Metadata for the dataset from the manuscript:   
Duszkiewicz et al, Nature Neuroscience, 2024

The dataset contains recordings made from postsubiculum (PoSub, also called dorsal presubiculum) and anterodorsal thalamic nucleus (ADN) in freely moving mice. Electrode placement was confirmed by histology. Many recording sessions (especially in Datasets 1, 2 and 3) include large ensembles of simultaneously recorded head-direction cells. The dataset is divided into 6 parts:

**Dataset\_1**: PoSub recordings with a 64-channel silicon probe. Open field exploration and sleep. Silicon probe implanted parallel to the cortical layers (20 degree angle from vertical plane), 17 recordings from 17 mice. Each recording folder in the above dataset contains three sub-folders:

* Data: files necessary for new analyses (spike times, mean waveforms, position, head direction, cell type classification, etc.)
* Analysis: additional files related to analyses described in Duszkiewicz et al, 2024 (tuning curves, Fourier spectra, GLM coupling, Isomap projections, etc.)
* Sleep: sleep scoring output of SleepScoreMaster (WAKE, REM and NREM epochs, pseudo-EMG, etc.)

**Dataset\_2**: PoSub recordings with a 64-channel silicon probe implanted vertically (across cortical layers). Open field exploration and sleep, 14 recordings from 14 mice. Each recording folder in the above dataset contains three sub-folders:

* Data: files necessary for new analyses (spike times, mean waveforms, position, head direction, cell type classification, etc.)
* Analysis: additional files related to analyses described in Duszkiewicz et al, 2024 (tuning curves, Fourier spectra, GLM coupling, Isomap projections, etc.)
* Sleep: sleep scoring output of SleepScoreMaster (WAKE, REM and NREM epochs, pseudo-EMG, etc.)

**Dataset\_ 3**: PoSub recordings with a 64-channel silicon probe implanted parallel to the cortical layers. Cue rotation task, 6 recordings from 6 mice. Regular open field recording sessions from all of these animals are included in Dataset 2. Each recording folder in the above dataset contains two sub-folders:

* Data: files necessary for analysis (spike times, mean waveforms, position, head direction, cell type classification, cue epoch intervals, etc.)
* Analysis: additional files related to analyses described in Duszkiewicz et al, 2024 (tuning curves, Bayesian decoding, etc.)

**Dataset\_4**: One RSC-PoSub recording session with a Neuropixel 1.0 silicon probe implanted parallel to the cortical layers (20 degree angle from vertical plane). Open field exploration and sleep. The recording folder in the above dataset contains two sub-folders:

* Data: files necessary for new analyses (spike times, mean waveforms, position, head direction, cell type classification, etc.)
* Analysis: additional files related to analyses described in Duszkiewicz et al, 2024 (tuning curves, Fourier spectra, GLM coupling, Isomap projections, etc.)

**Dataset\_ 5**: ADN recordings with a 32-channel 4-shank silicon probe. Open field exploration and sleep, 19 recordings from 7 mice.

* Data: files necessary for analysis (spike times, mean waveforms, position, head direction, cell type classification, etc.)
* Analysis: files related to analyses described in Duszkiewicz et al, 2024 (tuning curves, Fourier spectra, GLM coupling, Isomap projections, etc.)

**Dataset\_6**: PoSub and ADN recordings with several types of silicon probes (linear 64-channel or 4-shank 32-channel). Optogenetic inactivation of TRN input to ADN during open field exploration. Some of the sessions are also included in Datasets 1 and 5 (for analysis of HD tuning etc.). Each recording folder in the above dataset contains one sub-folder:

* Data: files necessary for new analyses (spike times, position, head direction, cell type classification, timestamps of optogenetic stimulation, etc.)

Summary.

The data set contains recordings made from multiple anterior thalamic nuclei, mainly the antero-dorsal (AD) nucleus, and subicular areas, mainly the post-subiculum (PoS), in freely moving mice. Thalamic and subicular electrodes yielding high number of the so-called Head-Direction (HD) cells were likely to be located in the AD nucleus and the PoS, respectively. Electrode placement was confirmed by histology.

The data was obtained during 42 recording sessions and includes responses of 720 neurons in the thalamus and 357 neurons in the PoS, in seven animals while they foraged for food in an open environment (53- x 46-cm).  Three animals were recorded simultaneously in the thalamus and the PoS (21 sessions). In the four other animals, electrodes were implanted in the anterior thalamus and in the pyramidal layer of the CA1 area of the hippocampus but only to record Local field Potentials (LFPs). The raw (broadband) data was recorded at 20KHz, simultaneously from 64 to 96 channels.  The raw data was processed to extract the LFPs and detect spikes. Included in the data set are the following items:

* Times and waveforms of detected potential spikes.
* Results of spike sorting.
* LFPs.
* The coordinate and direction of the mice head and video files from which the positions were extracted.
* Metadata tables giving properties of the neurons and characteristics of the recording sessions.

More information is given in document: crcns\_th-1\_data\_description.pdf and in the following publication which is based on this dataset: