

## **CRCNS.org hc-24 data description**

Version 0.6 (Aug 6, 2019)

Simultaneous extracellular recordings from midline thalamic nuclei, medial prefrontal cortex and CA1 from rats cycling through bouts of sleep and wakefulness

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### **Summary**

These data set was used in Varela & Wilson, 2019 (<https://doi.org/10.1101/653436>) to demonstrate and characterize the correlations between single cell activity in nuclei of the midline thalamus with the hallmark oscillations of non-REM sleep recorded simultaneously in the medial prefrontal cortex and the CA1 region of the hippocampus (slow oscillation, spindles, sharp-wave ripples) in behaving rats. The data set consists of recordings from three sessions, with LFPs and units from 3 different rats for a total of approximately 3.5 h of recording (52mins, session 1; 69mins session 2; 93mins session 3). During the recording the animals were allowed to rest in a quiet enclosure and cycled through bouts of wakefulness and sleep. Methods used to gather and process the data, and results from these experiments are described in:

mPFC Spindle Cycles Organize Sparse Thalamic Activation and Recently Active CA1 cells During non-REM Sleep. Varela, C; Wilson, MA. doi: <https://doi.org/10.1101/653436>

### **Conditions for using the data**

The authors welcome collaborations based on these data. Consultation with the authors prior to using the data is appreciated ([varelac@fau.edu](mailto:varelac@fau.edu), [mwilson@mit.edu](mailto:mwilson@mit.edu)). If you publish work using the data, please cite our publication (Varela & Wilson, 2019) and also the data set using the following:

Carmen Varela, Matthew A. Wilson (2019); Simultaneous extracellular recordings from midline thalamic nuclei, medial prefrontal cortex and CA1 from rats cycling through bouts of sleep and wakefulness. CRCNS.org  
<http://dx.doi.org/10.6080/K0K35RVG>

## **Data files organization**

- Sessions are organized in 3 folders that contain the 'Primary Data', 'Derived Data', and 'Sample Scripts' for each session. Each session illustrates findings reported in more detail in Varela & Wilson, 2019.
- The primary data folder contains Matlab readable files that store the raw unit (file names contain 'cl-', which refers to a sorted unit cluster), multi-unit (all spikes detected from one tetrode) and local field potential (LFP, sample at 600Hz) from the indicated brain regions (reflected in the name of the folder). The files with unit and multi-unit data contain a matrix of 5 columns; column number 5 contains the timestamps (in seconds), columns 1-4 the peak amplitude in each of the 4 wires of the tetrode (NaNs indicate that no signal was recorded in that wire).
- The derived data folder contains results specific to sleep analyses, such as detected periods of sleep, K-complex timestamps, spindle trough timestamps and/or sharp-wave ripple timestamps; details on the algorithms used to generate these data are found in Varela & Wilson, 2019.
- The sample scripts folder contains sample Matlab live scripts that run through the folders, load the data, and perform analyses to illustrate some of the correlations between unit, multi-unit activity, and oscillatory non-REM sleep events. Pdf files in the same folder show the results obtained from running the live scripts.

## **Data format**

Data files are in the .mat binary format, which can be open with software such as Matlab and Octave. Examples of how to upload the data to Matlab are provided within the live scripts, which includes Matlab code, embedded output, images, and formatted text (any of these can also be copied from the pdf files directly).

## **How to get started**

Run the provided scripts section by section to get started; a good place to start is Session 1, which plots baseline correlations between sleep events and unit activity in the three regions.

## **How to get help**

To get help with the data set post any questions on the forum at [CRCNS.org](http://CRCNS.org) or contact the contributors.

## **Change history**

Version 0.6 (Aug 6, 2019) – Initial version