Data structures used by Aleks’ MEA analysis suite

Data

*Stores raw and filtered data*

---this\_file

---tb

---raw\_data

---sweep\_sort

|---window\_std

|---window\_std\_max

|---successful\_sweeps

|---failures

---filtered\_lfp

---filtered\_spikes

---mean\_channels

---std\_channels

---max\_amp\_mono

---latency\_mono

---max\_amp

---latency

---burst\_timing

|---latency

|---amp

CSD

*Stores current source density analysis fields*

---params

|---nx

|---ny

|---dx

|---dy

|---h

|---zprofile

---csd\_array

---mean\_monosynaptic

---grand\_mean\_monosynaptic

---sweep\_sort

|---detection\_threshold

|---window\_std

|---window\_std\_max

Params

*Stores general recordings/ analysis parameters (e.g. sampling frequency, search window times etc.)*

---files

|---MEA

| |---dir

| |---parent

| |---FileListShort

| |---FileListFull

---Fs

---Nyquist

---selected\_rep

---last\_sweep

---dead\_channels

---frame

---degree

---window\_retained

---baseline\_win

---monosynaptic\_win

---search\_win

---baseline\_win\_samples

---monosynaptic\_win\_samples

---search\_win\_samples

---detection\_threshold

---first\_stim

---channel\_index

---flags

|---rotate

|---denoise

|---prune\_failures

|---plot\_online

---no\_points

---no\_channels

---denoise

|---tapers

|---fpass

|---Fs

---bp

|---wn\_low

|---wn\_high

|---B\_low

|---A\_low

|---B\_high

|---A\_high

Spikes

*Stores multi- and single- unit clustering and rate parameters and times*

---time\_conversion

---f

---detection\_thresh

---detection\_rearm\_time

---blanking\_times

---padding\_time

---spike\_locs

---clusters

|---waveforms

|---spiketimes

---waveforms\_array

---spiketimes

---no\_trials

---no\_spikes

---total\_spikes

---PDF

|---data\_aligned

|---time\_window

|---binwidth

|---spiketimes

|---timestamps

|---kernel\_sigma

|---kernel\_shoulder

|---edges

|---kernel

|---kernel\_center

|---PDF\_trimmed

|---mean\_PDF

|---std\_PDF

|---grand\_mean\_PDF

|---grand\_std\_PDF

Burst

*fields for burst propagation analysis*

---params

|---no\_points

|---detectionthreshold

|---useCSD

---StrongestChannel

|---map

|---coords

|---amp

|---id

---ActiveChannels

|---map

|---grand\_map

|---map\_1D

|---no\_ActiveChannels

|---no\_ActiveChannels\_mean

|---no\_ActiveChannels\_sem

---Location

|---useModePosition

|---peak\_position

|---peak\_displacement

|---peak\_displacement\_vector

|---displacement\_hist

|---map\_hist

|---grand\_map\_hist

|---grand\_map\_maximum

|---grand\_map\_xaxis

|---grand\_map\_yaxis

|---grand\_map\_xyzaxis

|---peak\_displacement\_vector\_mean

|---peak\_displacement\_vector\_sem

|---peak\_velocity

|---peak\_velocity\_mean

|---peak\_velocity\_sem

|---peak\_velocity\_bins

|---peak\_velocity\_histo

|---grand\_map\_polaraxis

---burst\_window\_tb

PCAs

*fields for principle component vector analysis*

---MUA

|---trajectories

|---trajectories\_mean

|---trajectories\_error

|---percent\_var\_explained

---LFP

|---trajectories

|---trajectories\_mean

|---trajectories\_error

|---percent\_var\_explained

---CSD

|---trajectories

|---trajectories\_mean

|---trajectories\_error

|---percent\_var\_explained

Granger

*fields for analysis of Granger causality (“spread of effect”)*

---PVAL

---NLAGS

---freqs

---Fs

---X

---sfile

---nvar

---N

---uroot

---inx

---kh

---kpss

---ret

|---gc

|---fs

|---prb

|---covu

|---covr

|---rss

|---rss\_adj

|---waut

|---cons

|---doi

|---type

---dwthresh

---waut

---rss

---PR

---q

---GC

---GC2

---causd

|---cd

|---ucd

|---cdw

|---ucdw

---causf

|---indeg

|---outdeg

|---flow

|---windeg

|---woutdeg

|---wflow

Spectro

*spectral analysis fields incorporating Chronux routines (e.g. spectral power, coherence between lfp-lfp / lfp-spike / spike-spike, spike triggered average LFP, spike-LFP (Hilbert) phase preference), wavelet / matching pursuit spectrograms*

