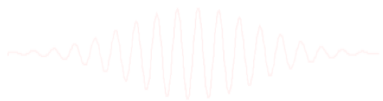
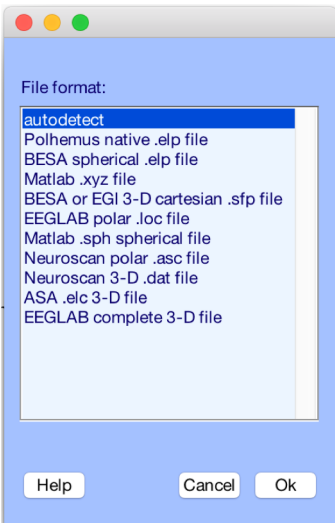
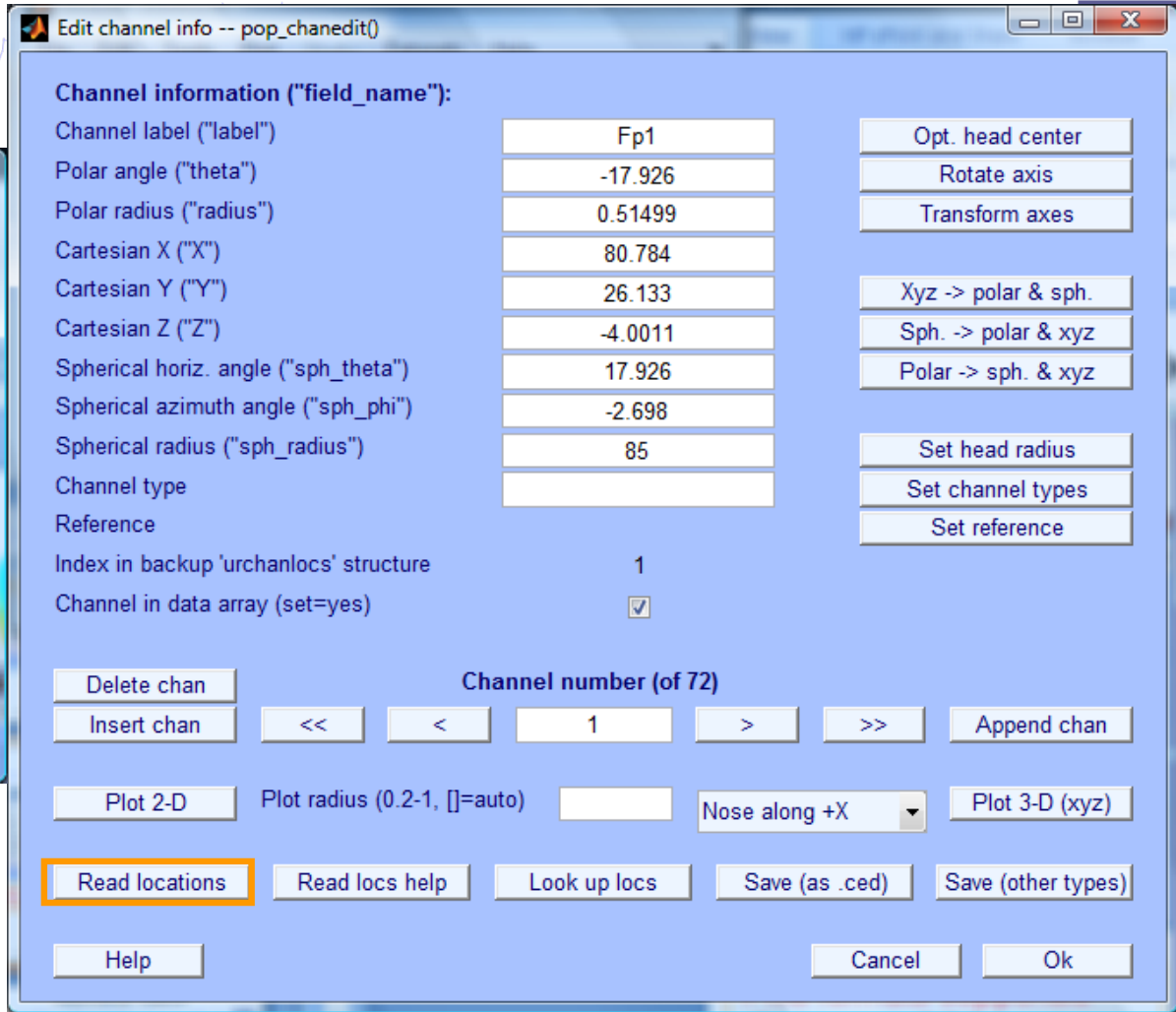
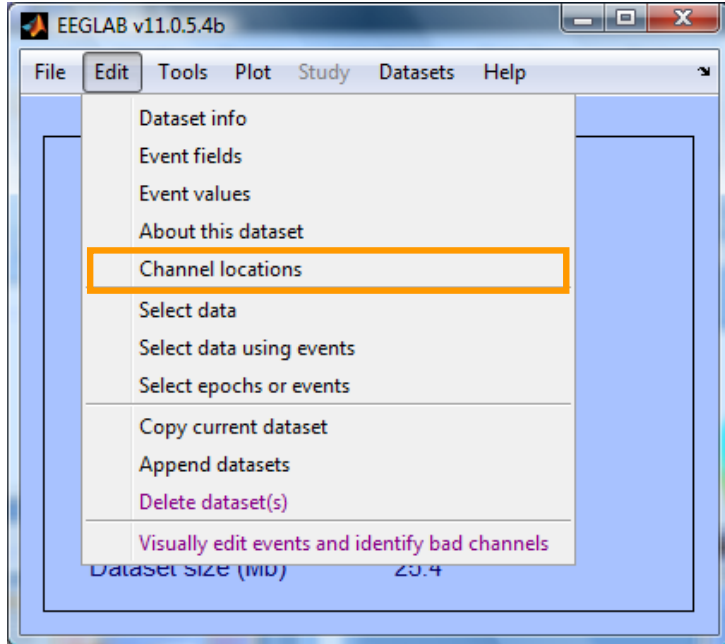
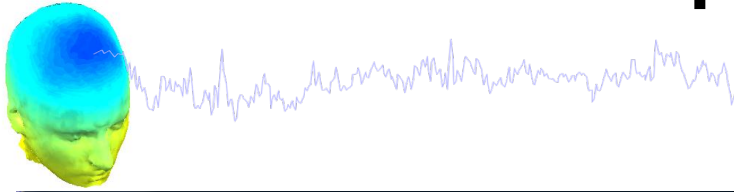


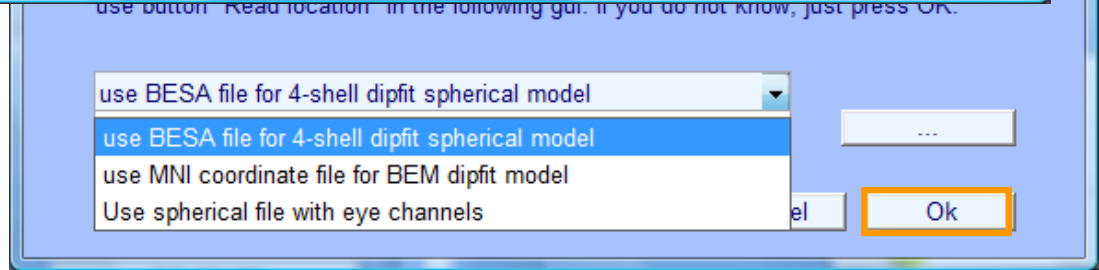
Channel coordinates and source localization

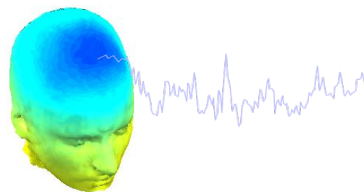


Import channel locations



10 file formats supported (Polhemus, BESA, ...)





Edit channel info -- pop_chanedit()

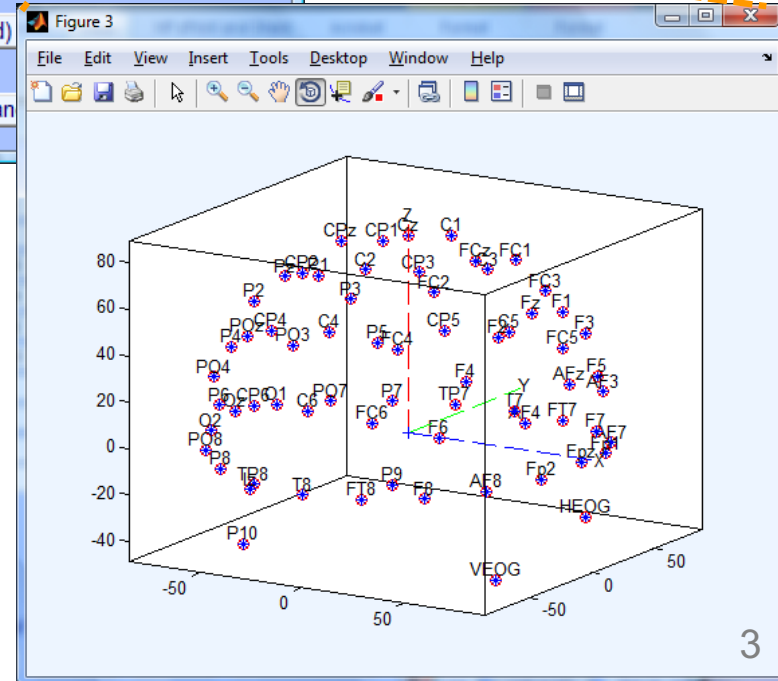
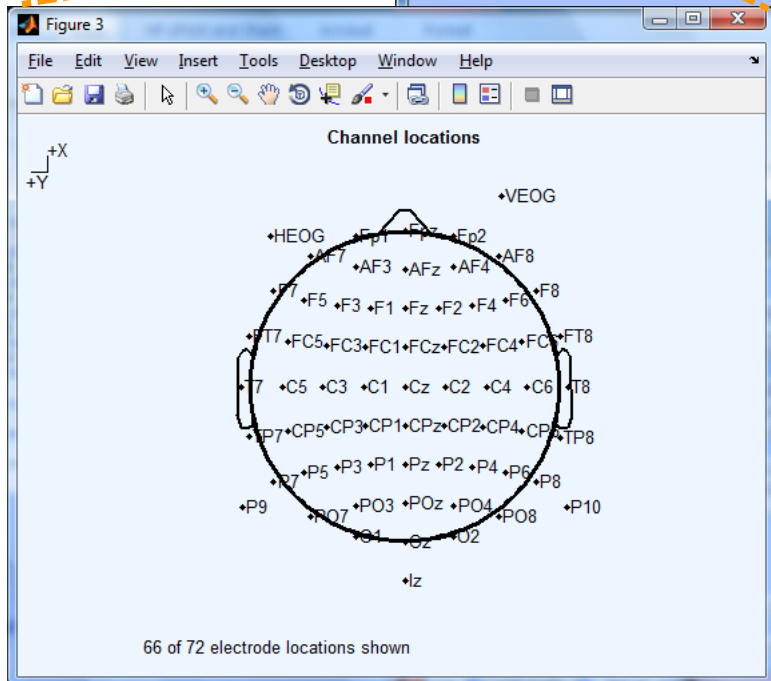
Channel information ("field_name"):

