**Overview of data processing for the paper:**

Multisite silicon probes enable simultaneous recording of spontaneous and evoked activity in multiple isolated C-fibres in rat saphenous nerve, A C Sales, G W T Newton, A E Pickering, J P Dunham, J Neurosci Methods, 2022 Feb

**Links to external packages –**

* PHY: <https://github.com/cortex-lab/phy/> (requires python)
* Kilosort latest version: <https://github.com/MouseLand/Kilosort> . NB Need MATLAB + a machine with NVIDIA graphics card. Must install correct CUDA Toolkit for the release of MATLAB being used <https://uk.mathworks.com/help/parallel-computing/gpu-support-by-release.html>

**Order of business for data processing -**



**Code used to make figures / analyse data in the paper:**

* I’ve put together a few folders with the code I used for the paper. To run this, you’ll need to add the ‘utilities’ and ‘clustering’ folders to the MATLAB path (with their subfolders) . These should contain all the dependencies for the code used to analyse the multisite data / plot results. (I hope I got them all but let me know if I’ve missed any files).
* The ‘clustering’ folder also contains a full version of Kilosort2 and some example files for getting it running.
* Most of the scripts I wrote are written to be run section-by-section, so you can pick and choose which bits you use. Mostly they start by dragging the relevant spikeStruct into the workspace. Some more details…
* **Figure 1:** I’ve used the common average referenced data to plot the output from multiple sites (Fig 1e), so run the Figure 1 code from the CAR folder of data
* **Figure 2:** heatmaps were created using the common averaged reference data, so can run Figure 2 code from the CAR folder also. NB the process of extracting all the windowed data around all the TTLs is very slow, so in each of the CAR folders there are pre-saved ‘windowed data’ MATLAB files, for both the 2Hz and 0.25Hz stimulations. These can be dragged into the workspace to save having to run the entire thing again (just skip the section marked ‘Read in data’)
* **Figure 3:** plots the results of clustering and some basic properties of the units. Need to navigate to the folder containing the clustering results (usually in ‘artefact\_free/correct\_chanmap\_clustering’ or something with a similar name) & drag the spikeStruct into the workspace, then can run the rest of the code section by section. (NB not all sections were actually used in the paper.) Make sure that you’ve asked for the right list of clusters to plot (rat 3 = [3,1,2,4], rat 4=[3,4]; there are several sections where you need to enter this explicitly). At the top there are a few lines of code specifying the names of the files holding the pedal ADC recording – make sure the right lines are active. Use for Figure 3 and Supp 3 showing Rat 4 results.
* **Figure 4**: run from clustered data folder as for Figure 3 code. This script is set up for Rat3, as in the Figure.
* **Figure 5**: run from clustered data folder, drag spikeStruct into workspace. The section at the bottom actually does the calculation – will need to specify unit, channels to consider, and whether to track peak or trough (details in powerpoint file in Figure 5 folder).
* **Supp Figure 1** – I’ve just plotted some openEphys data (common average ref’d) and zoomed in on the artefact
* **Supp Figure 2** – I’ve used the heatmaps code, as for Figure 2
* **Supp Figure 3** – I’ve used the code for Figure 3, for Rat 4
* **Supp Figure 4 (a)** – Use Supp\_4\_all\_spikes.m. Run from the folder containing clustered data, drag the spikeStruct into the workspace. Will plot waterfall plot during Obreja protocol, including all the spikes from selected units (need to specify which units in line 49)
* **Supp Figure 4(b)** – used the Figure 3 code to plot a few examples of the Obreja responses in clusters containing multi-unit activity. Units plotted were Rat#5, cluster 3, Rat#2, cluster 8
* **Supp Figure 4(c)** – I used Supp4\_all\_spikes\_by\_colour.m to plot the Obreja responses for 2 different clusters in different colours - specifically, Rat #4, clusters 2 and 3. Also used the code in the Figure 3 script to plot the autocorrelograms and waveforms for those two units.