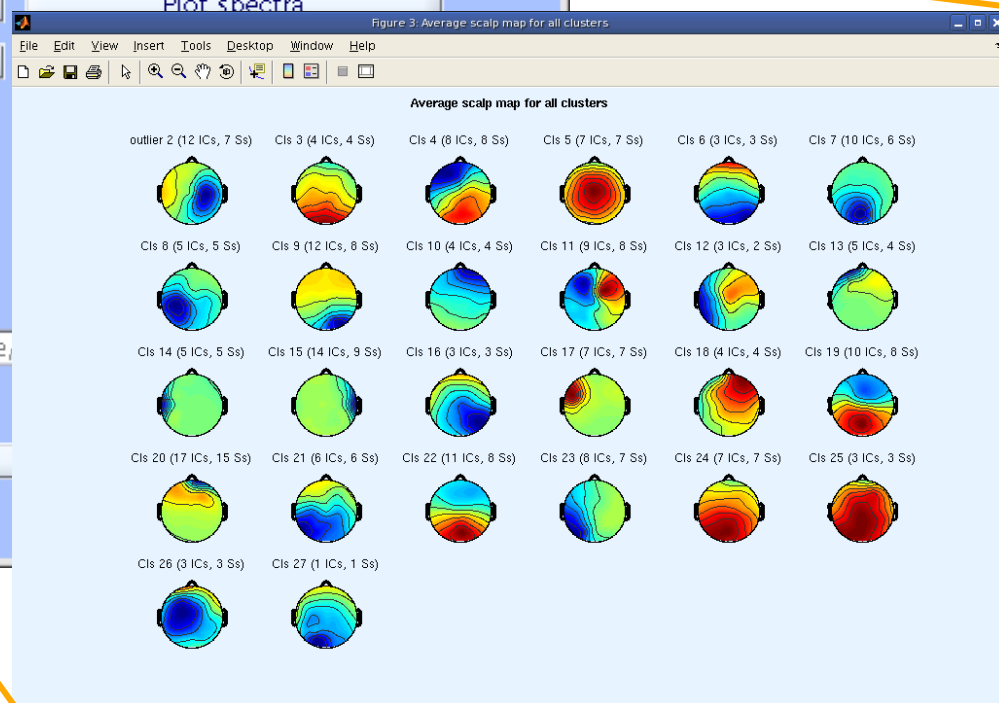
Rename selected cluster

Merge clusters

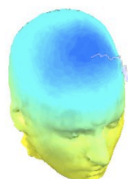
Save STUDY set to disk /home/julie

Cancel Help

Plot mean scalp maps for easy reference to clusters



# Plot clusters



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

**Select cluster to plot**

- Cls 6 (3 ICs)
- Cls 7 (10 ICs)**
- Cls 8 (5 ICs)
- Cls 9 (12 ICs)

**Select component(s) to plot**

- All components**
- S01 IC6
- S05 IC9
- S06 IC12

Plot scalp maps  
Plot dipoles  
Plot ERPs  
Plot spectra  
Plot ERSPs  
Plot ITCs  
Plot cluster properties

Params  
Params  
Params

Create new cluster  
Rename selected cluster  
Merge clusters

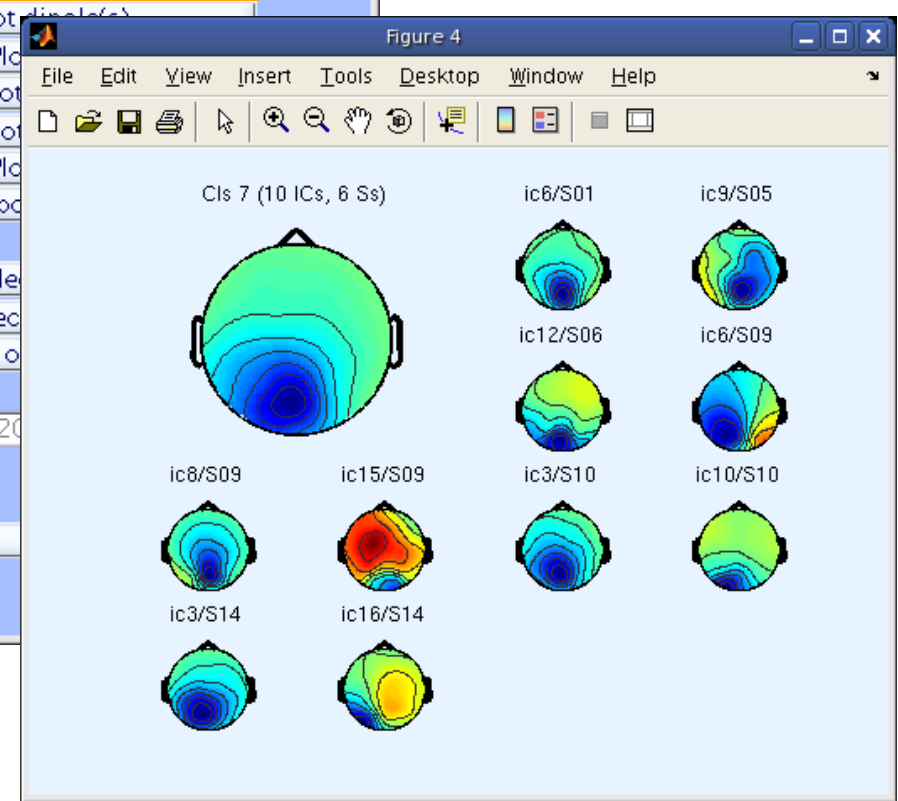
Reassign selected  
Remove selected  
Auto-reject outliers

Save STUDY set to disk /home/julie/WorkshopSD20

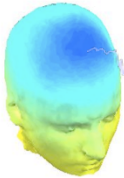
Cancel Help

Choose which cluster

Choose which components



# Plot clusters



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

**Select cluster to plot**

- Cls 6 (3 ICs)
- Cls 7 (10 ICs)**
- Cls 8 (5 ICs)
- Cls 9 (12 ICs)

Plot scalp maps  
Plot dipoles  
Plot ERPs  
Plot spectra  
Plot ERSPs  
Plot ITCs  
Plot cluster properties

Params  
Params  
Params

**Select component(s) to plot**

- All components
- S01 IC6
- S05 IC9
- S06 IC12

Plot scalp map(s)  
**Plot dipole(s)**  
Plot ERP(s)  
Plot spectra  
Plot ERSP  
Plot ITC(s)  
Plot component

Reassign selected c...  
Remove selected o...  
Auto-reject outlier

Save STUDY set to disk /home/julie/WorkshopSD2007/S

Cancel Help

Cls 7 - 6 sets - 10 components (10 dipoles)

File Edit View Insert Tools Desktop Window Help

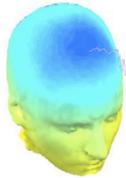
11 dipoles:

- Plot one
- Keep|Next
- Next
- Prev
- Keep|Prev
- 1
- IC6, S01
- RV: 7.73%
- X tal: 15
- Y tal: -81
- Z tal: 48

**Display:**

- Mesh on
- Tight view
- Sagittal vi...
- Coronal v...
- Top view
- No contro...