Channel label ("label")	HEOG	Opt. head center
Polar angle ("theta")	-42	Rotate axis
Polar radius ("radius")	0.65556	Transform axes
Cartesian X ("X")	55.7734	
Cartesian Y ("Y")	50.2186	Xyz -> polar & sph.
Cartesian Z ("Z")	-39.9051	Sph. -> polar & xyz
Spherical horiz. angle ("sph_theta")	42	Polar -> sph. & xyz
Spherical azimuth angle ("sph_phi")	-28	
Spherical radius ("sph_radius")	85	Set head radius
Channel type		Set channel types
Reference		Set reference
Index in backup 'urchanlocs' structure	68	
Channel in data array (set=yes)	<input checked="" type="checkbox"/>	

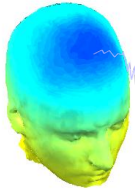
Channel number (of 72): 68

Buttons: Delete chan, Insert chan, <<, <, >, >>, Append chan

Plot 2-D, Plot radius (0.2-1, []=auto), Nose along +X, Plot 3-D (xyz)



Import channel locations



Edit channel info -- pop_chanedit()

Channel information ("field_name"):

Channel label ("label")	LEYE
Polar angle ("theta")	-45.1543
Polar radius ("radius")	0.54374
Cartesian X ("X")	0.79487
Cartesian Y ("Y")	0.79917
Cartesian Z ("Z")	-0.15585
Spherical horiz. angle ("sph_theta")	45.1543
Spherical azimuth angle ("sph_phi")	-7.8725
Spherical radius ("sph_radius")	1.1379
Channel type	EEG
Reference	
Index in backup 'urchanlocs' structure	
Channel in data array (set=yes)	<input checked="" type="checkbox"/>

Buttons: Delete chan, Insert chan, Plot 2-D, Read locations, Help

Channel number (of 71)

Buttons: <<, <, 1, >, >>, Append chan

Buttons: Plot radius (0.2-1, [=auto]), Nose along +X, Plot 3-D (xyz)

Buttons: Read locs help, Look up locs, Save (as .ced), Save (other types), Cancel, Ok

- Opt. head center
- Rotate axis
- Transform axes
- XYZ -> polar & sph.
- Sph. -> polar & xyz
- Polar -> sph. & xyz
- Set head radius
- Set channel types
- Set reference

Convert channel locations -- pop_chancenter()

Optimize center location or specify center

Channel indices to ignore for best-sphere matching

Buttons: Help, Browse, Cancel, Ok

Force electrode location -- forcelocs()

X/Y value	Coordinate	Electrode list
0	X (rotate X-Z plane)	Cz

Buttons: Help, Pick, Cancel, Ok

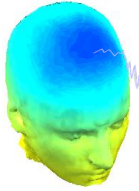
Set channel ...

Channel indices

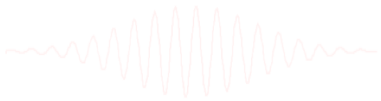
Type (e.g. EEG)

Buttons: Help, Cancel, Ok

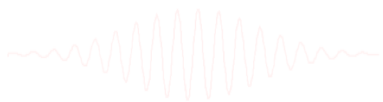
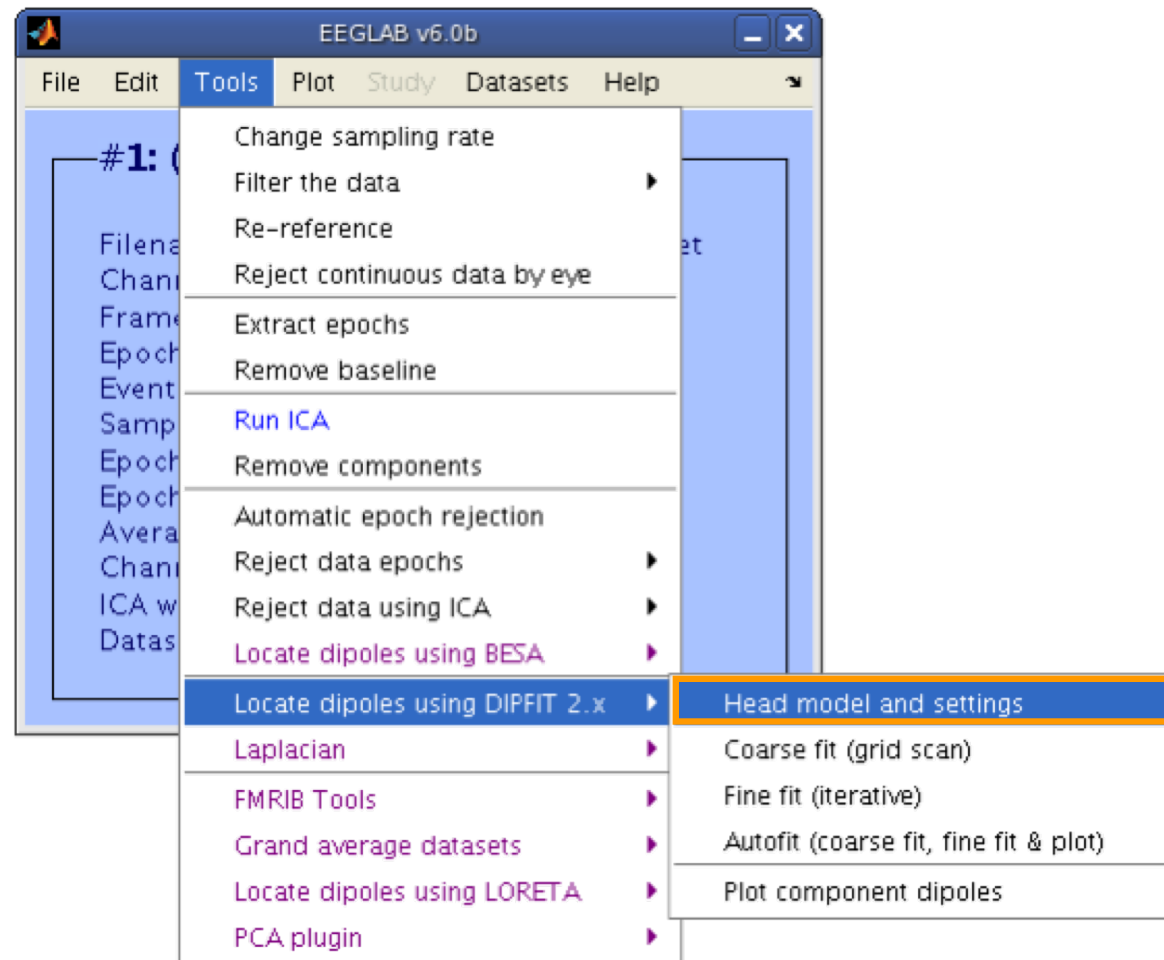
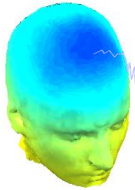
DIPFIT and model co-registration



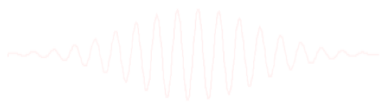
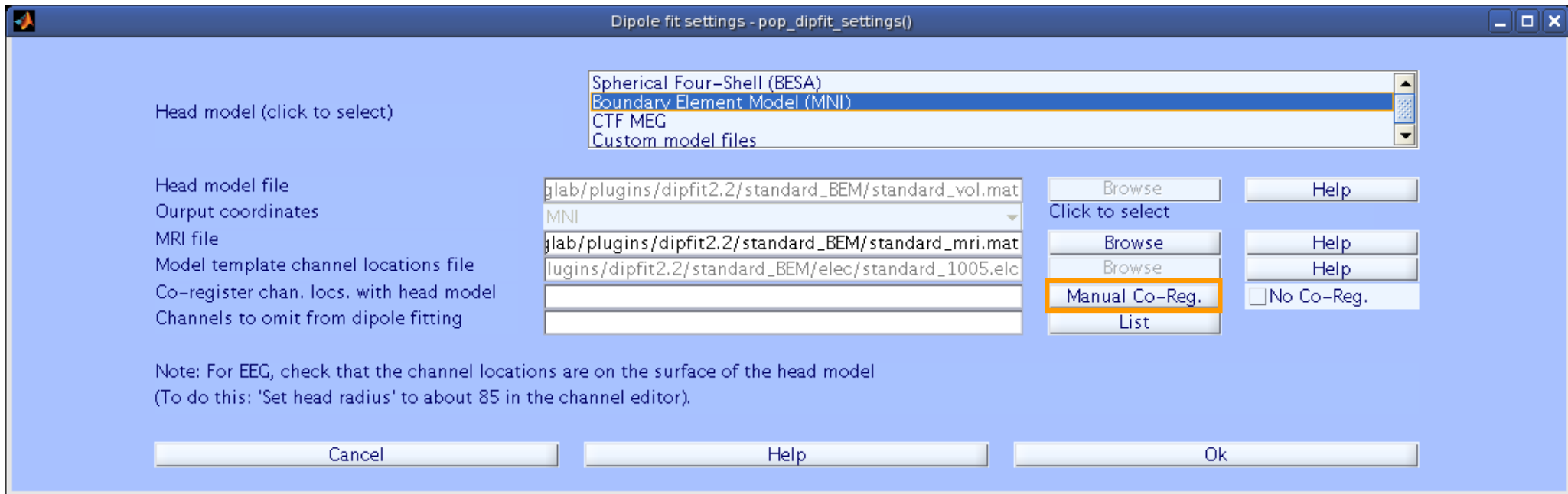
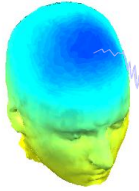
1. Co-register electrodes with model
2. Autofit, plot dipoles, fine fit
3. 3D headplot co-registration



