Communication tool for data sharing in neuroscience

brainSTEM

<u>brain</u> <u>St</u>ructured <u>E</u>xperimental <u>M</u>etadata

OXT group at NYU
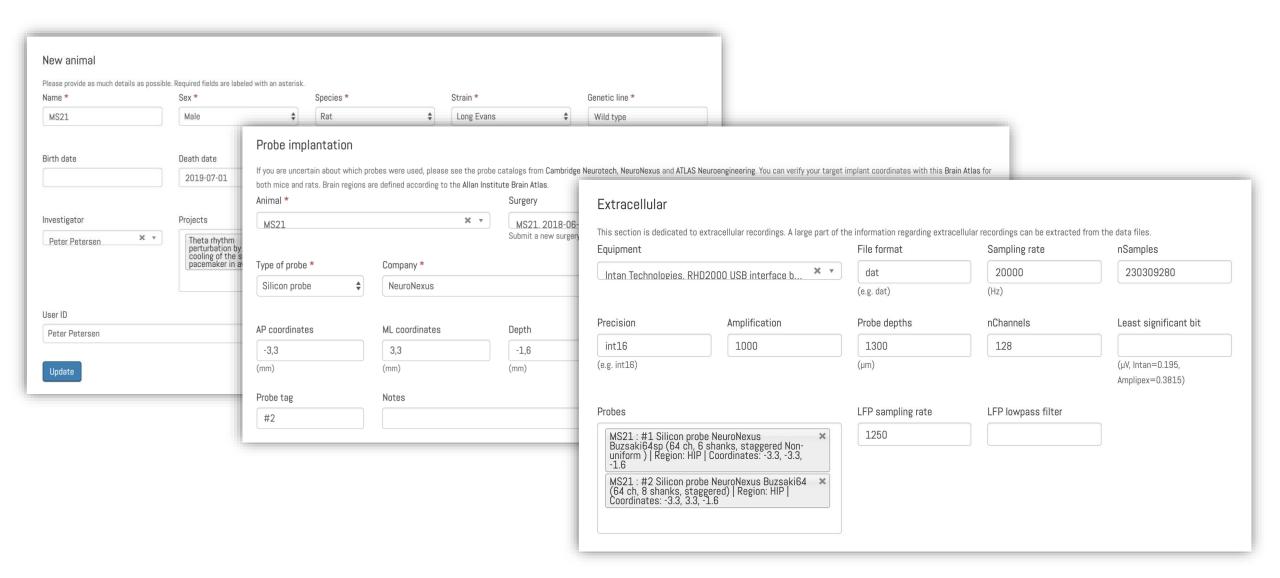
What is brainSTEM?

Structured Experimental Metadata

1. Structured language for experimental neuroscience

2. Centralized and standardized database for metadata

3. Granular access control

4. Access via web interface and REST API

Many benefits to this model, both within and across laboratories

1. Functions as an electronic notebook for lab members to organize experiments and raw data

2. User friendly and efficient data handling and organization of experimental data (through the web interface)

3. Coordinates analysis tools (e.g. Matlab, Python) with that same notebook (through the REST API)

4. Allows for other researcher to discover and interpret the same data: within- and across laboratories, expanding its lifetime

Web interface

New animal

Please provide as much details as possible. Required fields are labeled with an asterisk.

Name *
MS21

Sex *
Male

Species *
Rat

Strain *
Long Evans

Genetic line *
Wild type

Birth date

Death date
2019-07-01

Investigator
Peter Petersen

Projects
Theta rhythm perturbation by cooling of the s pacemaker in a

User ID
Peter Petersen

Update

Probe implantation

If you are uncertain about which probes were used, please see the probe catalogs from Cambridge Neurotech, NeuroNexus and ATLAS Neuroengineering. You can verify your target implant coordinates with this Brain Atlas for both mice and rats. Brain regions are defined according to the Allan Institute Brain Atlas.

Animal *
MS21

Surgery
MS21. 2018-06-
Submit a new surgery

Type of probe *
Silicon probe

Company *
NeuroNexus

AP coordinates
-3,3
(mm)

ML coordinates
3,3
(mm)

Depth
-1,6
(mm)

Probe tag
#2

Notes

Extracellular

This section is dedicated to extracellular recordings. A large part of the information regarding extracellular recordings can be extracted from the data files.

Equipment
Intan Technologies, RHD2000 USB interface b...

File format
dat
(e.g. dat)

Sampling rate
20000
(Hz)

nSamples
230309280

Precision
int16
(e.g. int16)

Amplification
1000

Probe depths
1300
(µm)

nChannels
128

Least significant bit

(µV, Intan=0.195, Amplipex=0.3815)

Probes
MS21 : #1 Silicon probe NeuroNexus Buzsaki64sp (64 ch, 6 shanks, staggered Non-uniform) | Region: HIP | Coordinates: -3.3, -3.3, -1.6

MS21 : #2 Silicon probe NeuroNexus Buzsaki64 (64 ch, 8 shanks, staggered) | Region: HIP | Coordinates: -3.3, 3.3, -1.6

LFP sampling rate
1250

LFP lowpass filter

Data Categories and Relationships

Permission and ownership
- Groups
- Users
- Laboratories

Projects

Publications

Data repositories
- Data repositories

Datasets

Time (intervals)
- Intervals

Data modules
- Extracellular
- Other time series data
- Intracellular
- Imaging
- Behavioral tracking
- Impedances
- Weighing

Action coordinates
- Probe coordinates
- intra slice coordinate
- Optic fiber coordinates
- intra prep coordinate
- Virus injections
- Manipulation coordinates

Manipulation modules
- Pharmacological manipulations
- Optogenetical manipulations
- Electromagnetic field stimulation
- Anesthesia
- Transcranial electric stimulation
- Thermal perturbation
- Light stimulations
- Electrical stimulation
- Ultrasound stimulation

Behavioral states
- Behavioral states

Subject State Change
- Death
- Perfusions
- Creating slices
- Performing lesions

Behavioral lists
- Behavioral paradigms
- Physical environments
- Physical dimensions

Data submodules
- electrode groups
- Brain regions
- Channel Tags
- Analysis Tags
- Spike sorting sets
- Cell metrics

Hardware devices
- Hardware devices

Manipulation Taxonomies
- Manipulation profiles

Behavioral taxonomies
- Sensory stimulus types
- Environment types

Brain region taxonomies
- Brain region atlas

Supplier Taxonomies
- Suppliers

Consumables
- Probe designs
- Optic fiber designs
- Virus constructs

Manipulation protocols
- Manipulation protocols

Cell type taxonomies
- Cell types

Position movers (e.g. actuators)
- Linear actuator (circular to linear)
- actuator adjustments

Subjects

Subject Taxonomies
- Species
- Strain