# Plot ERPs



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

Select cluster to plot

- Cls 6 (3 ICs)
- Cls 7 (10 ICs)
- Cls 8 (5 ICs)
- Cls 9 (12 ICs)

Select component(s) to plot

- All components
- S01 IC6
- S05 IC9
- S06 IC12

Plot scalp maps

Plot dipoles

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Plot cluster properties

Params

Params

Params

Plot scalp map(s)

Plot dipole(s)

Plot ERP(s)

Plot spectra

Plot ERSP(s)

Plot ITC(s)

Plot component properties

Set parameters for plotting ERPs -- pop\_erpparams()

Time range in ms [low high]    -50 1000    Plot limits in uV [low high]   

Plot scalp map at latency [ms]    NaN    Display filter in Hz [high]   

Plot conditions on the same panel

Plot groups on the same panel

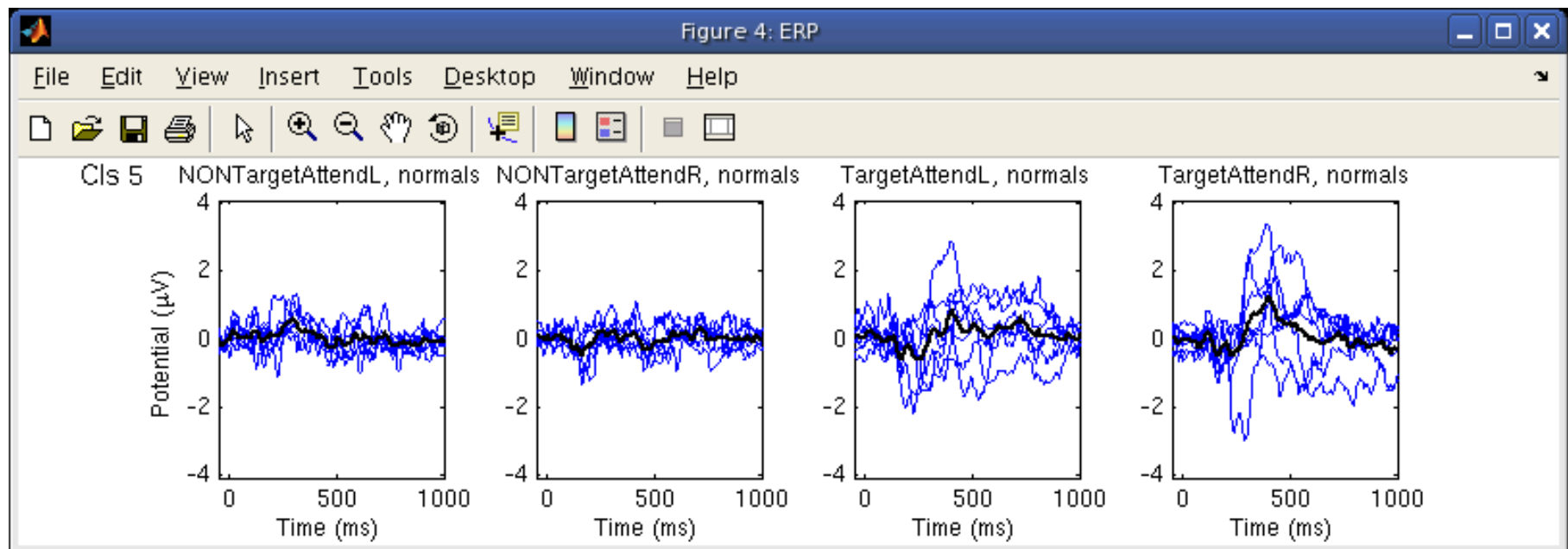
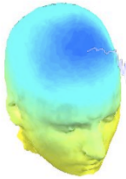
Statistics    Parametric    Threshold   

Compute condition statistics

Compute group statistics

Cancel    Help    Ok

# Plot cluster ERP

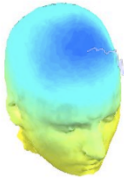


**Each blue trace is the ERP of a different component**





# Plot cluster spectra



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

Select cluster to plot

- Cls 6 (3 ICs)
- Cls 7 (10 ICs)
- Cls 8 (5 ICs)
- Cls 9 (12 ICs)

Select component(s) to plot

- All components
- S01 IC6
- S05 IC9
- S06 IC12

Plot scalp maps

Plot dipoles

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Plot cluster properties

Params

Params

Params

Plot scalp map(s)

Plot dipole(s)

Plot ERP(s)

Plot spectra

Plot ERSP(s)

Plot ITC(s)

Plot component properties

Create

Rename se

Merge

Save STU

Cancel

Set parameters for plotting specs -- pop\_specparams()

Frequency [low\_Hz high\_Hz]   Plot limits [low high]

Plot scalp map at freq. [Hz]