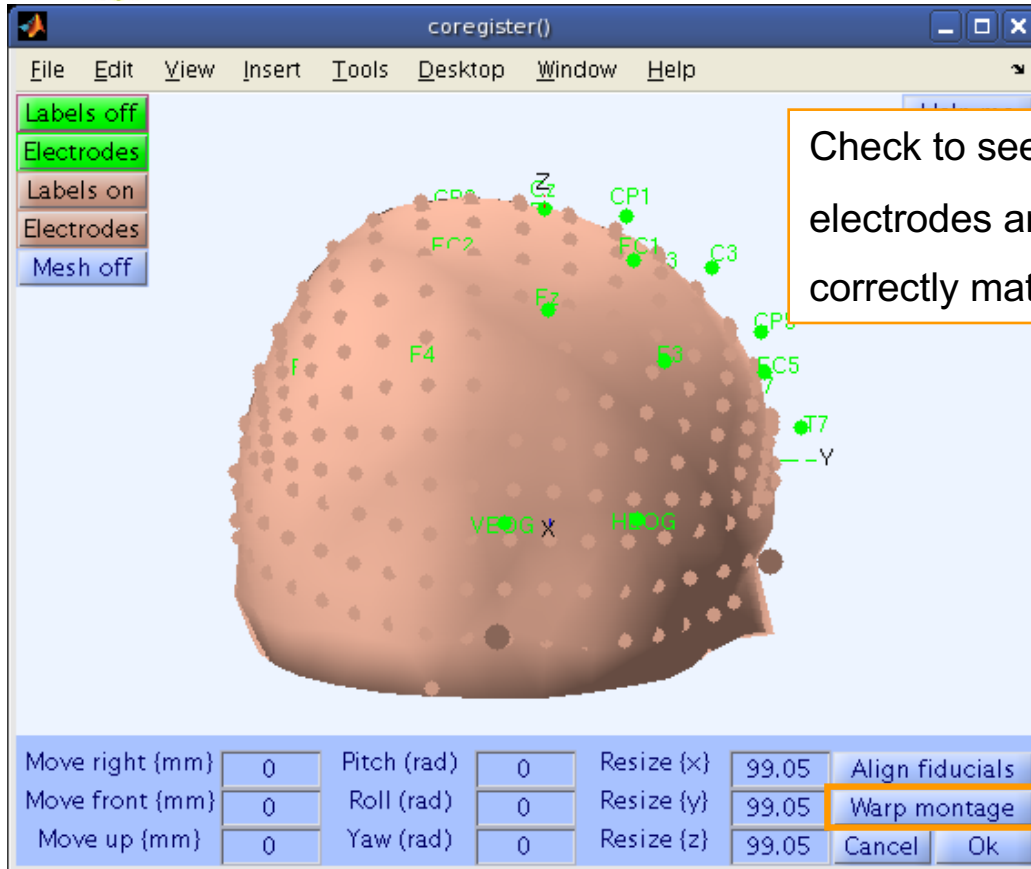
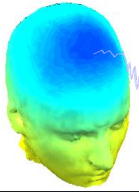
Finding dipole locations using DIPFIT in EEGLAB



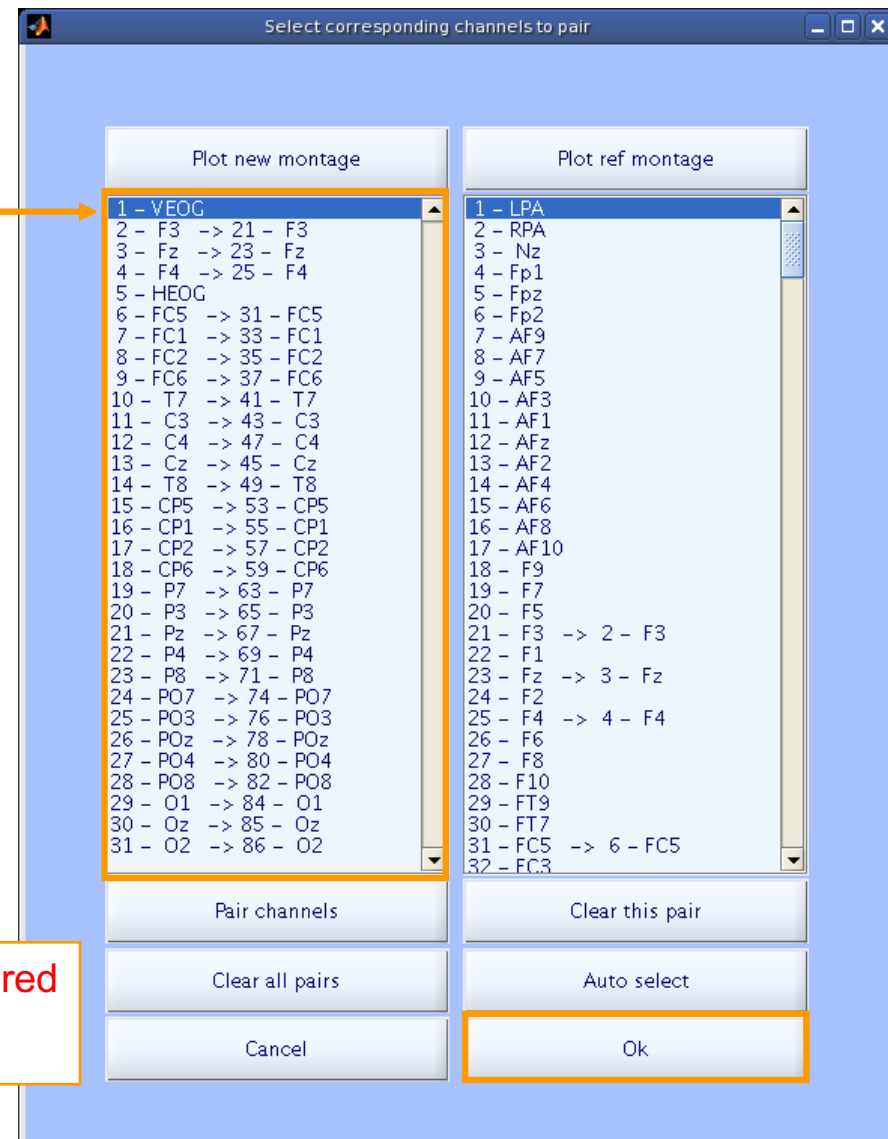
Co-register to model



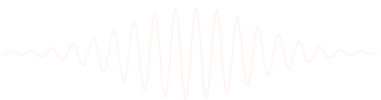
Alternatively, warp to standard montage



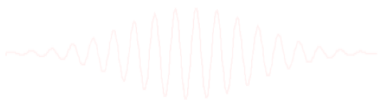
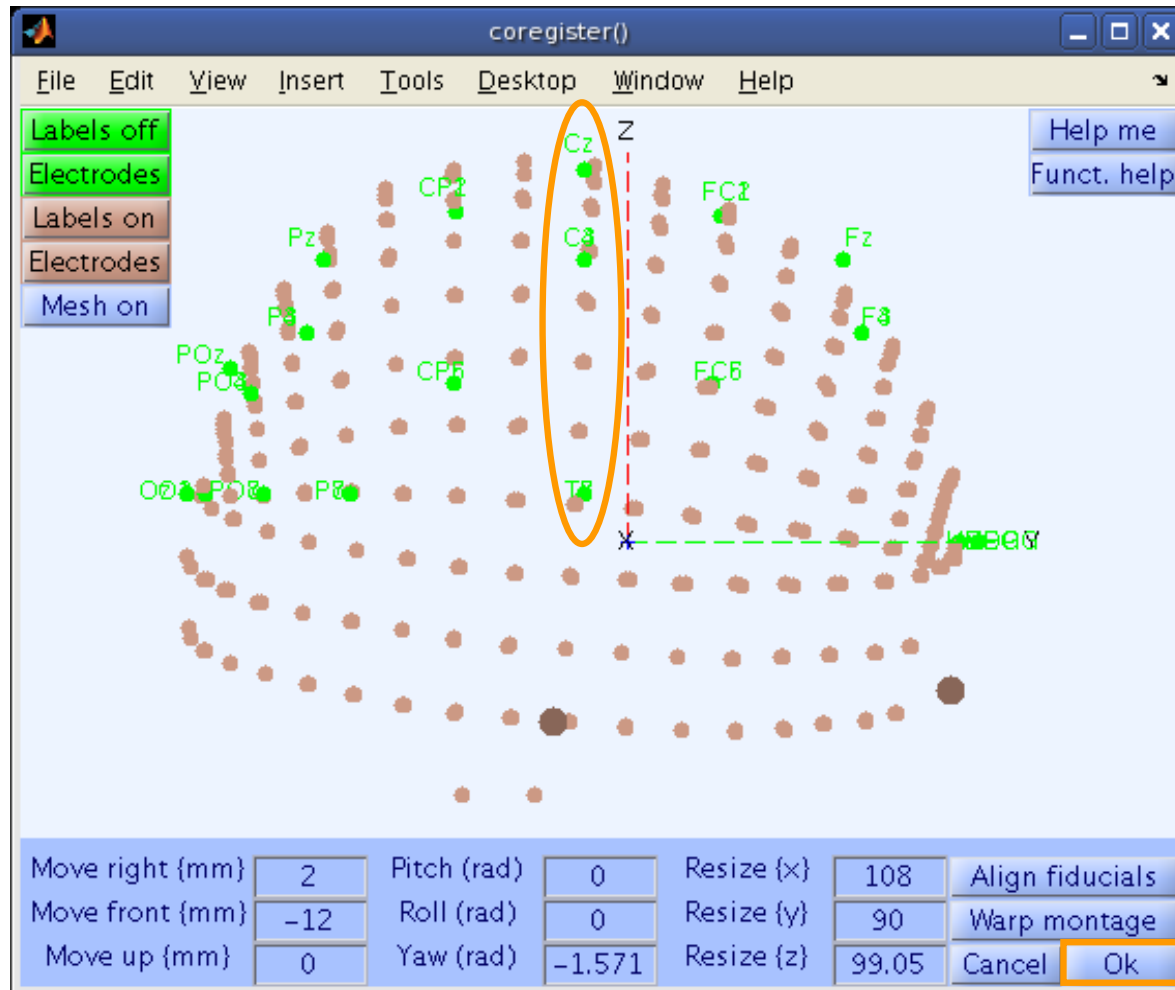
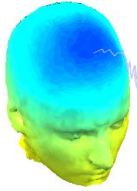
Check to see that electrodes are correctly matched



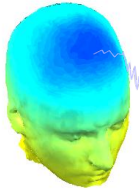
stats toolbox required for warping



Check coregistration with model



Confirm electrode transformation



Dipole fit settings - pop_dipfit_settings()

Head model (click to select)
Spherical Four-Shell (BESA)
Boundary Element Model (MNI)
CTF MEG
Custom model files

Head model file
g:\lab\plugins\dipfit2.2\standard_BEM\standard_vol.mat
Browse Help

Output coordinates
MNI
Click to select

MRI file
g:\lab\plugins\dipfit2.2\standard_BEM\standard_mri.mat
Browse Help

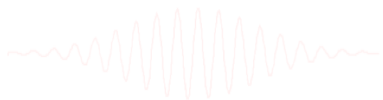
Model template channel locations file
g:\lab\plugins\dipfit2.2\standard_BEM\elec\standard_1005.elc
Browse Help

Co-register chan. locs. with head model
 Manual Co-Reg. No Co-Reg.

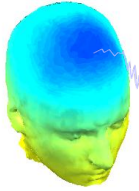
Channels to omit from dipole fitting
0 -1.570796 108 90 99.05485
List

Note: For EEG, check that the channel locations are on the surface of the head model
(To do this: 'Set head radius' to about 85 in the channel editor).

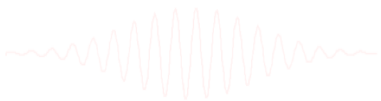
Cancel Help Ok



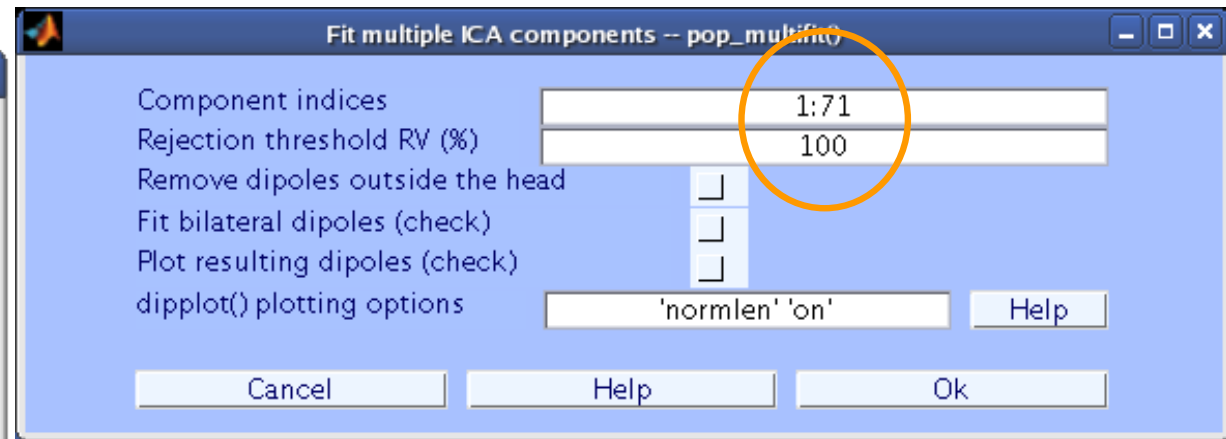
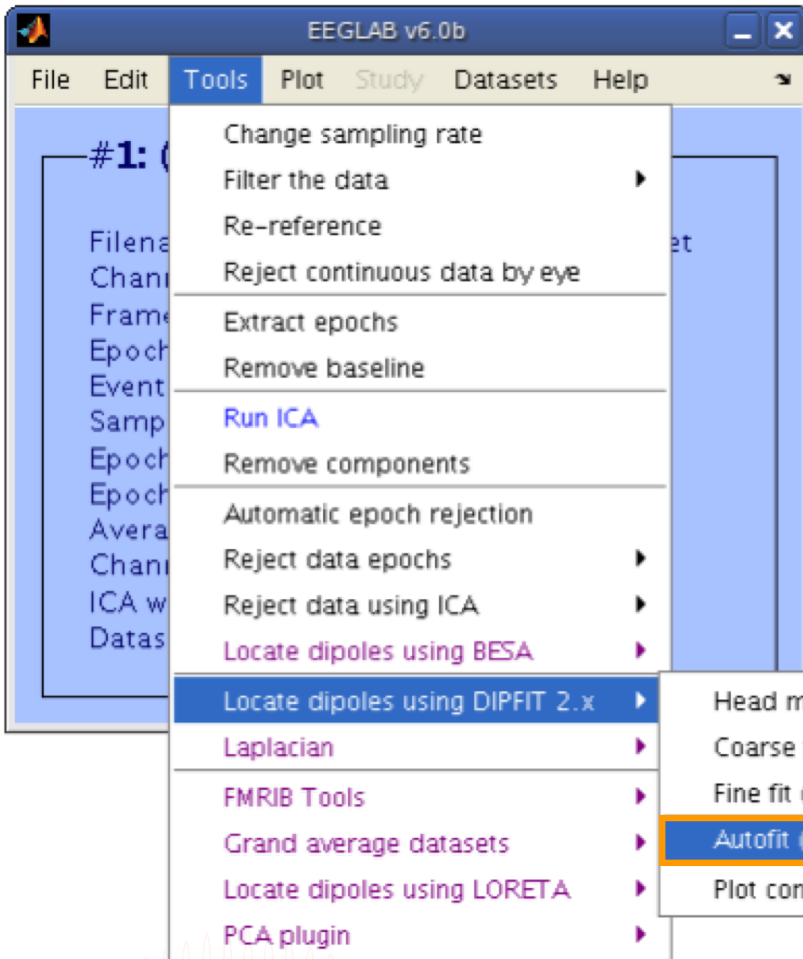
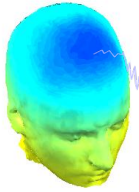
DIPFIT and model co-registration



1. Co-register electrodes with model
2. Autofit, plot dipoles, fine fit
3. 3D headplot co-registration



Autofit equivalent dipoles



Plot dipoles



Plot dipoles - pop_dipplot

Components indices ([]=all available)

Plot dipoles within RV (%) range ([min max])

Background image /data/common/matlab/eeglab/plugins/c

Plot summary mode

Plot edges

Plot closest MRI slide

Plot dipole's 2-D projections

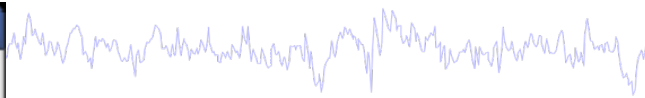
Plot projection lines

Make all dipoles point out

Normalized dipole length

Additional dipplot() options

Cancel Help



EEGLAB v6.0b

File Edit Tools Plot Study Datasets Help

#1: (

- Change sampling rate
- Filter the data
- Re-reference
- Reject continuous data by eye
- Extract epochs
- Remove baseline
- Run ICA
- Remove components
- Automatic epoch rejection
- Reject data epochs
- Reject data using ICA
- Locate dipoles using BESA
- Locate dipoles using DIPFIT 2.x
 - Head model and settings
 - Laplacian
- FMRIB Tools
- Grand average datasets
- Locate dipoles using LORETA
- PCA plugin

- Coarse fit (grid scan)
- Fine fit (iterative)
- Autofit (coarse fit, fine fit & plot)
- Plot component dipoles

Figure 2

File Edit View Insert Tools Desktop Window Help

71 dipoles:

Plot one

Keep|Next

Next

Prev

Keep|Prev

1

Comp: 1

RV: 9.92%

X tal: 4

Y tal: 67

Z tal: -37

Display:

Mesh on

Tight view

Sagittal view

Coronal view

Top view

No controls

Scroll through dipoles

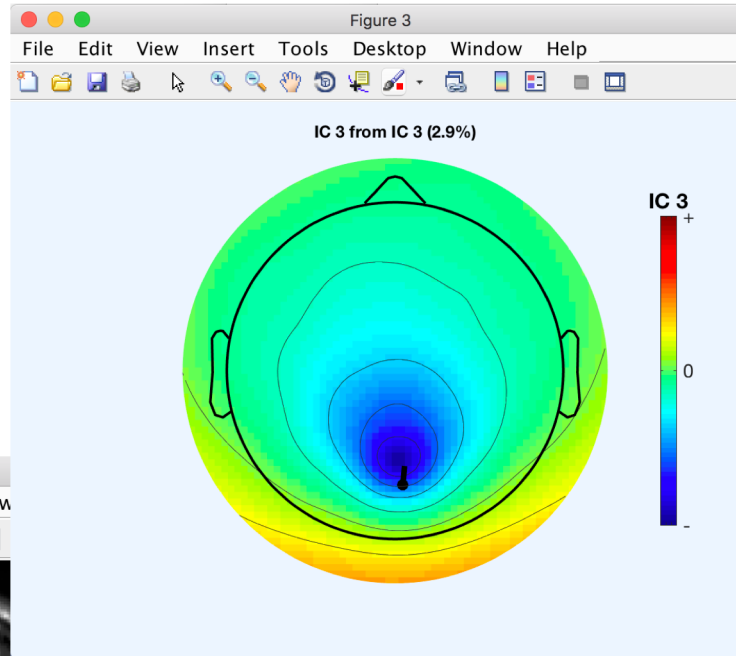
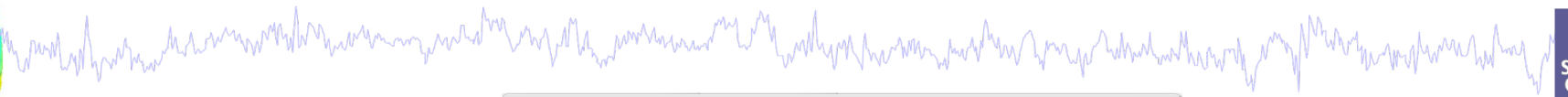
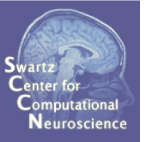
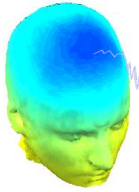


Figure 3

File Edit View Insert Tools Desktop Window

1 dipoles:

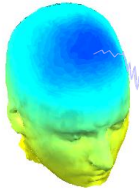
- Plot one
- Keep|Next
- Next
- Prev
- Keep|Prev
- 1
- Comp: 3
- RV: 2.91%
- X tal: 4
- Y tal: -81
- Z tal: 33
- cuneus R**
- Display:**
- Mesh on
- Tight view
- Sagittal view
- Coronal view
- Top view
- No controls**

