# Standardizing animal electrophysiology data

BIDS Extension Proposal 032

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Data structuration for electrophysiology data

- Animal research: Microelectrode recordings
  - Invasive, chronic & acute electrode recordings
  - Large diversity of commercial systems
  - More than 30 different commercial formats
- Metadata tracking
  - Manual (labnote books)
  - Digital (configuration files, additional modalities, setup files, …)
- Project / lab specific file organization
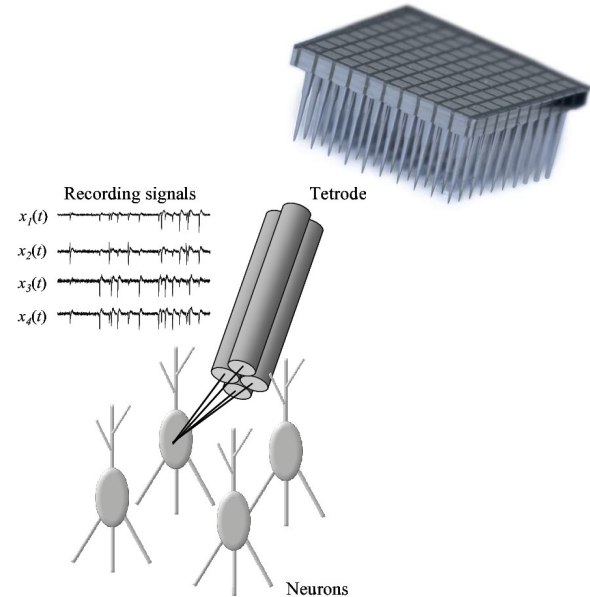
(Shiraishi et al. 2009)

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https://bids.neuroimaging.io/bep032

Benefits of animal ephys data in BIDS environment

- Defined dataset storage, **exchange** and archive organization

- **Minimal metadata** is required and standardized

- Simple integration with **other modalities** supported by BIDS

- Compatibility with existing BIDS based **tools**

- Standardized input for ephys **tool development**
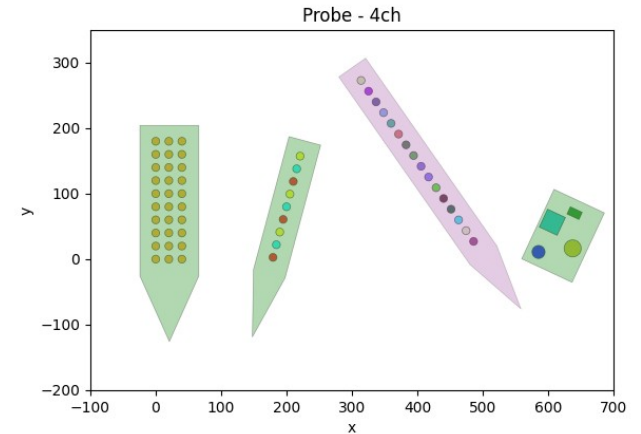
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https://bids.neuroimaging.io/bep032

Status: In development, looking for community feedback

Content

- Data file formats

- Probe and wiring description

- Recording setup metadata

- *Animal metadata*

    – Collaboration on *sample entity* with Microscopy BEP 031
       https://bids.neuroimaging.io/bep031

https://probeinterface.readthedocs.io

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an example...

```
my_dataset/
├── dataset_description.json
├── participants.json
├── participants.tsv
├── tasks.json
├── tasks.tsv
├── sub-i/
│   ├── sub-i_sessions.json
│   ├── sub-i_sessions.tsv
│   └── ses-140703/
│       └── ephys/
│           ├── sub-i_ses-140703_task-r2g_run-001_channels.tsv
│           ├── sub-i_ses-140703_task-r2g_run-001_contacts.tsv
│           ├── sub-i_ses-140703_task-r2g_run-001_ephys.json
│           ├── sub-i_ses-140703_task-r2g_run-001_ephys.nix
│           └── sub-i_ses-140703_task-r2g_run-001_probes.tsv
└── sub-l/
    ├── sub-l_sessions.json
    ├── sub-l_sessions.tsv
    └── ses-101210/
        └── ephys/
            ├── sub-l_ses-101210_task-r2g_run-001_channels.tsv
            ├── sub-l_ses-101210_task-r2g_run-001_contacts.tsv
            ├── sub-l_ses-101210_task-r2g_run-001_ephys.json
            ├── sub-l_ses-101210_task-r2g_run-001_ephys.nix
            └── sub-l_ses-101210_task-r2g_run-001_probes.tsv
```

Naming of files and directories :
- follows the generic rules of BIDS
- intuitive hierarchy (*project/animal/session/modality*)
- redundancy of information in file and directory names
- added specific infos for electrophysiology

Supported data file format (INCF standards) :
- NIX
- NWB

Supported metada file formats (as in generic BIDS) :
- tsv
- json

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Tools & resources emerging for animal-ephys BIDS

- Collection of example datasets https://gin.g-node.org/NeuralEnsemble/BEP032-examples
- AnDO https://github.com/INT-NIT/AnDO
  - Basic validation accompanying BIDS animal-ephys development
  - Structure generation
- ProbeInterface – unified framework for probe description
  - Import / export of probe information to BIDS animal-ephys
  - Permits automatic spikesorting of ephys datasets using `spikeinterface`

Join the discussion!

- INCF Working Group on Standardized Data
  https://www.incf.org/sig/incf-working-group-standardized-data
  - Regular meetings
  - Covers general data and metadata organization topics, including BEP032
- Animal-ephys BIDS https://bids.neuroimaging.io/bep032
  - Join the discussion
  - Improve the proposal
  - Contribute datasets
  - Test the available tools

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Thanks!

Sylvain Takerkart, Thomas Brochier, Jeremy Garcia @ INT
Ben Dichter @ Catalyst Neuro
Samuel Garcia @ CRNL
all BEP032 contributors
Lyuba Zehl, Andrew Davison & every one @ our INCF Working Group

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