Subtract individual subject mean spectrum

Plot conditions on the same panel

Plot groups on the same panel

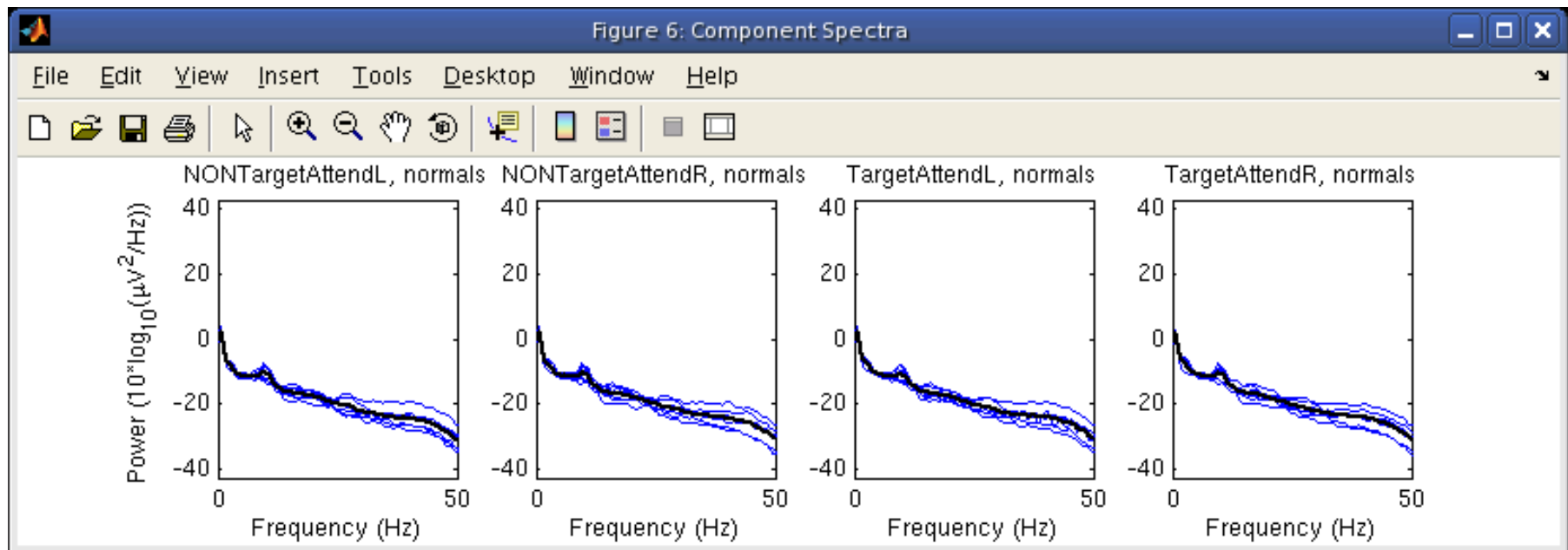
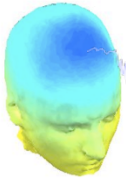
Statistics  Threshold

Compute condition statistics

Compute group statistics

Cancel Help Ok

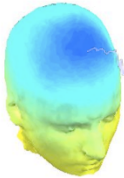
# Plot cluster spectra



**Each blue trace is the power spectrum of a different component**



# Plot cluster ERSPs



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

Select cluster to plot

- Cls 6 (3 ICs)
- Cls 7 (10 ICs)
- Cls 8 (5 ICs)
- Cls 9 (12 ICs)

Select component(s) to plot

- All components
- S01 IC6
- S05 IC9
- S06 IC12

Plot scalp maps

Plot dipoles

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Params

Params

Params

Plot scalp map(s)

Plot dipole(s)

Plot ERP(s)

Plot spectra

Plot ERSP(s)

Plot ITC(s)

Set ERSP/ITC plotting parameters -- pop\_erspparams()

Time range in ms [Low High] 0 1500

Freq. range in Hz [Low High] 0 40

Power limits in dB [Low High] ITC limit (0-1) [High]

Compute ERSP baseline across conditions

Statistics Parametric Threshold 0.01

Data for statistics Use means

Compute condition statistics

Compute group statistics

Mask non-significant data (only when threshold is set)

Cancel Help Ok

# Plot cluster ERSPs

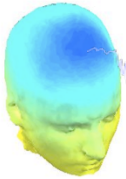
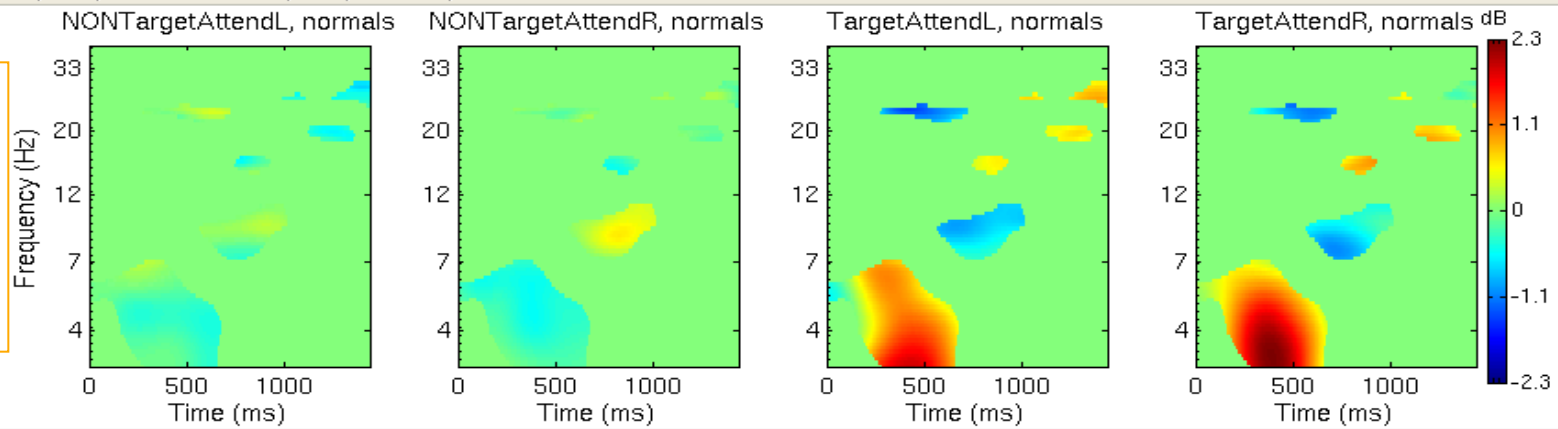
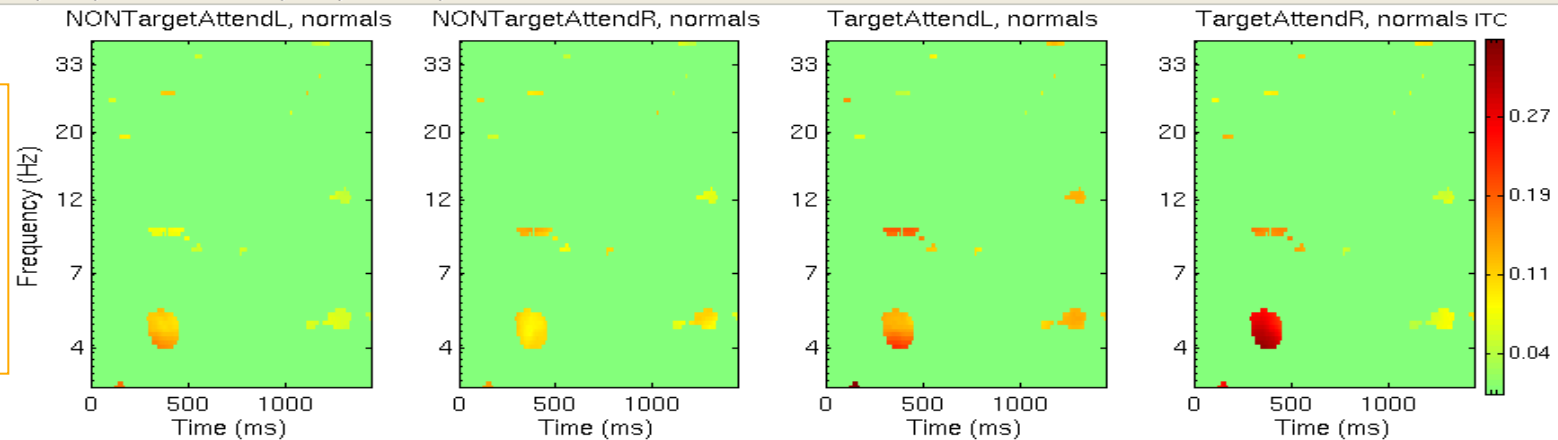


