EEGLAB documentation

EEGLAB Home Page   sccn.ucsd.edu/eeglab/

EEGLAB Tutorial Index   sccn.ucsd.edu/wiki/EEGLAB

Workshop Home Page   sccn.ucsd.edu/eeglab/Tenth_EEGLAB_Workshop

- 200 pages of tutorial (including "how to" for plugins) WEB or PDF

- Function documentation (next slide)

- Send questions to the mailing list eeglablist@sccn.ucsd.edu
  (or search mailing list archive using google)

- Bug submission http://sccn.ucsd.edu/eeglab/bugzilla

- Email us (suggestions) eeglab@sccn.ucsd.edu

- Workshop with practicum every year

Help message
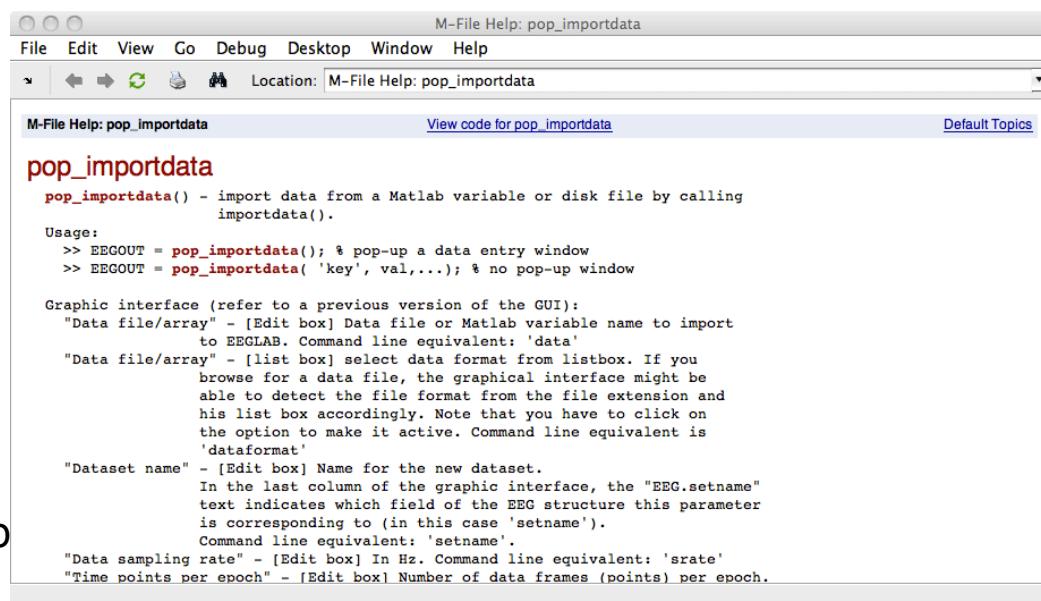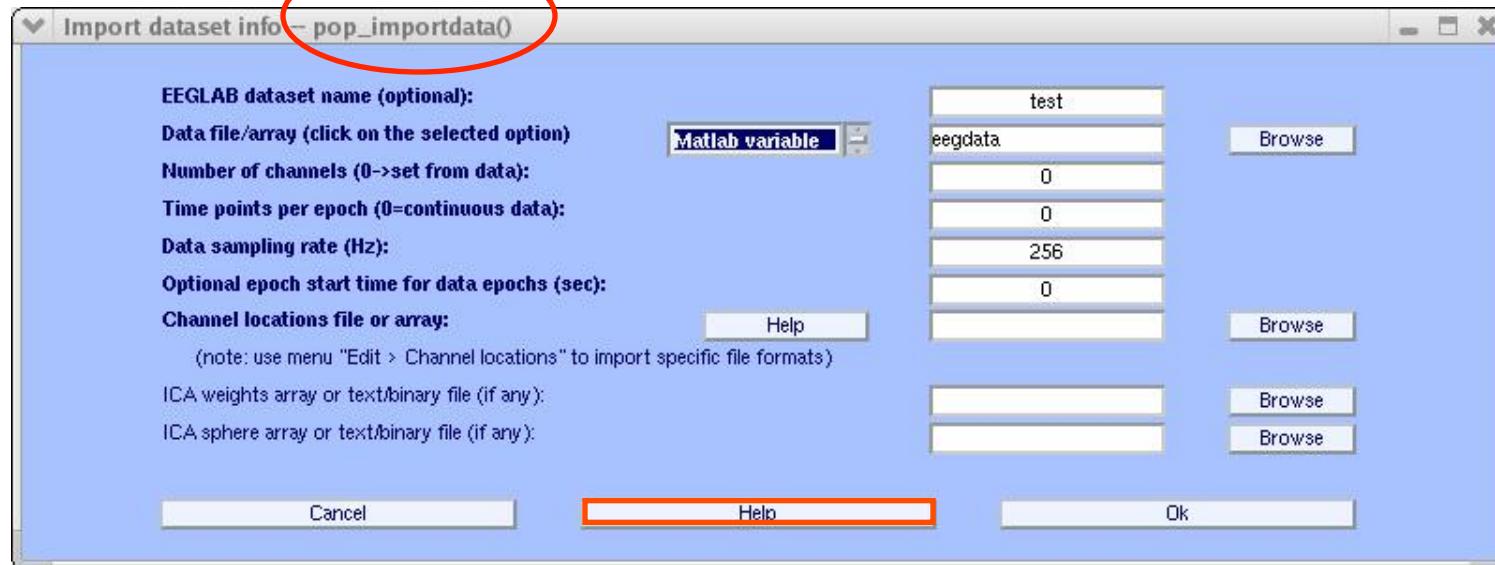
>> help pop