Figure 3

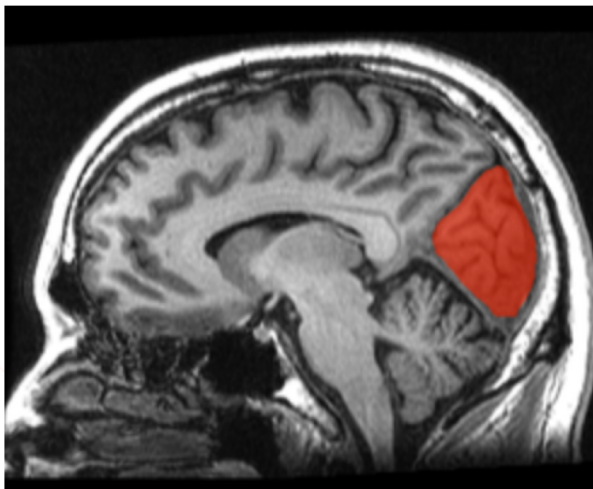
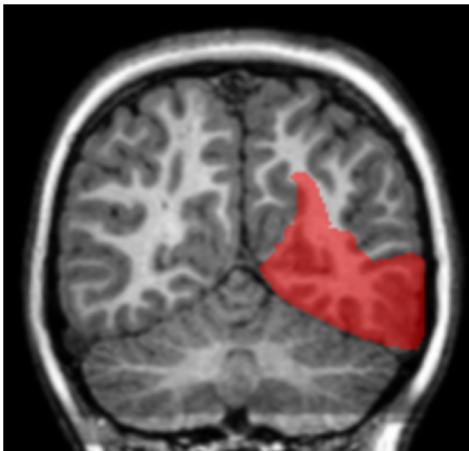
Tools Desktop Window Help

- Next
- Prev
- Keep|Prev
- 1
- Comp: 3
- RV: 2.91%
- X tal: 4
- Y tal: -81
- Z tal: 33
- cuneus R
- Display:**
- Mesh on
- Tight view
- Sagittal view
- Coronal view
- Top view
- No controls**

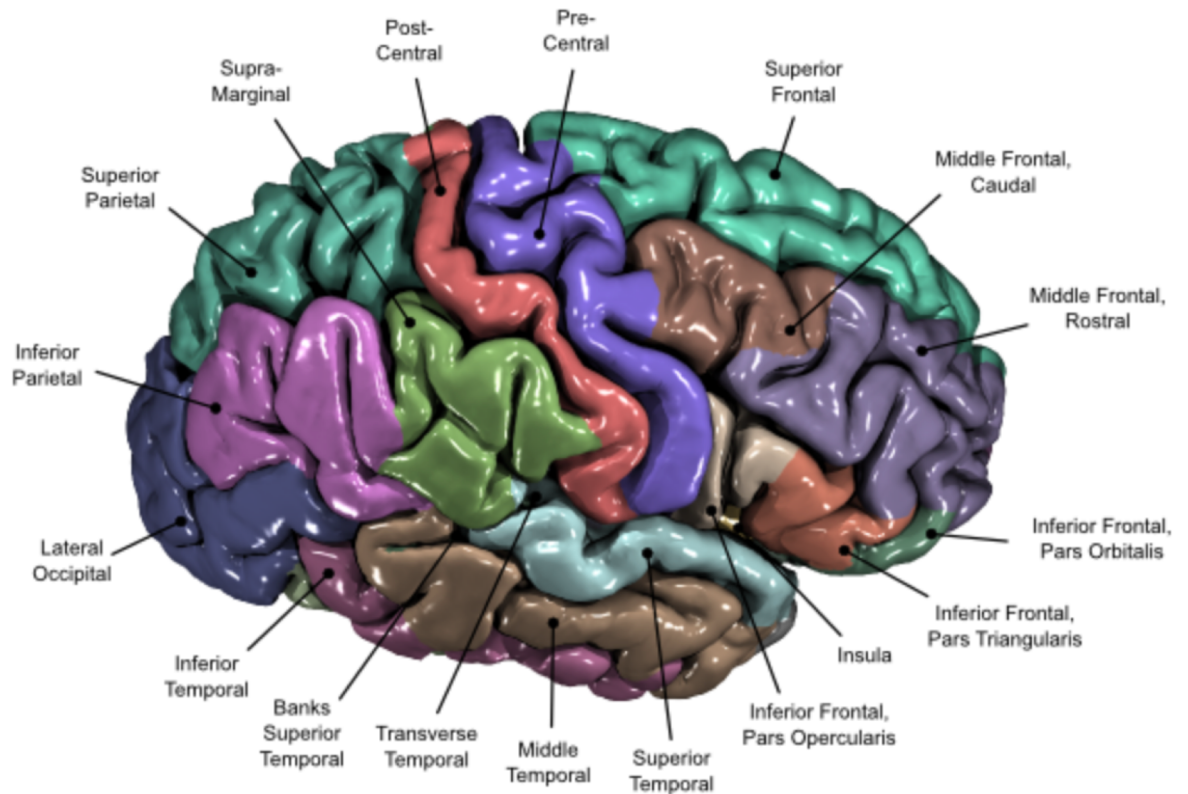
Desikan-Killiany Atlas



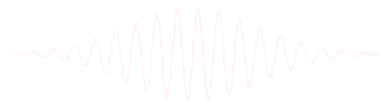
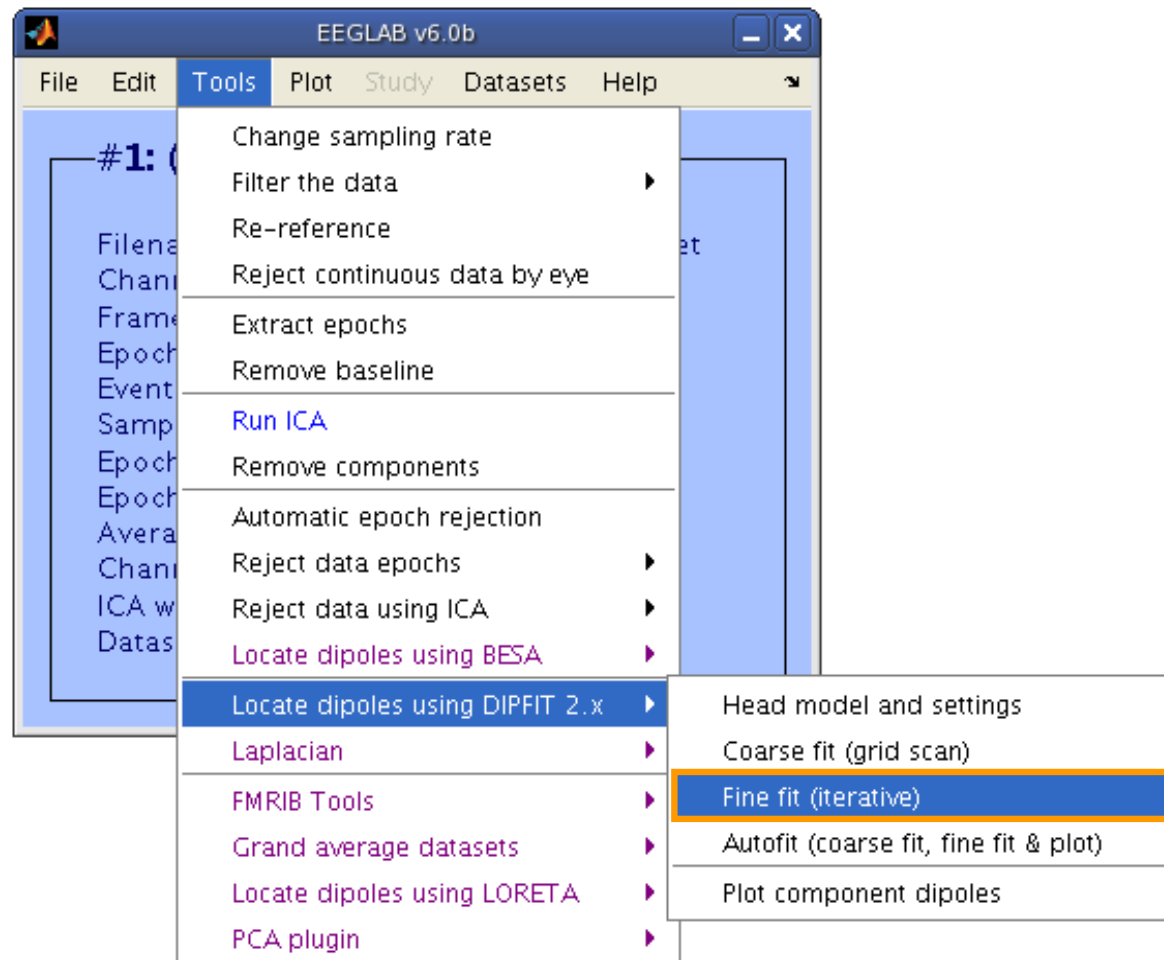
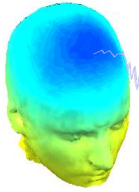
Right Cuneus



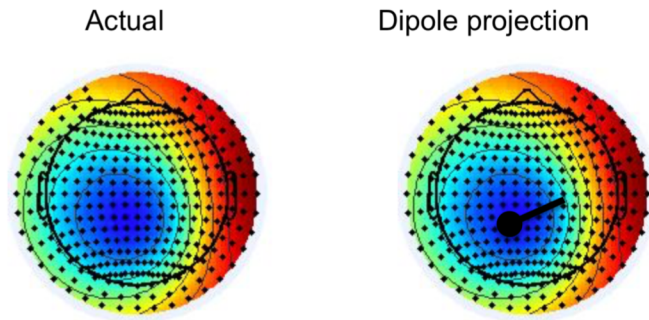
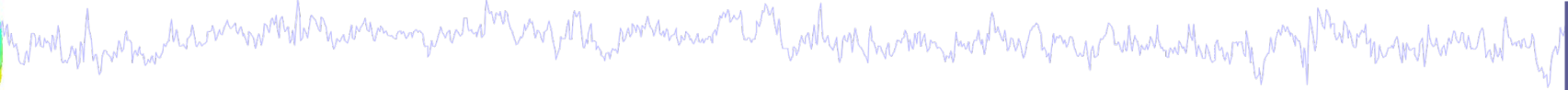
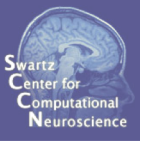
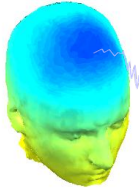
68 brain areas