Figure 4: ERSP of Cls 5

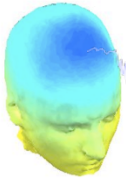
**ERSP**  
(non-sig  
voxels  
across  
conditions  
are green)



**ITC**  
(non-sig  
voxels  
across  
conditions  
are green)



# Remove outlier components



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

Select cluster to plot

- Cls 6 (3 ICs)
- Cls 7 (10 ICs)

Select component(s) to plot

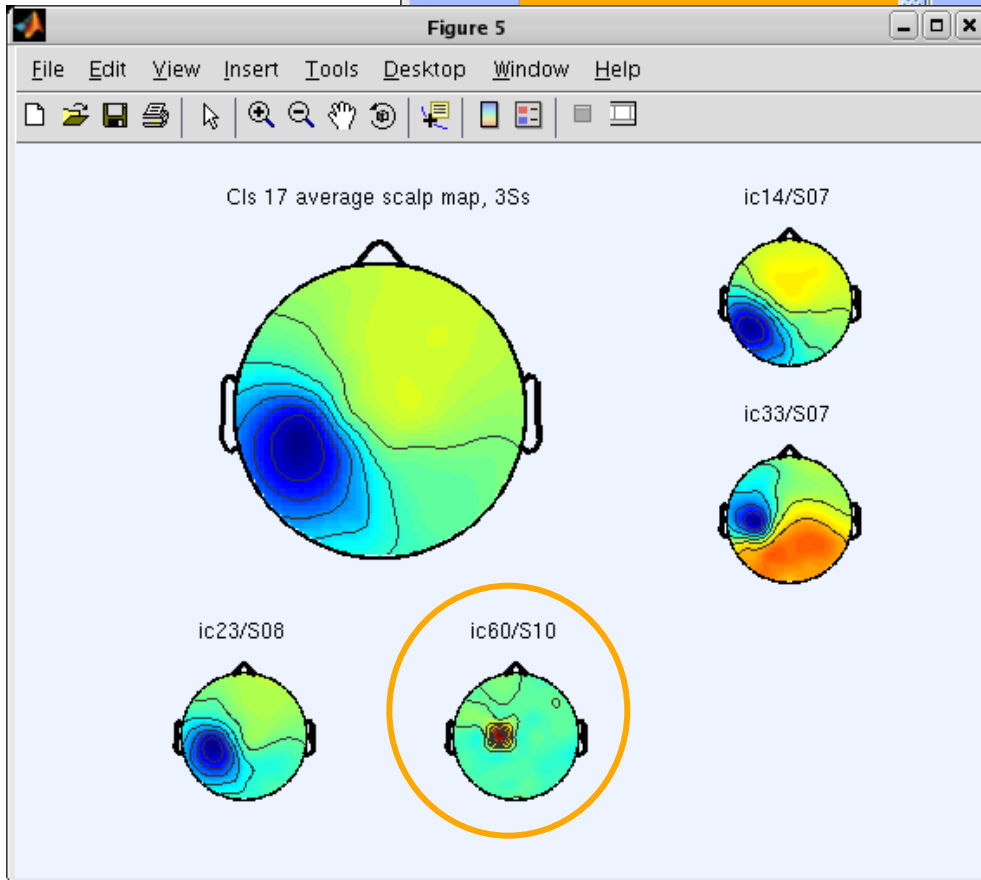
- All components
- S01 IC6
- S05 IC9
- S06 IC12

Plot scalp map(s)

Plot dipole(s)

Plot ERPs

Plot spectra



rams

rams

rams

e/julie/Works

help

Cls 1, 3 sets - 4 components (4 dipoles)

File Edit View Insert Tools Desktop Window Help

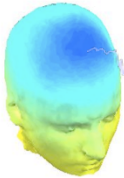
5 dipoles:

- Plot one
- Keep|Next
- Next
- Prev
- Keep|Prev
- 1
- IC14, S07
- RV: 0.96%
- X tal: -46
- Y tal: -25
- Z tal: 46

Display:

- Mesh on
- Tight view
- Sagittal view
- Coronal view
- Top view
- No controls

# Remove outlier components



View and edit current component clusters -- pop\_clustedit()

Study #: 151 of 151 components clustered

Select cluster to plot

- Cls 13 (5 ICs)
- Cls 14 (11 ICs)
- Cls 15 (8 ICs)
- Cls 16 (6 ICs)
- Cls 17 (4 ICs)

Select component(s) to plot

- All components
- S07 IC14
- S07 IC33
- S08 IC23
- S10 IC60

Plot scalp maps

Plot dipoles

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Plot cluster properties

Create new cluster

Rename selected cluster

Merge clusters

Save STUDY set to disk

/home/julie/workshop06/5subjects/WSstudy.study

Cancel Help Ok

Remove outliers - from pop\_clustedit()

Remove currently selected component below from Cls 17 to its outlier cluster?

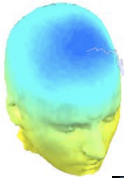
S10 IC60

Cancel Ok

Remove selected outlier comps.

Auto-reject outlier components

# Remove outlier components



View and edit current component clusters -- pop\_clustedit()

Study #: 151 of 151 components clustered

Select cluster to plot

- Cls 16 (6 ICs)
- Cls 17 (3 ICs)
- Cls 18 (14 ICs)
- Cls 19 (14 ICs)
- Outliers Cls 17 20 (1 ICs)

Select component(s) to plot

- All components
- S10 IC60

Plot scalp maps

Plot dipoles

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Plot cluster properties

Params

Params

Params

Plot scalp map(s)

Plot dipole(s)

Plot ERP(s)

Plot spectra

Plot ERSP(s)

Plot ITC(s)

Plot component properties

Create new cluster

Rename selected cluster

Merge clusters

Reassign selected component(s)

Remove selected outlier comps.