EEGLAB Plugins

Starting EEGLAB

```
>> eeglab
eeglab: options file is /Volumes/donnees/data/STUDYst
Adding path to all EEGLAB functions
Adding path to eeglab/external/bioelectromagnetism_ligt
Adding path to eeglab/external/biosig-partial
Adding path to eeglab/external/fieldtrip-partial
Adding path to eeglab/external/fieldtrip-partial subfolders
EEGLAB: adding plugin function "eegplugin_VisEd"
EEGLAB: adding "eepimport1.02" plugin (see >> help ee
EEGLAB: adding "bdfimport" plugin (see >> help eegplu
EEGLAB: adding "brainmovie0.1b" plugin (see >> help e
EEGLAB: adding "ctfimport1.03" plugin (see >> help eeg
EEGLAB: adding "dipfit2.2" plugin (see >> help eegplugi
EEGLAB: adding "EEG toolbox ERP plotting" plugin (see >> help eegplugin_eeg_toolbox)
EEGLAB: adding "erpssimport1.00" plugin (see >> help eegplugin_erpssimport)
EEGLAB: adding "fmrib1.21" plugin (see >> help eegplugin_fmrib)
EEGLAB: adding "iirfilt1.01" plugin (see >> help eegplugin_iirfilt)
EEGLAB: adding "eepimport1.02" plugin (see >> help eegplugin_ascinstep)
EEGLAB: adding "loreta1.0" plugin (see >> help eegplugin_loreta)
EEGLAB: adding "Butter1.0" plugin (see >> help eegplugin_ERPLAB_filters)
EEGLAB: adding "Measure_Product1.0" plugin (see >> help eegplugin_mp_clustering)
EEGLAB: adding plugin function "eegplugin_miclust"
EEGLAB: adding "4dneuroimaging1.00" plugin (see >> help eegplugin_4dneuroimaging)
>>
```

EEGLAB v4.6b

No current dataset

```
- Create a new or load an existing dataset:
   Use "File > Import data"        (new)
   Or  "File > Load existing dataset" (old)
- If new,
   "File > Import epoch info" (data epochs) else
   "File > Import event info" (continuous data)
   "Edit > Dataset info" (add/edit dataset info)
   "File > Save dataset" (save dataset)
- Prune data: "Edit > Select data"
- Reject data: "Tools > Reject continuous data"
- Epoch data: "Tools > Extract epochs"
- Remove baseline: "Tools > Remove baseline"
- Run ICA:    "Tools > Run ICA"
```