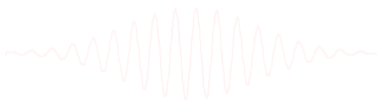
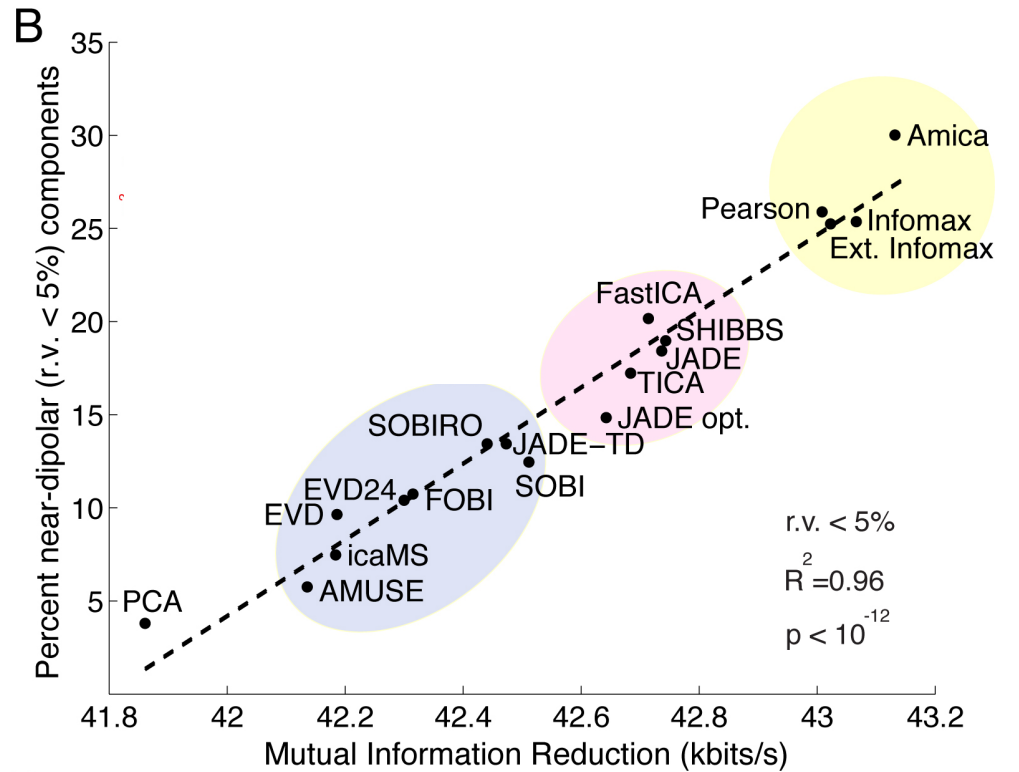
Fine fit options in DIPFIT



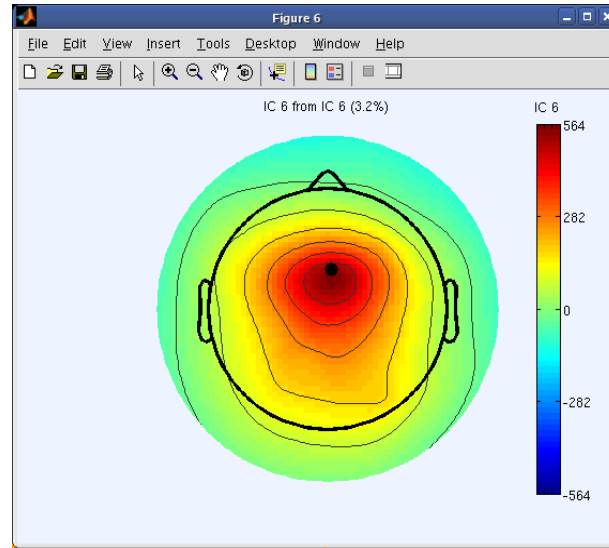
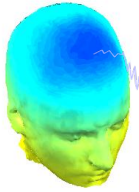
Computing residual variance



$$r = \frac{\sum (x_i - \tilde{x}_i)^2}{\sum x_i^2}$$



Fine fit menu



Manual dipole fit -- pop_dipfit_nonlinear()

Component to fit: 6 Plot map Residual variance = 3.21%

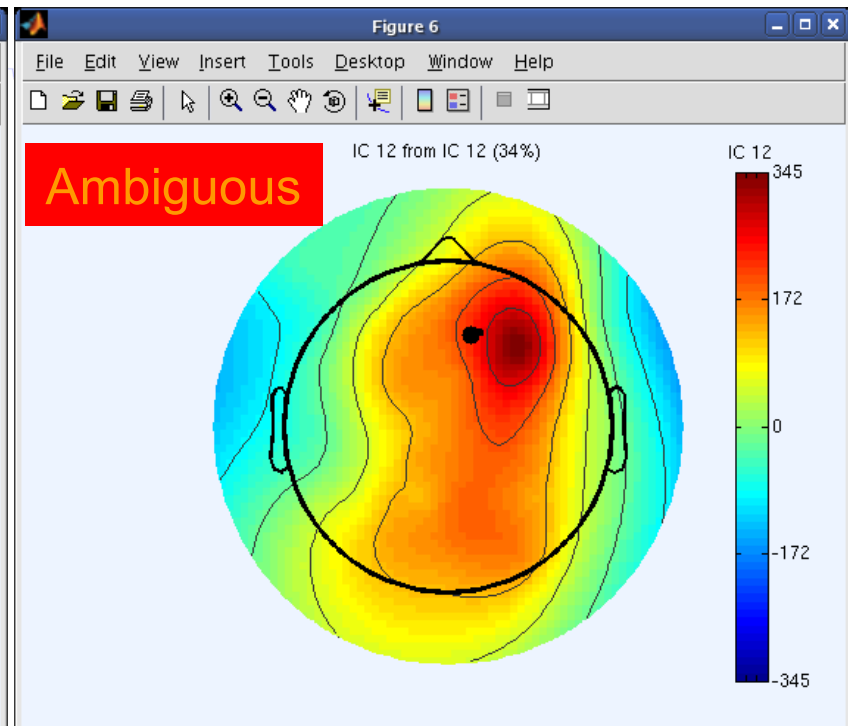
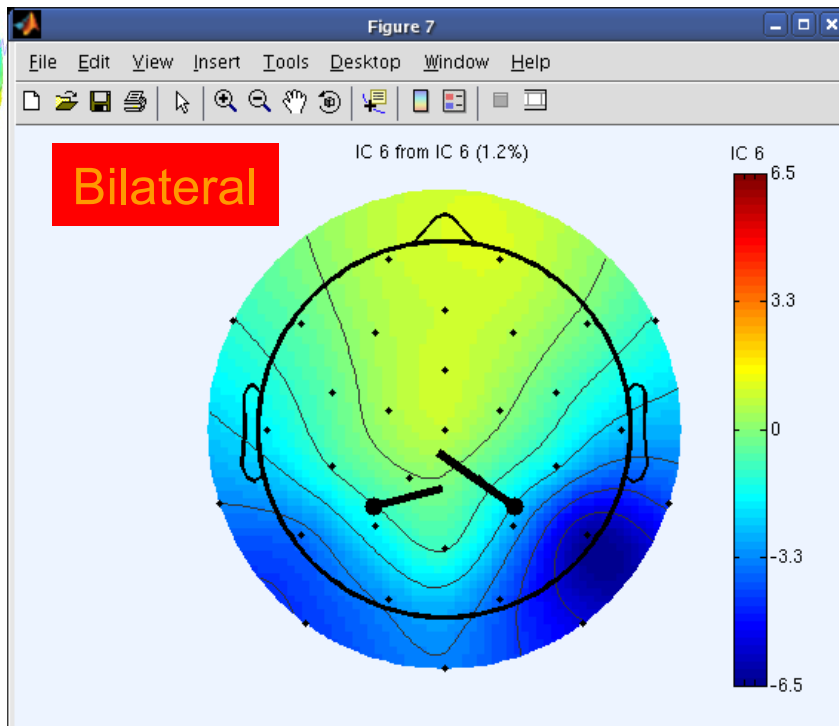
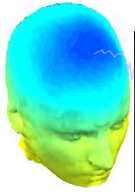
dipole	fit	position	moment	
#1	<input checked="" type="checkbox"/>	28.222 -2.401 37.331	2.380 475942.653 3819304.288	Flip (in out)
#2	<input type="checkbox"/>	0.000 0.000 0.000	0.000 0.000 0.000	Flip (in out)

Symmetry constrain for dipole ...

Fit dipole(s)' position & moment Or fit only dipole(s)' moment Plot dipole(s)

Cancel Help Ok

Bilateral dipoles



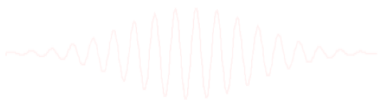
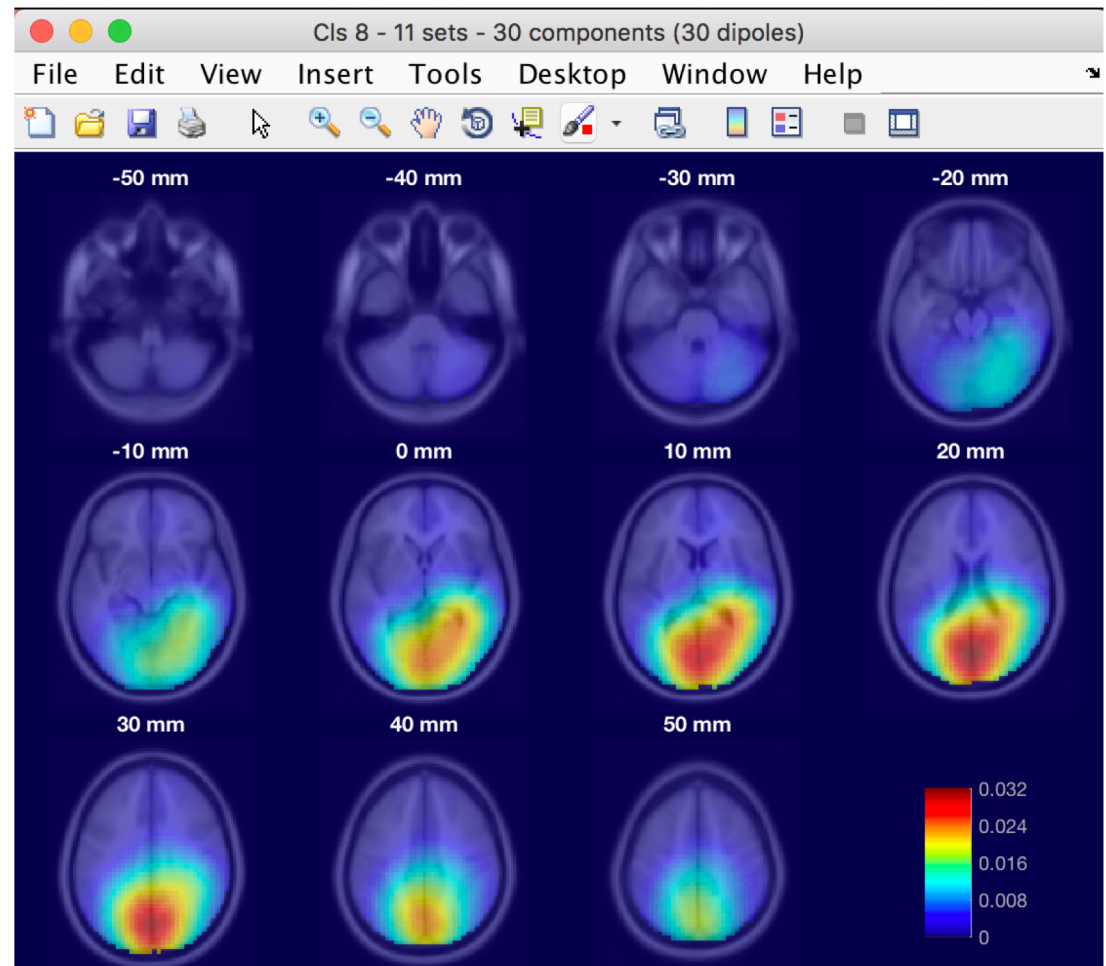
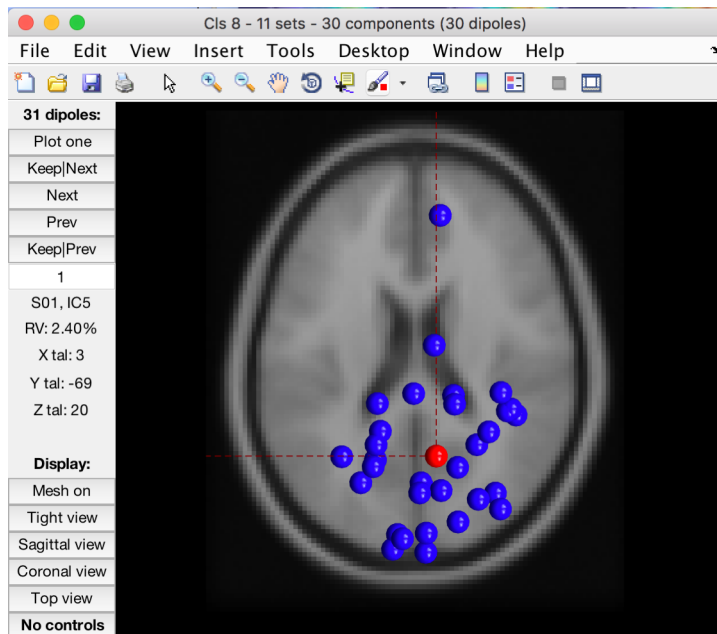
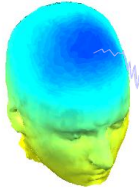
Manual dipole fit -- pop_dipfit_nonlinear()