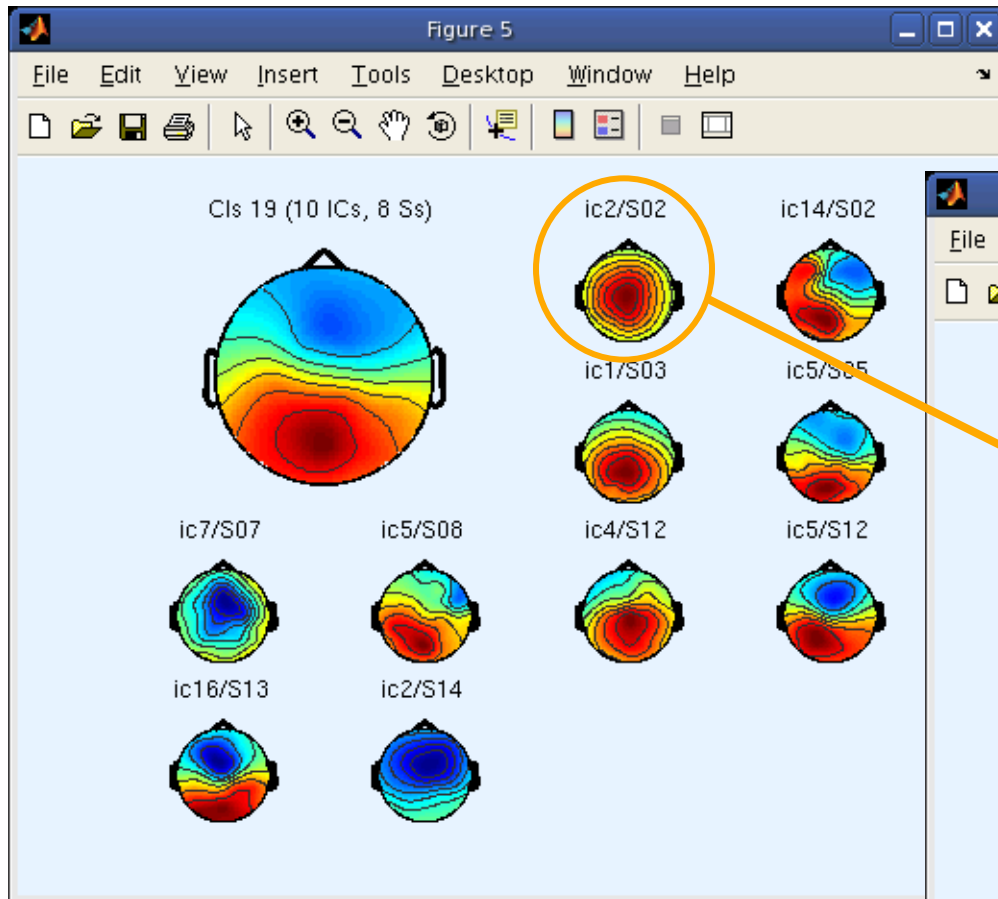
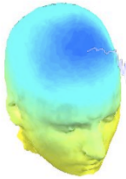
Auto-reject outlier components

Save STUDY set to disk

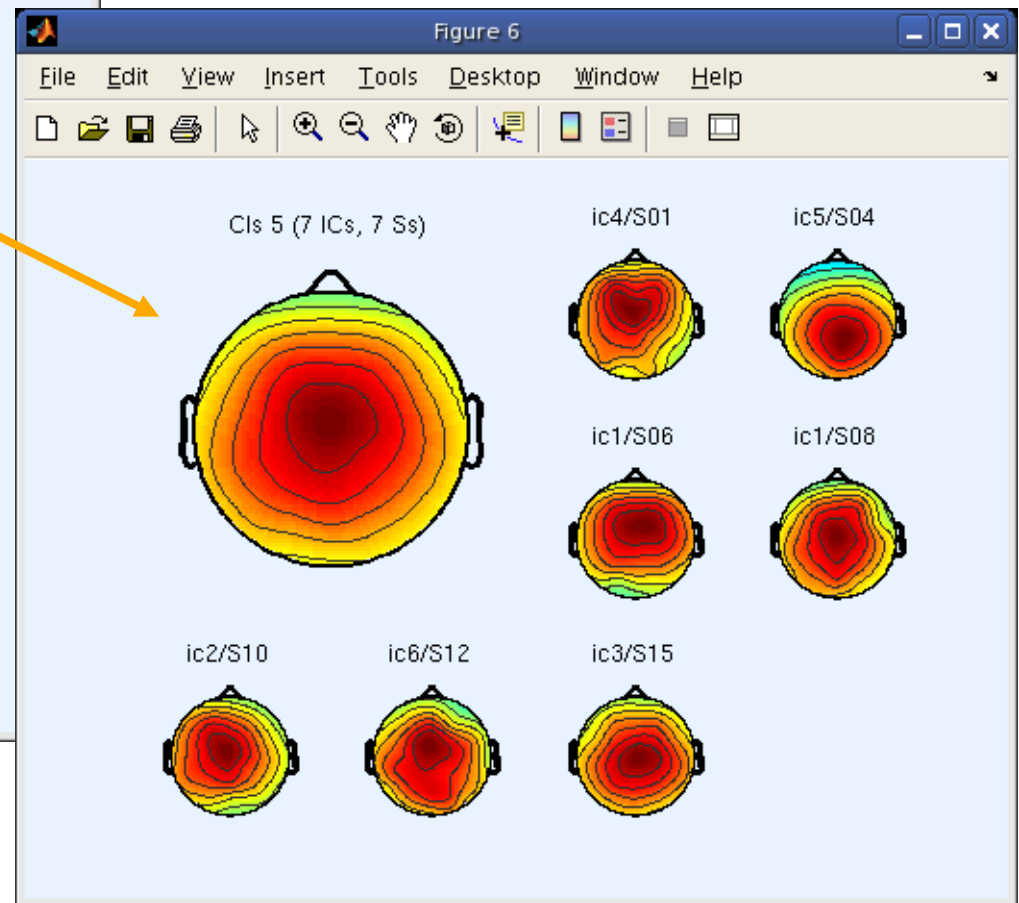
/home/julie/workshop06/5subjects/WSstudy.study

Cancel Help Ok

# Reassign component

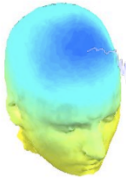


**If you want to manually reassign a component to another cluster...**





# Reassign component



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

**Select cluster to plot**

- Cls 18 (4 ICs)
- Cls 19 (10 ICs)
- Cls 20 (17 ICs)
- Cls 21 (6 ICs)

Plot scalp maps  
Plot dipoles  
Plot ERPs  
Plot spectra  
Plot ERSPs  
Plot ITCs  
Plot cluster properties

Params  
Params  
Params

**Select component(s) to plot**

- All components
- S02 IC2
- S02 IC14
- S03 IC1

Plot scalp map(s)  
Plot dipole(s)  
Plot ERP(s)  
Plot spectra  
Plot ERSP(s)  
Plot ITC(s)  
Plot component properties

Reassign selected component(s)  
Remove selected outlier comps.  
Auto-reject outlier components

Create new cluster  
Rename selected cluster  
Merge clusters

Save STUDY set to disk /home/julie/WorkshopSD2007/STUDY ...