File   Edit   Tools   Plot   Datasets   Help

EEGLAB plugins

eepimport1.02   Data importing for EEprobe data (Oostenved & ANT company)
bva_io1.30   Brain vision analyzer import/export plugin (Widmann & Delorme)
ctfimport1.01   MEG CTF import plugin (Carver, Weber & Delorme)
dipfit2.0   4-shell and BEM (Oostenveld & Delorme)
fmrib1.2b   Removal of artifact from simultaneously EEG/fMRI recording (Niazi)
icaclust1.00   Clustering ICA components (Serby, Delorme, Makeig)
iirfilt1.0   Non-linear IIR filtering (Pozdin)
loreta1.0   Interface to LORETA-KEY (Delorme)
newtimefreq1.00   Time-freq. decomposition (Delorme)

Better than FIR

Coregistration…

Matlab toolboxes interfaced

BIOSIG   Data importing for rare data binary format (Schloegl)
Fieldtrip   Source localization and time-freq. decompositions (Oostenveld)
ICALAB   20 ICA algorithms (automativally detected by EEGLAB)
SPM2   Spatial normalization of anatomical MRI

Writing EEGLAB plugins

- Assuming that you have a signal processing function called xxxxx $\longrightarrow$ Process any Input data $\qquad$ Timef()

- a pop_xxxxx function will interface your signal processing function $\longrightarrow$ Process EEG structure $\qquad$ Pop_timef()

- a eegplugin_xxxxx function will add the menu to the main interface (and history etc…)

Pop functions

- Called with the EEG structure only pop_xxxxx(EEG), they pop-up a GUI asking for more arguments

- Called with enough arguments, the simply call the signal processing function

```
function [EEG, com] = pop_sample( EEG,  param1 );

com = ''; % empty history
if nargin < 2
        % pop up window if less than 2 arguments
        result      = inputdlg({ 'Enter the parameter:' }, 'Title of window', 1, { '0' })
        if length( result ) == 0 return; end;

        param1  = eval( [ '[' result{1} ']' ] ); % the brackets allow to process matlab arrays
end;

sample( EEG.data, param1); % run sample function

com = sprintf('pop_sample(EEG, %d );', param1); % return history
```
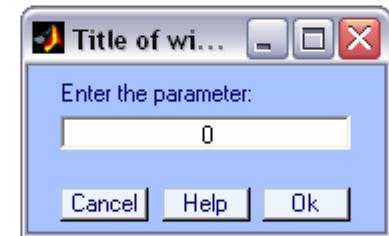
eegplugin functions

- eegplugin_xxxx function

```
% eegplugin_erp() - plot ERP plugin

function eegplugin_erp( fig, try_strings, catch_strings);

% create menu
plotmenu = findobj(fig, 'tag', 'plot'); % find plot menu

% create submenu
uimenu( plotmenu, 'label', 'ERP plugin', ...
    'callback', 'figure; plot(EEG.times, mean(EEG.data,3));');
```

