

## **Brainhack Magdeburg 2024**

### **Dataset 2: Neuronal data from mice**

This is a documentation for accessing a dataset that will be needed for one of the projects in **Brainhack Magdeburg (18th-19th March, 2024)**. The open-access dataset has been procured from a study conducted by Dr. Nicholas Steinmetz and colleagues. It is a multi-dimensional data with behavioral, anatomical and neuronal spiking information, collected from mice performing a visual discrimination task, using multi-channel electrodes called 'neuropixels'.

I (Anwasha Das) came across this dataset in 2020 during my Master's, when I worked on a project as part of a 3-week online summer school called [Neuromatch Academy](#). The data explanation and codes that you will find below, owe credits to different individuals who organised the data for ease of use.

#### About the dataset:

The Steinmetz dataset is an **electrophysiological recording** from multiple regions of the mouse brain during a 2-Alternative Forced Choice Task paradigm. Neuropixel probes were used to record from approx. **30,000 neurons from 42 regions**, while the mouse performed a visual discrimination task. In each trial (multiple trials conducted over each session; and a total of 39 sessions), a mouse was placed on a wheel with its head fixed, surrounded by 3 screens (left, right and in front). Visual stimuli of differential contrast were presented to either the left, right or both the screens and the mouse had to turn the wheel in the correct direction in order to bring the greater-contrast image to the front-screen. If there was no stimulus presented on either side, the correct response was to hold the wheel steady for 1.5s. Neuronal activity was continuously recorded for the entire duration of the task.

You can read more about the task and the study from their paper in Nature, [Steinmetz et al. 2019](#). Since the journal is not freely accessible, you can find the PDF file [here](#).

The full dataset can be downloaded from [here](#), and you can understand the data variables from the documentation provided by Nick Steinmetz, [here](#). You can load and visualise some of the data by executing the commands in [this](#) and [this](#) Collab notebooks, organised by Marius Pachitariu. You can also check out this [youtube video](#) by Nick Steinmetz introducing the dataset and talking about the task.

#### For Brainhack:

Please access the data and read the required explanation before the start of Brainhack on 18th March 2024. It would be great if you can already think of a small aim that you would like to achieve in your project. You can also get in touch with the other members of your team (via email IDs) in advance, in order to get to know one another's background and field of expertise. Over the 2 days, you would need to work together to solve your project aim as much as possible and on the 2nd day you will make a group presentation, showing your progress and insights.

In case you want to have a look, my little experience of working with this data in 2020 can be found [here](#). In that project, we simply managed to explore the dataset and visualise spiking activity from 2 specific brain regions during one of the sessions. Although we worked for 3 weeks, achieving this much was already quite a task since we were beginners in the field with no prior experience.

Therefore it might seem daunting to envision and execute a small project in 2 days during our Brainhack, but I would really encourage you to go ahead and explore the richness of this dataset, as it is very interesting.

Finally, I would remind you that the goal of our Brainhack is to get together and brainstorm, indulge in discussion and benefit from the diversity of scientific backgrounds of your team members. So, even if you are able to just go through the data and explore various aspects of the task, and come up with interesting questions that can be potentially solved using this dataset, or critical insights, then that itself will be a success!

Looking forward to Brainhacking with you all!