Cancel Help Ok

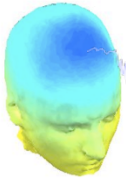
Reassign cluster - from pop\_clustedit()

Reassign currently selected component from Cls 19 to the cluster selected below

- Cls 4
- Cls 5
- Cls 6
- Cls 7

Cancel Ok

# Reassign component



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

Select cluster to plot

- Cls 4 (8 ICs)
- Cls 5 (8 ICs)**
- Cls 6 (3 ICs)
- Cls 7 (10 ICs)

Plot scalp maps  
Plot dipoles  
Plot ERPs  
Plot spectra  
Plot ERSPs  
Plot ITCs  
Plot cluster properties

Params  
Params  
Params

Create new cluster  
Rename selected cluster  
Merge clusters

Save STUDY set to disk /home/julie/WorkshopSD2007/

Cancel Help

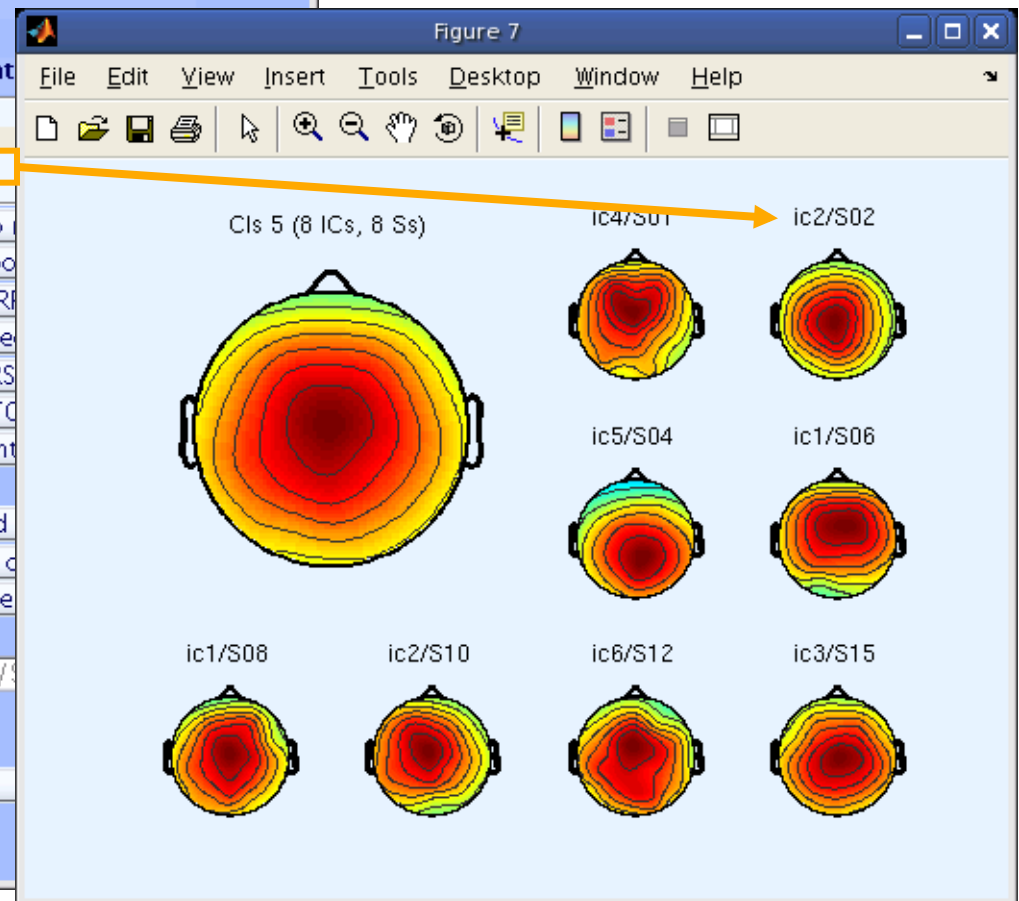
Select component

- All components
- S01 IC4
- S02 IC2**
- S04 IC5

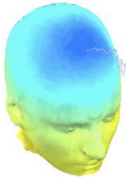
Plot scalp maps  
Plot dipoles  
Plot ERPs  
Plot spectra  
Plot ERSPs  
Plot ITCs  
Plot component properties

Reassign selected  
Remove selected cluster  
Auto-reject outliers

Successful reassignment



# Rename a cluster



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

Select cluster to plot

- Cls 4 (8 ICs)
- Cls 5 (8 ICs)**
- Cls 6 (3 ICs)
- Cls 7 (10 ICs)

Plot scalp maps

Plot dipoles

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Plot cluster properties

Create new cluster

**Rename selected cluster**

Merge clusters

Save STUDY set to disk  /home/julie/WorkshopSD2007/...