Component to fit: Residual variance = 1.23%

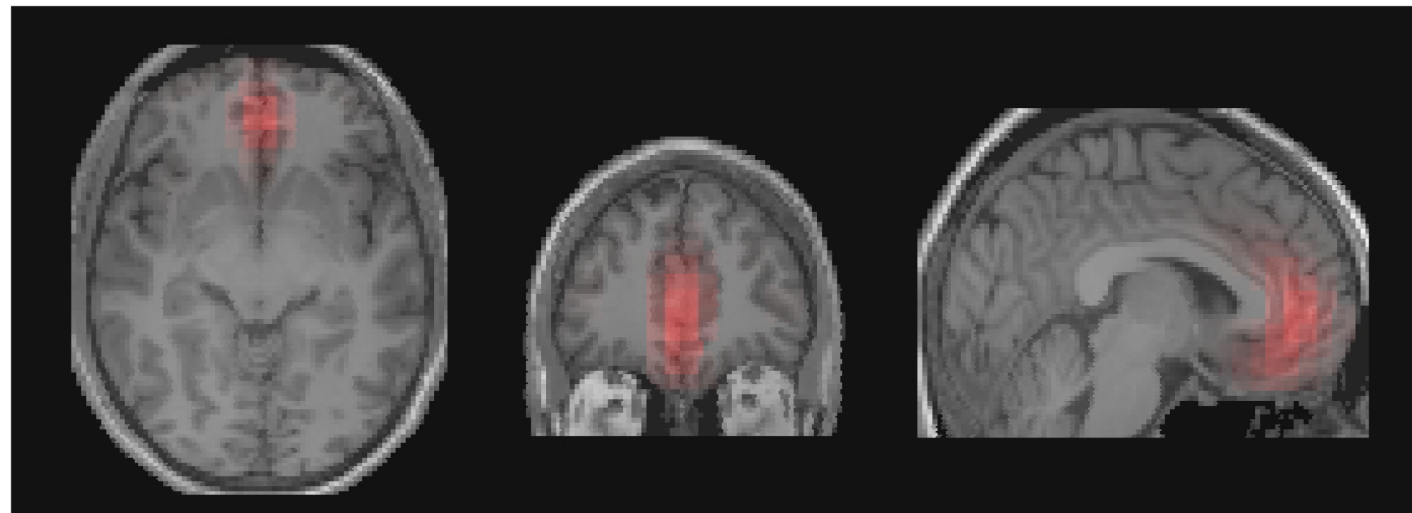
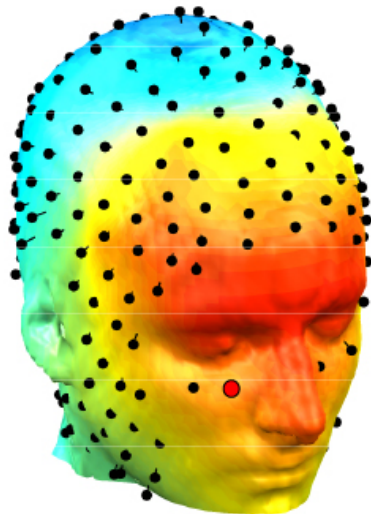
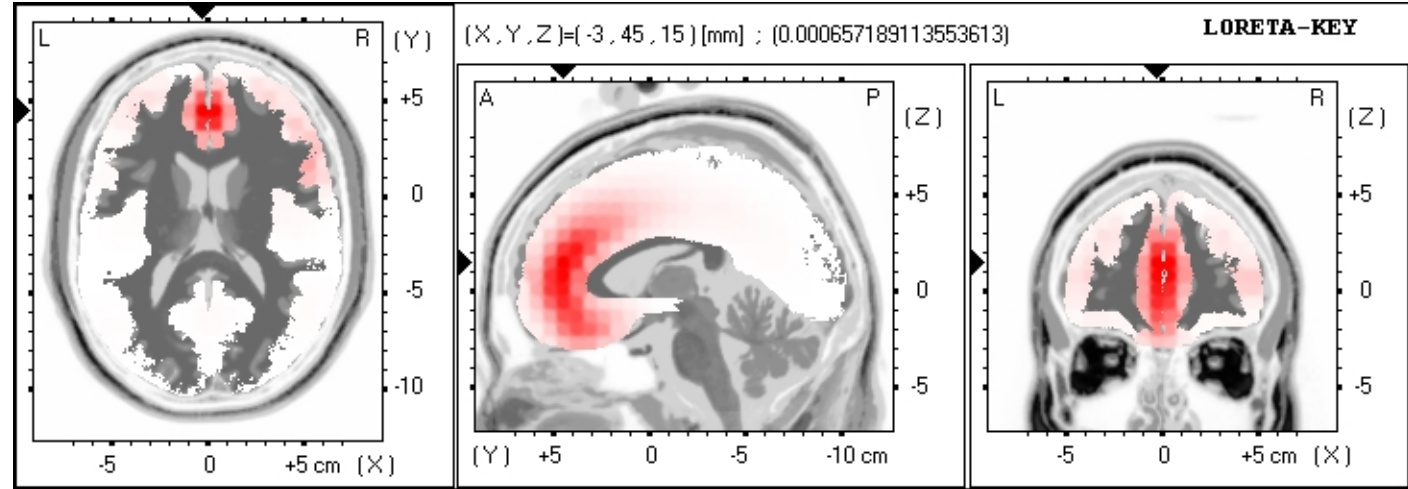
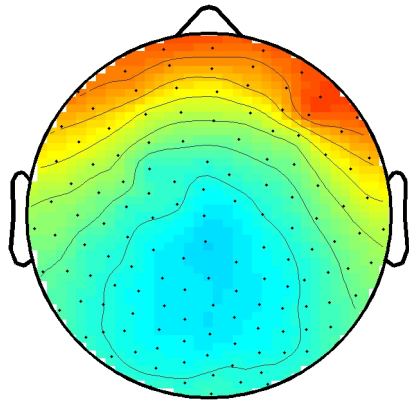
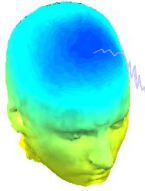
dipole	fit	position	moment	
#1	<input checked="" type="checkbox"/>	-35.066 -32.492 -4.684	32271.382 46141.284 5880.224	<input type="button" value="Flip (in/out)"/>
#2	<input checked="" type="checkbox"/>	-35.066 32.492 -4.684	1005.419 -38050.427 14094.824	<input type="button" value="Flip (in/out)"/>

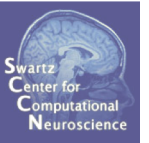
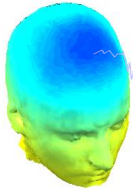
Symmetry constrain for dipole ...

Visualizing ICA component clusters



Localization of activity using Loreta





https://sccn.ucsd.edu/wiki/LORETA_for_EEGLAB

(8) LORETA plugin for EEGLAB x Person 1

Secure | https://www.youtube.com/watch?v=amttvN_Sb6A

Apps Qwant Google Google maps Sofia email MyYoutb Math Leili JAST Japan Israel Activit Jira PJ mask Other Bookmarks

YouTube^{JP} Rechercher

Using the LORETA 2.0 plugin for EEGLAB

Arnaud Delorme, PhD

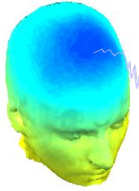
0:01 / 8:24

LORETA plugin for EEGLAB

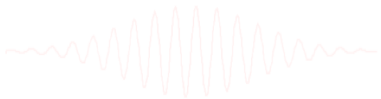
293 vues

5 0 PARTAGER

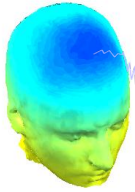
DIPFIT and model co-registration



1. Co-register electrodes with model
2. Autofit, plot dipoles, fine fit
3. 3D headplot co-registration



Plot scalp maps in 3D



EEGLAB v6.0b

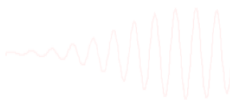
File Edit Tools **Plot** Study Datasets Help

#1: (no d...
Filename: ...
Channels pe...
Frames per e...
Epochs
Events
Sampling rat...
Epoch start (...
Epoch end (s...
Average refe...
Channel loca...
ICA weights
Dataset size

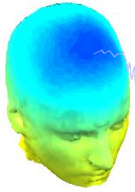
Channel locations
Channel data (scroll)
Channel spectra and maps
Channel properties
Channel ERP image
Channel ERPs
ERP map series
Sum/Compare ERPs
Component activations (scroll)
Component spectra and maps
Component maps
Component properties
Component ERP image
Component ERPs
Sum/Compare comp. ERPs
Data statistics
Time-frequency transforms
Average time-frequency
Cluster dataset ICs

In 2-D
In 3-D

Headplot() warning
headplot() must generate a spline file the first time it is called or after changes in the channel location file. You must also co-register your channel locations with the head template.
Ok



Headplot co-registration



Component head plot(s) -- pop_headplot()

Co-register channel locations with head mesh and compute a mesh spline file (done only once)

Use the following spline file or structure

Or (re)compute a new spline file named:

3-D head mesh file

Mesh associated channel file

Talairach-model transformation matrix

/home/julie/S01_attend1_pos1.spl

mheadnew.mat

mheadnew.xyz

Browse Help

Browse Help

Browse

Browse

Manual coreg.

1:31

Components of dataset:

Ok

coregister()

File Edit View Insert Tools Desktop Window Help

Labels off

Electrodes

Labels on

Electrodes

Mesh off

Help me

Func. help

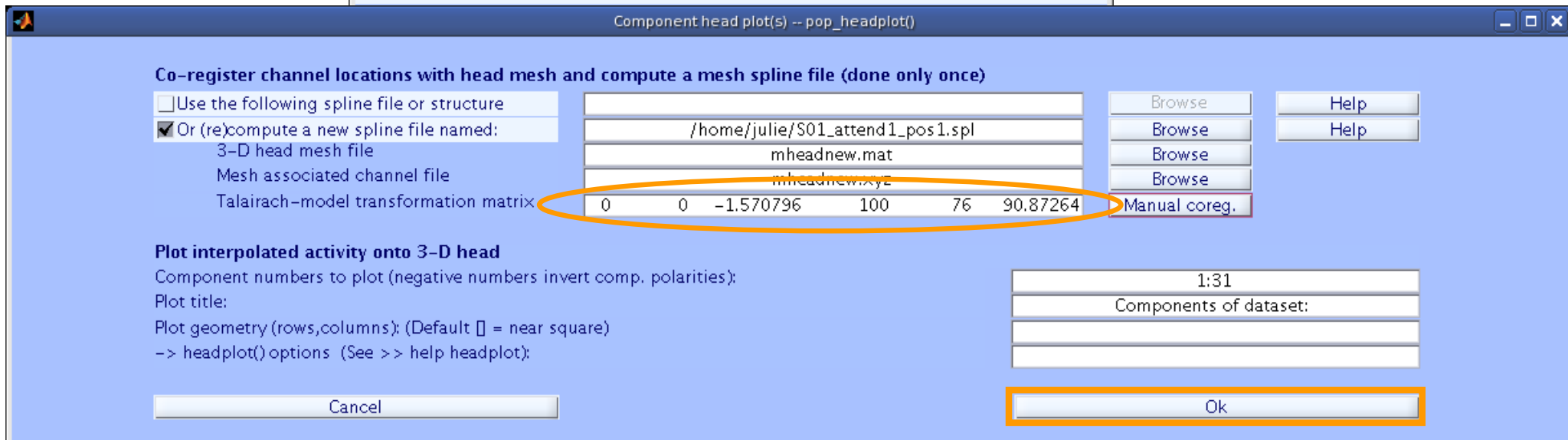
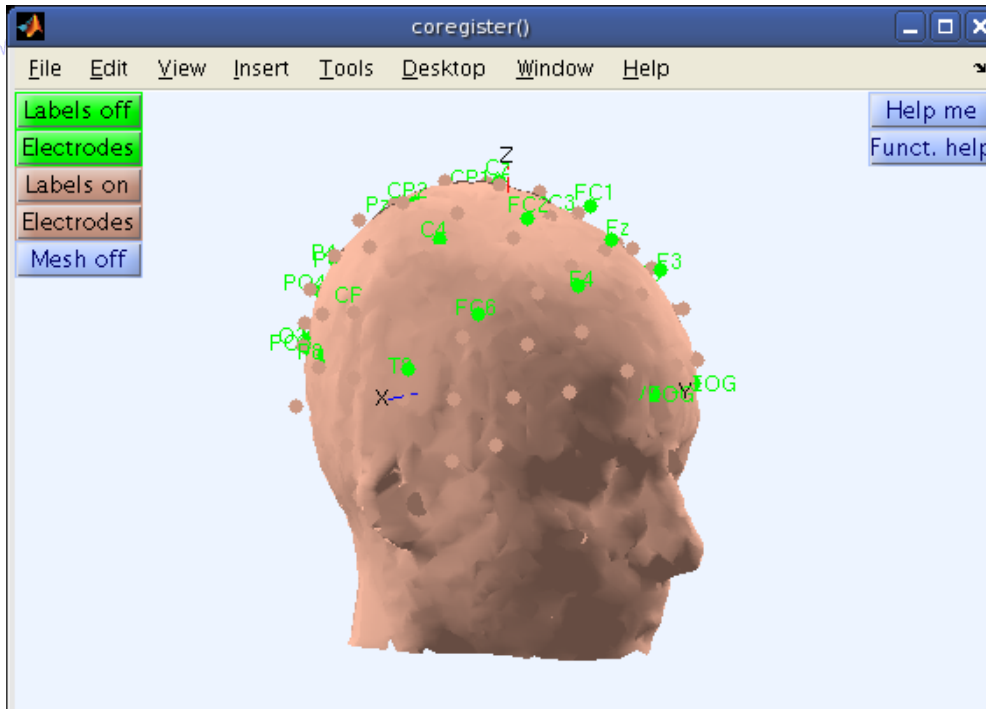
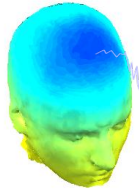
Move right {mm} 0 Pitch (rad) 0 Resize {x} 90.87 Align fiducials

Move front {mm} 0 Roll (rad) 0 Resize {y} 90.87 Warp montage

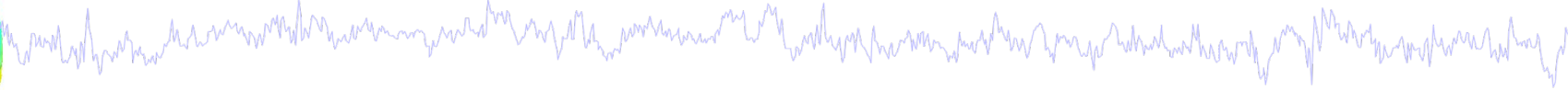
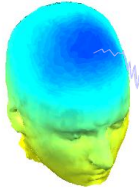
Move up {mm} 0 Yaw (rad) 0 Resize {z} 90.87 Cancel Ok

Go through co-registration
in the same way as
with dipfit co-registration

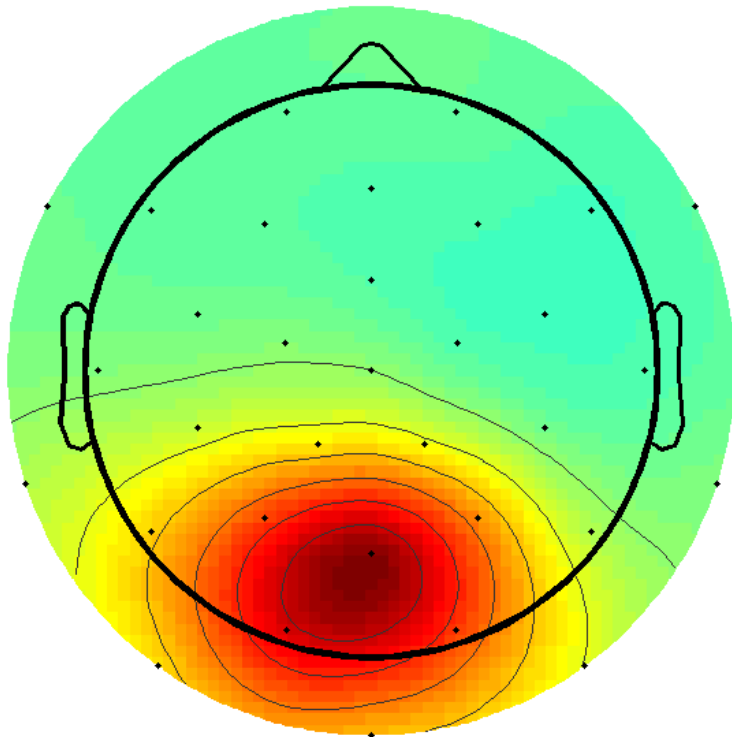
Confirm headplot co-registration



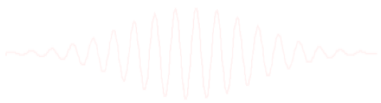
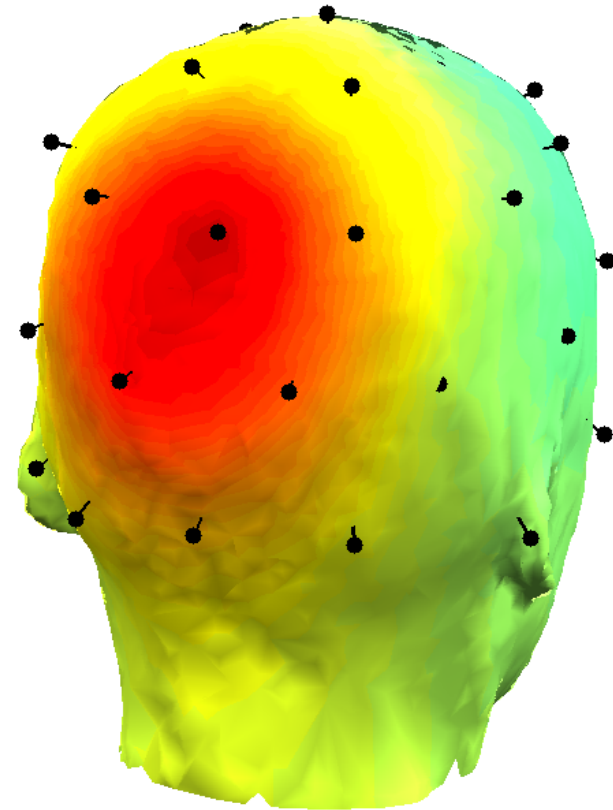
Spline file in EEG structure



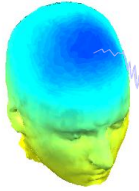
2D scalp map for IC 12



3D scalp map for IC 12



Exercise



- **Novice / Intermediate**

- Load 'stern_125Hz.set' dataset
- Practice co-registering electrodes with **BEM** model (choose 'Erase' because this dataset has co-registration done already)
- Autofit IC dipoles
- Fine fit dipoles
- Plot dipoles from the GUI; scroll through components individually
- Co-register the head model for 3D scalp map plotting. Then plot some ICs in 3D

- **Advanced**

- In the Finefit menu, try fitting a bilateral dipole, what happens to the residual variance?
- Try plotting a subset of dipoles in 'summary mode'