eegplugin functions

```
>> eeglab
eeglab: adding "BIOSIGv0.86" plugin
eeglab: adding "eepimport1.02" plugin (see >> help eegplugin_eepimport)
eeglab: adding "bva_io1.30" plugin (see >> help eegplugin_bva_io)
eeglab: adding "ctfimport1.01" plugin (see >> help eegplugin_ctfimport)
eeglab: adding "dipfit2.0" plugin (see >> help eegplugin_dipfit2_0)
eeglab: adding plugin function "eegplugin_erp"
eeglab: adding "fmrib1.2b" plugin (see >> help eegplugin_fmrib)
eeglab: adding "icaclust1.00" plugin (see >> help eegplugin_icaclust)
eeglab: adding "iirfilt1.0" plugin (see >> help eegplugin_iirfilt)
eeglab: adding "loreta1.0" plugin (see >> help eegplugin_loreta)
eeglab: adding "newtimefreq1.00" plugin (see >> help eegplugin_ne
>>
```
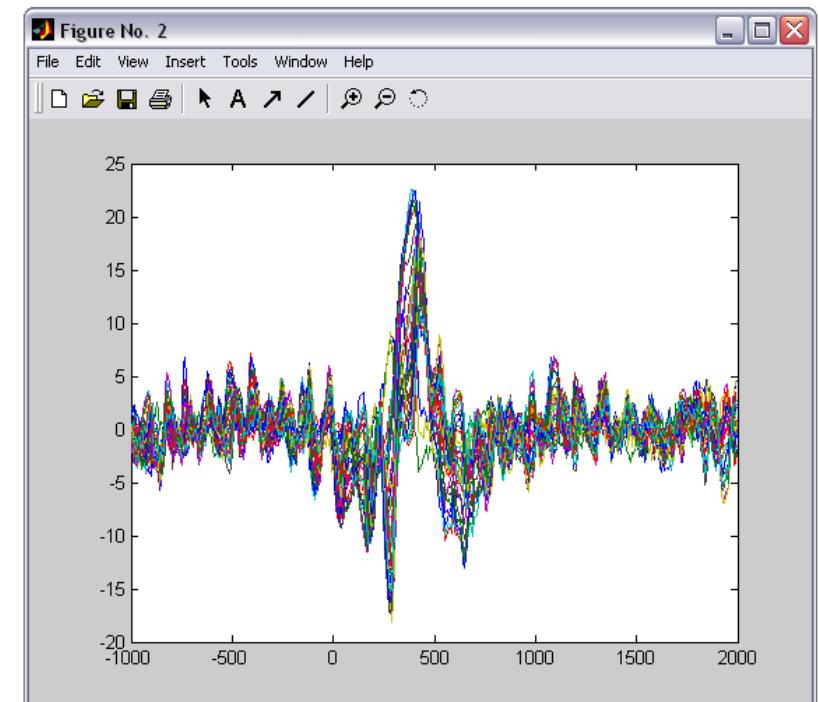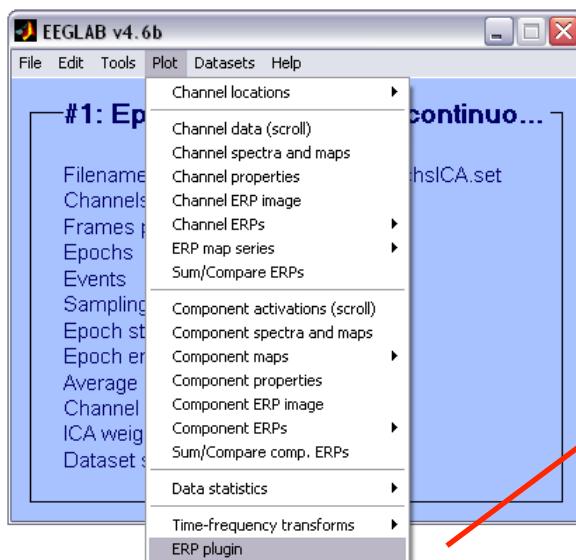
PCA plugin

```
function vers = eegplugin_pca(fig, trystrs, catchstrs)

    vers = 'pca1.00';
    if nargin < 3, error('eegplugin_pca requires 3 arguments');  end;

    % add icaclust folder to path
    if ~exist('eegplugin_pca')
        p = which('eegplugin_pca');
        p = p(1:findstr(p,'eegplugin_pca.m')-1);
        addpath( p );
    end;

    % find tools menu
    menu = findobj(fig, 'tag', 'tools');

    % PCA command
    cmd = [ '[tmp1 EEG.icawinv] = runpca(EEG.data(:,:));' ];
    cmd = [ cmd 'EEG.icaweights = pinv(EEG.icawinv);' ];
    cmd = [ cmd 'EEG.icasphere = eye(EEG.nbchan);' ];
    cmd = [ cmd 'clear tmp1;' ];

    % create menu
    uimenu( menu, 'Label', 'Run PCA', 'CallBack', cmd, 'separator', 'on');
```

```
'import data'    -> File > import data menu
'import epoch'   -> File > import epoch menu
'import event'   -> File > import event menu
'export'         -> File > export
'tools'          -> tools menu
'plot'           -> plot menu
```

Exercice

Write a plugin to plot ERPs