Cancel Help

Select component

- All components
- S01 IC4
- S02 IC2
- S04 IC5

Plot scalp maps

Plot dipoles

Params

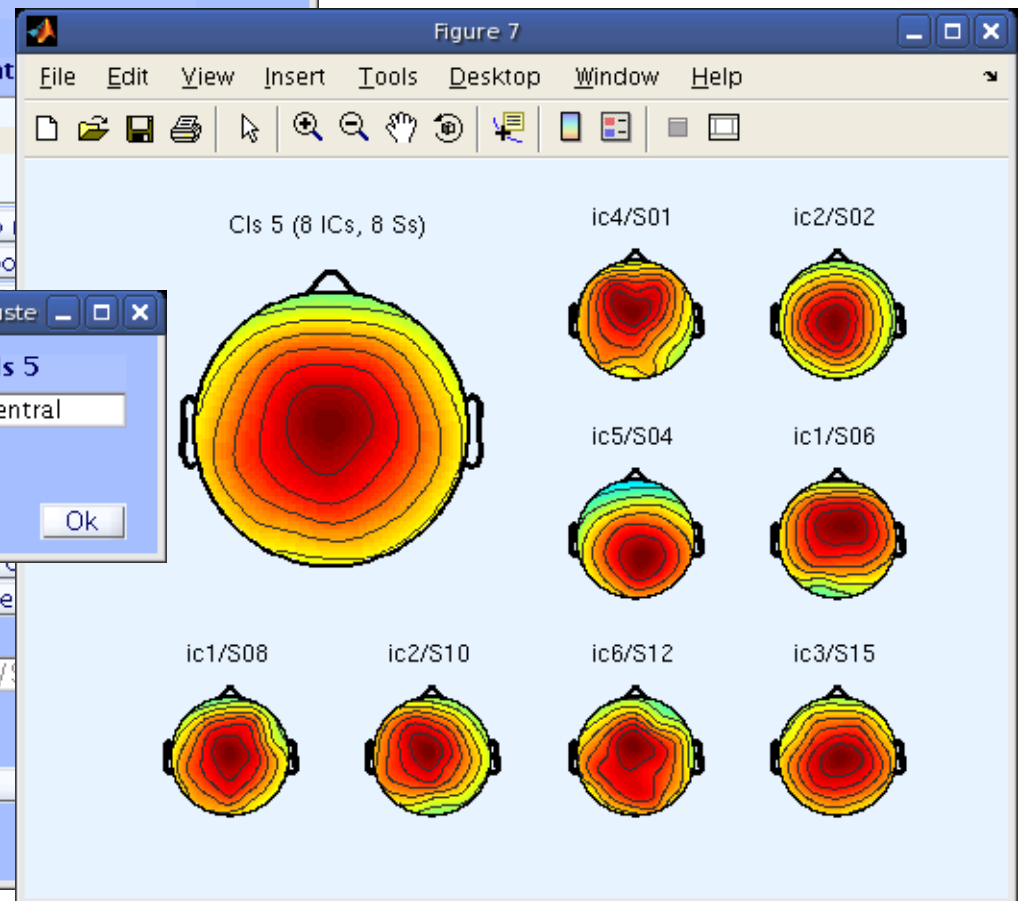
Params

Params

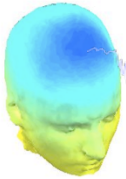
Remove selected cluster

Auto-reject outliers

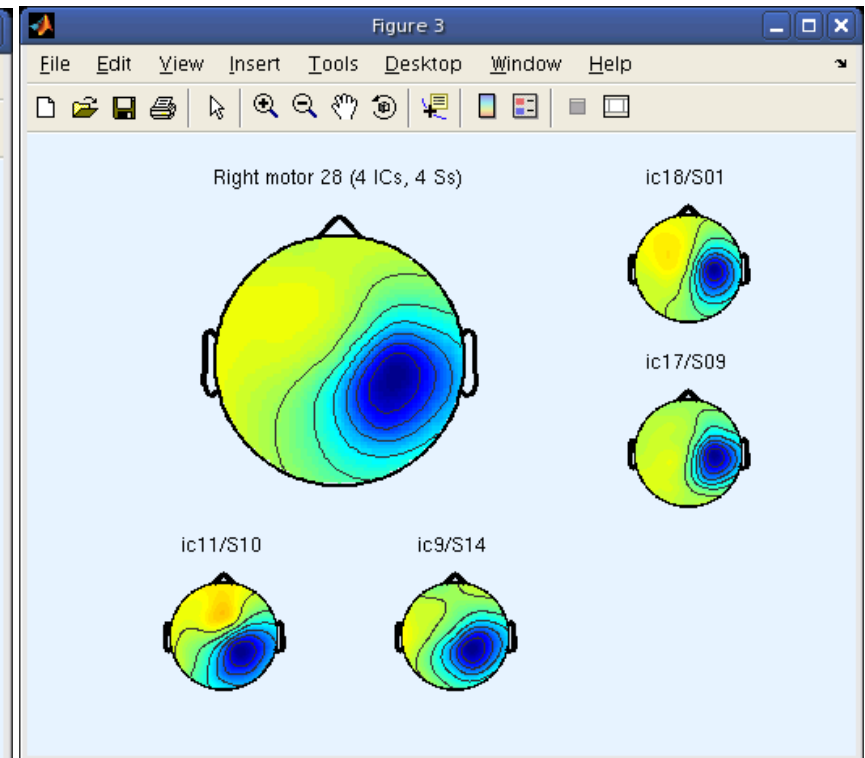
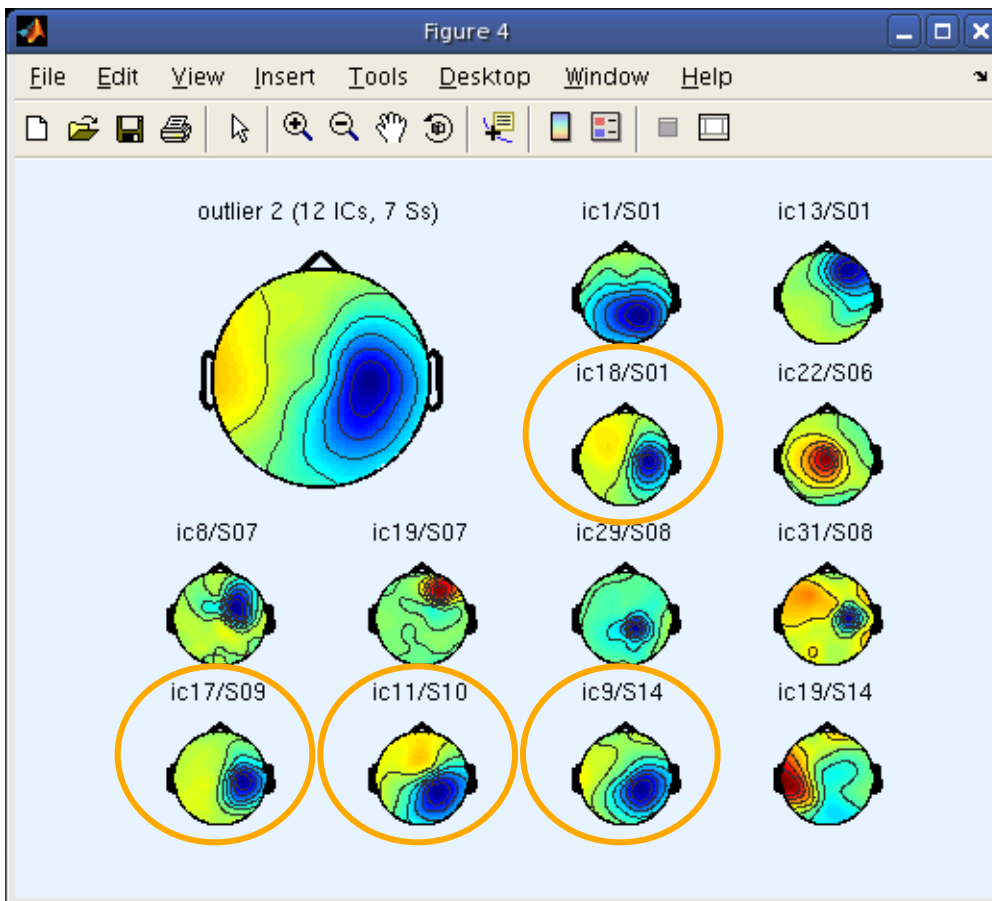
Name your cluster of interest



# Create a new cluster

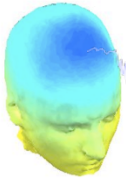


You found a bunch of 'outliers' that seem well-matched



Create a new cluster...

