**General Description:**

This dataset consists of electrocorticography (ECoG) recordings over primary somatosensory and primary motor cortices in rhesus macaques that expressed C1V1 in pyramidal neurons. The experimental setup, including the optogenetic expression and simultaneous ECoG and laser stimulation, are detailed in (Yazdan-Shahmorad et al., 2016).

This dataset was collected during ~1.5hr long experiments in which laser pulse trains were used to repeatedly stimulate one or two cortical sites. Each experiment was organized into blocks:

1. Recording Blocks: Passive recordings were conducted during spontaneous activity (30 s or 5 min)
2. Testing Blocks: 100 laser pulses were delivered with each laser, each in separate, interleaved blocks (10, 5ms pulses @ 5 or 7Hz). ECoG signals were recorded simultaneously.
3. Conditioning Blocks: Laser pulses were delivered through each laser (5ms pulses @ 5 or 7Hz) for 10min. The second laser had a fixed delay relative to the first laser and this delay varied across experiments. ECoG signals were recorded simultaneously.

A single experiment consisted of a pre-test period, with a Recording Block (RB) and a Testing Block (TB), followed by 5 repetitions of a Conditioning Block (CB), RB, and TB, for a total of 6 TB and RB and 5 CB:

{ RB TB - CB RB TB - CB RB TB - CB RB TB - CB RB TB - CB RB TB }

**Data Organization:**

The dataset is organized as follows:

*table\_of\_experiments.xlsx* contains some summary data for each experiment such as the number and timing of the lasers during the conditioning blocks.

Each experiment is self contained within a zip file:

*Monkey\_YYYYMMDD\_ Session#\_PREAMP.zip*

and each .zip file contains the following directories:

ConditioningBlocks/

CondBlock1.mat

CondBlock2.mat

CondBlock3.mat

CondBlock4.mat

CondBlock5.mat

 RecordingBlocks/

RecBlock1.mat

RecBlock2.mat

RecBlock3.mat

RecBlock4.mat

RecBlock5.mat

RecBlock6.mat

 TestingBlocks/

TestBlock1.mat

 TestBlock2.mat

 TestBlock3.mat

 TestBlock4.mat

 TestBlock5.mat

 TestBlock6.mat

Each Conditioning Block .mat file contains the following variables:

* lfp\_ch# - broadband lfp signals for each channel #
* hg\_ch# - high gamma filtered lfp signals for each channel #
* time - vector of time in seconds for each sample in lfp\_ch# and hg\_ch#
* samp\_freq - sampling frequency for lfp\_ch# and hg\_ch#
* stim1 - onset times of laser 1 pulses
* stim2 - onset times of laser 2 pulses
* tstart - start time of conditioning block
* tend - end time of conditioning block

Each Recording Block .mat file contains the following variables

* lfp\_ch# - broadband lfp signal for each channel #
* time - vector of time in seconds for each sample in lfp\_ch#
* samp\_freq - sampling frequency for lfp\_ch#
* tstart - start time of recording block
* tend - end time of recording block

Each Testing Block .mat file contains the following variables

* lfp\_traces1\_ch# - broadband lfp signal aligned to laser1 pulse onsets for each channel # [pulses x time]
* mean\_lfp\_traces1\_ch# - average broadband lfp signal aligned to laser1 pulse onsets for each channel # [pulses x time]
* lfp\_traces2\_ch# - broadband lfp signal aligned to laser2 pulse onsets for each channel # [pulses x time]
* mean\_lfp\_traces2\_ch# - average broadband lfp signal aligned to laser2 pulse onsets for each channel # [pulses x time]
* hg\_traces1\_ch# - high gamma filtered lfp signal aligned to laser1 pulse onsets for each channel # [pulses x time]
* mean\_hg\_traces1\_ch# - average high gamma filtered lfp signal aligned to laser1 pulse onsets for each channel # [pulses x time]
* hg\_traces2\_ch# - high gamma filtered lfp signal aligned to laser2 pulse onsets for each channel # [pulses x time]
* mean\_hg\_traces2\_ch# - high gamma filtered lfp signal aligned to laser2 pulse onsets for each channel # [pulses x time]
* samp\_freq - sampling frequency for lfp\_ch#
* stim1 - onset times of laser 1 pulses
* stim2 - onset times of laser 2 pulses
* tstart - start time of recording block
* tend - end time of recording block
* win - window in seconds of data captured around the pulse onsets, ex. [1,1] represents a window that looks 1s back and 1s forward from the pulse onsets

**References:**

YAZDAN-SHAHMORAD, A., DIAZ-BOTIA, C., HANSON, T. L., KHARAZIA, V., LEDOCHOWITSCH, P., MAHARBIZ, M. M. & SABES, P. N. 2016. A Large-Scale Interface for Optogenetic Stimulation and Recording in Nonhuman Primates. *Neuron,* 89**,** 927-39.