---analysis\_window

---params

|---fpass

|---W

|---T

|---tapers

|---Fs

|---pad

|---trialave

|---win

---StrongestChannel

---S

---F

---T

---P

---mean

---SD

---mean\_norm

---mean\_smooth

---mean\_norm\_smooth

---SD\_smooth

---tb

---mean\_correct

---average\_window\_power

---average\_window\_power\_mean

---average\_window\_power\_sem

---coherence\_LFPspike

|---C

|---phi

|---S12

|---S1

|---S2

|---f

|---zerosp

|---confC

|---phistd

|---Cerr

|---C\_mean

|---C\_sem

|---phi\_mean

|---phi\_sem

|---S12\_mean

|---S12\_sem

|---S1\_mean

|---S1\_sem

|---S2\_mean

|---S2\_sem

---channeltoanalyse

---coherence\_LFPLFP

|---C

|---phi

|---S12

|---S1

|---S2

|---f

|---C\_mean

|---C\_sem

|---phi\_mean

|---phi\_sem

|---S12\_mean

|---S12\_sem

|---S1\_mean

|---S1\_sem

|---S2\_mean

|---S2\_sem

---coherence\_radius

|---threshold

|---activeYN

|---active\_channels

|---LFPLFP

| |---radius\_average

| | |---LFPLFP\_coherence

| | |---LFPLFP\_phase

| | |---LFPLFP\_coherence\_cat

| | |---LFPLFP\_coherence\_mean

| | |---LFPLFP\_coherence\_SEM

| | |---LFPLFP\_phase\_cat

| | |---LFPLFP\_phase\_mean

| | |---LFPLFP\_phase\_SEM

| |

| |---coherence\_at\_peak\_gamma

| |---phase\_at\_peak\_gamma

| |---coherence\_at\_peak\_gamma\_cat

| |---peak\_gamma\_coherence\_mean

| |---peak\_gamma\_coherence\_SEM

| |---phase\_at\_peak\_gamma\_cat

| |---peak\_gamma\_phase\_mean

| |---peak\_gamma\_phase\_SEM

|---LFPspike

| |---radius\_average

| | |---LFPspike\_coherence

| | |---LFPspike\_phase

| | |---LFPspike\_coherence\_cat

| | |---LFPspike\_coherence\_mean

| | |---LFPspike\_coherence\_SEM

| | |---LFPspike\_phase\_cat

| | |---LFPspike\_phase\_mean

| | |---LFPspike\_phase\_SEM

| |---coherence\_at\_peak\_gamma

| |---phase\_at\_peak\_gamma

| |---coherence\_at\_peak\_gamma\_cat

| |---peak\_gamma\_coherence\_mean

| |---peak\_gamma\_coherence\_SEM

| |---phase\_at\_peak\_gamma\_cat

| |---peak\_gamma\_phase\_mean

| |---peak\_gamma\_phase\_SEM

---corr

|---maxlags

|---LFP\_autocorr

|---LFP\_autocorr\_mean

|---LFP\_autocorr\_sem

Fourier

*Homebrewed spectra power density decomposition*

---T

---L

---T\_baseline

---L\_baseline

---NFFT

---f

---degree

---frame

---fft

---psd

---fft\_baseline

---psd\_baseline

---fft\_norm

---fft\_mean\_success

---fft\_SEM\_success

---fft\_mean\_failure

---fft\_SEM\_failure

---fft\_norm\_mean\_success

---fft\_norm\_SEM\_success

---fft\_norm\_mean\_failure

---fft\_norm\_SEM\_failure

---psd\_mean\_success

---psd\_SEM\_success

---psd\_mean\_failure

---psd\_SEM\_failure