# Create a new cluster



View and edit current component clusters -- pop\_clustedit()

**Study 'Attention': 181 of 181 components clustered**

**Select cluster to plot**

- All cluster centroids
- ParentCluster 1 (181 ICs)
- outlier 2 (9 ICs)**
- Cls 3 (4 ICs)

Plot scalp maps  
Plot dipoles  
Plot ERPs  
Plot spectra  
Plot ERSPs  
Plot ITCs  
Plot cluster properties

**Select component(s) to plot**

- S01 IC18
- S06 IC22
- S07 IC8
- S07 IC19

Plot scalp map(s)  
Plot dipole(s)  
Plot ERP(s)  
Plot spectra  
Plot ERSP(s)  
Plot ITC(s)

Params  
Params  
Params

**Create new cluster**  
Rename selected cluster  
Merge clusters

Save STUDY set to disk

Cancel Help Ok

**Create new empty cluster - from pop\_clustedit()**

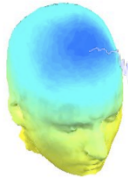
**Create new empty cluster**

Enter cluster name:

Cancel Ok



# Create a new cluster



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

Select cluster to plot

- All cluster centroids
- ParentCluster 1 (181 ICs)
- outlier 2 (9 ICs)
- Cls 3 (4 ICs)

Select component(s) to plot

- S01 IC18
- S06 IC22
- S07 IC8
- S07 IC19

Plot scalp maps

Plot dipoles

Params

Params

Params

Reassign selected component(s)

Remove selected outlier comps.

Aut...

disk /home/julie/Work

Help

Figure 4

File Edit View Insert Tools Desktop Window Help

outlier 2 (12 ICs, 7 Ss)

ic1/S01 ic13/S01

ic18/S01 ic22/S06

ic8/S07 ic19/S07 ic29/S08 ic31/S08

ic17/S09 ic11/S10 ic9/S14 ic19/S14

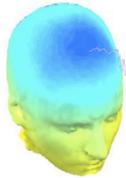
Reassign cluster - from pop\_clustedit()

Reassign currently selected component from outlier 2 to the cluster selected below

- Cls 25
- Cls 26
- Cls 27
- Right motor 28

Cancel Ok

# New cluster created



View and edit current component clusters -- pop\_clustedit()

Study 'Attention': 181 of 181 components clustered

Select cluster to plot

- Cls 25 (3 ICs)
- Cls 26 (3 ICs)
- Cls 27 (1 ICs)
- Right motor 28 (4 ICs)**

Select component(s) to plot

- All components
- S01 IC18
- S09 IC17
- S10 IC11

Plot scalp map(s)

Plot dipole(s)

Plot ERPs

Plot spectra

Plot ERSPs

Plot ITCs

Plot cluster properties

Params

Params

Params

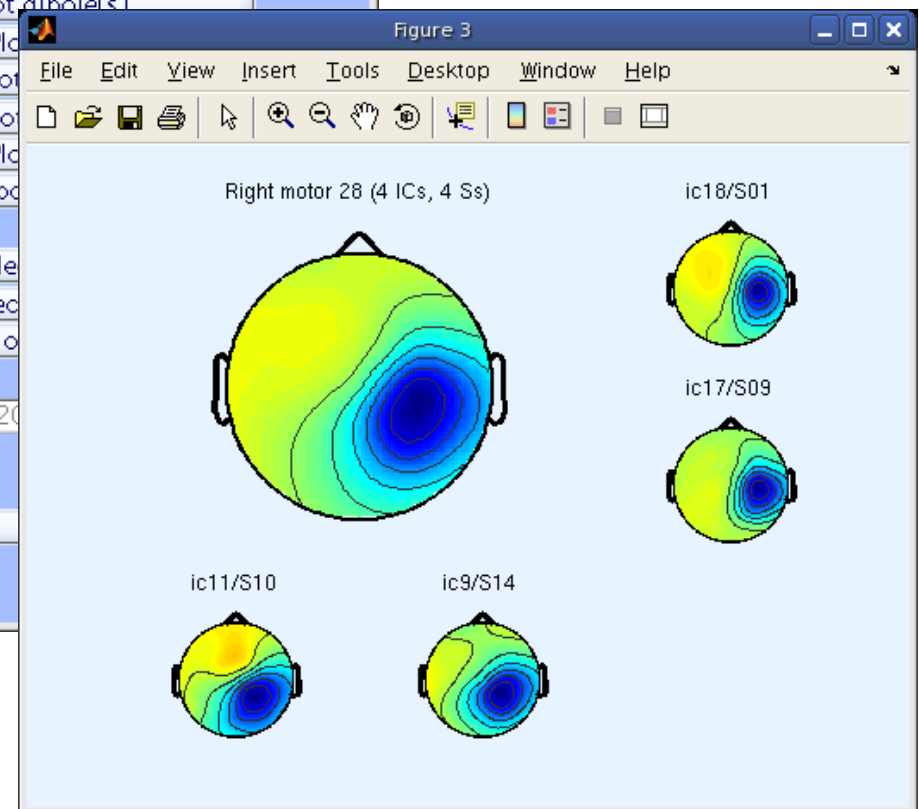
Create new cluster

Rename selected cluster

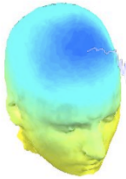
Merge clusters

Save STUDY set to disk  /home/julie/WorkshopSD20

Cancel Help



# Exercise



- **Novice**
  - Use the GUI to plot cluster and component data using default parameters
- **Intermediate**
  - Use the GUI to plot cluster and component data trying out different plotting parameters such as x/y-axis limits, and color scale limits to compare absolute values across clusters.
  - Apply statistical thresholds of your choice
- **Advanced**
  - Practice re-assigning an IC from one cluster to:
    - 1) an outlier cluster
    - 2) another cluster
  - Create and name a new cluster, fill with your choice of ICs

