

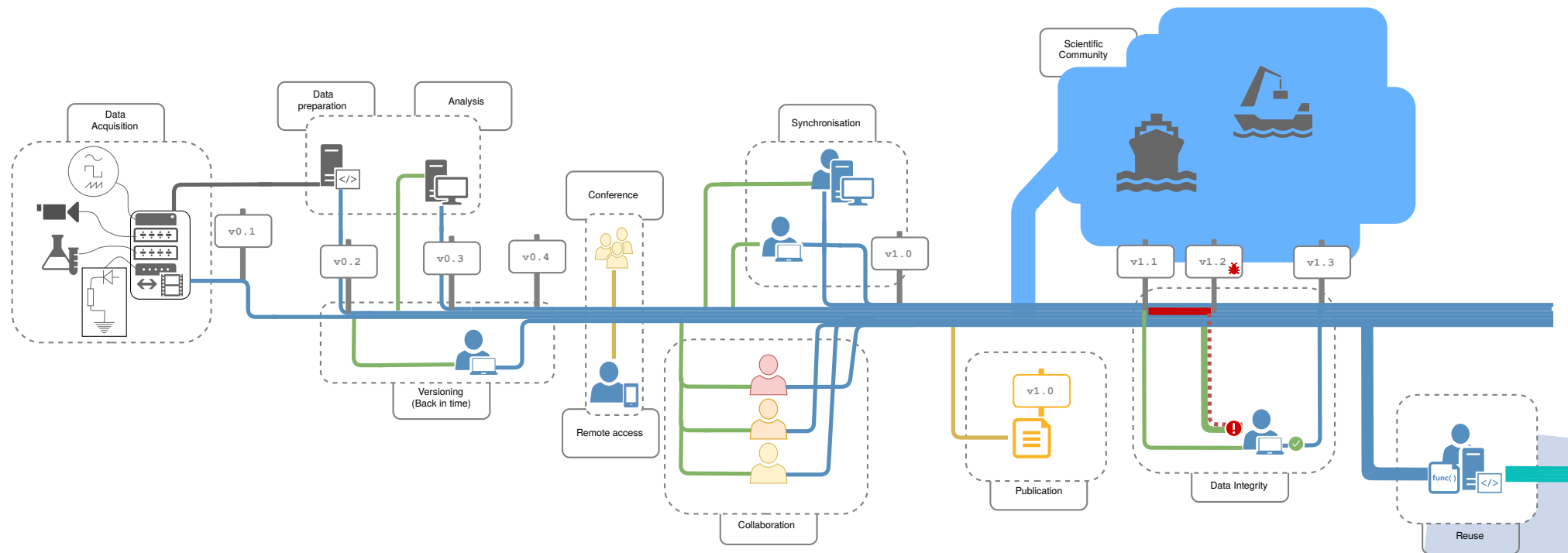
# German Neuroinformatics Node

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## Research Data Management, Hosting and Sharing

- GIN research data hosting service
- NIX neuroscience data format
- odML metadata format

## Data management from acquisition to publication





# GIN - G-Node Infrastructure

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## GIN

### Modern Research Data Management for Neuroscience

*...distributed version control, flavoured for science*



#### Manage your research data

Upload your data to private repositories.  
Synchronise across devices.  
Securely access your data from anywhere.



#### Share your data

Collaborate with colleagues.  
Make your data public.  
Make your data citable with the GIN DOI service.



#### Version your data

Uploaded files are automatically versioned.  
Retrieve any previously uploaded version of a file.  
Never lose file history.



#### Open Source

Based on open source projects such as [Git](#), [git-annex](#),  
and [Gogs](#). You can even set it up in your lab!

## Scientific data hosting service

[Search](#)

[doi / Resolving\\_and\\_rescuing\\_developmental\\_miswiring\\_in\\_a\\_mouse\\_model\\_of\\_cognitive\\_impairment](#) ★ 0 0 0

Updated 1 week ago



[hiobeen / Mouse\\_hdEEG\\_ASSR\\_Hwang\\_et\\_al](#) ★ 0 0 0

A set of high-density EEG (electroencephalogram) recording obtained from awake, freely-moving mice (*mus musculus*).

Updated 1 week ago



[mdp10yy / DCA](#) ★ 0 0 0

Supplementary Figure 1. Human bile increased afferent firing frequency in mouse proximal colon

Updated 5 months ago



[pgoltstein / Mini1p2pcomparison\\_Glas\\_Goltstein\\_2018](#) ★ 0 0 0

Dataset of "Benchmarking miniaturized microscopy against two-photon calcium imaging using single-cell orientation tuning in mouse visual cortex". By Annet Glas, Mark Hübener, Tobias Bonhoeffer & Pieter M Goltstein; Max Planck Institute of Neurobiology

## Data hosting service

- Location independent data access
- Secure access and user management
- Sharing and collaboration
- Built-in file versioning and retrieval
- Manual and automated workflow integration
- Free storage for scientific data
- Platform independent

- Neuroscientific service recommended by:



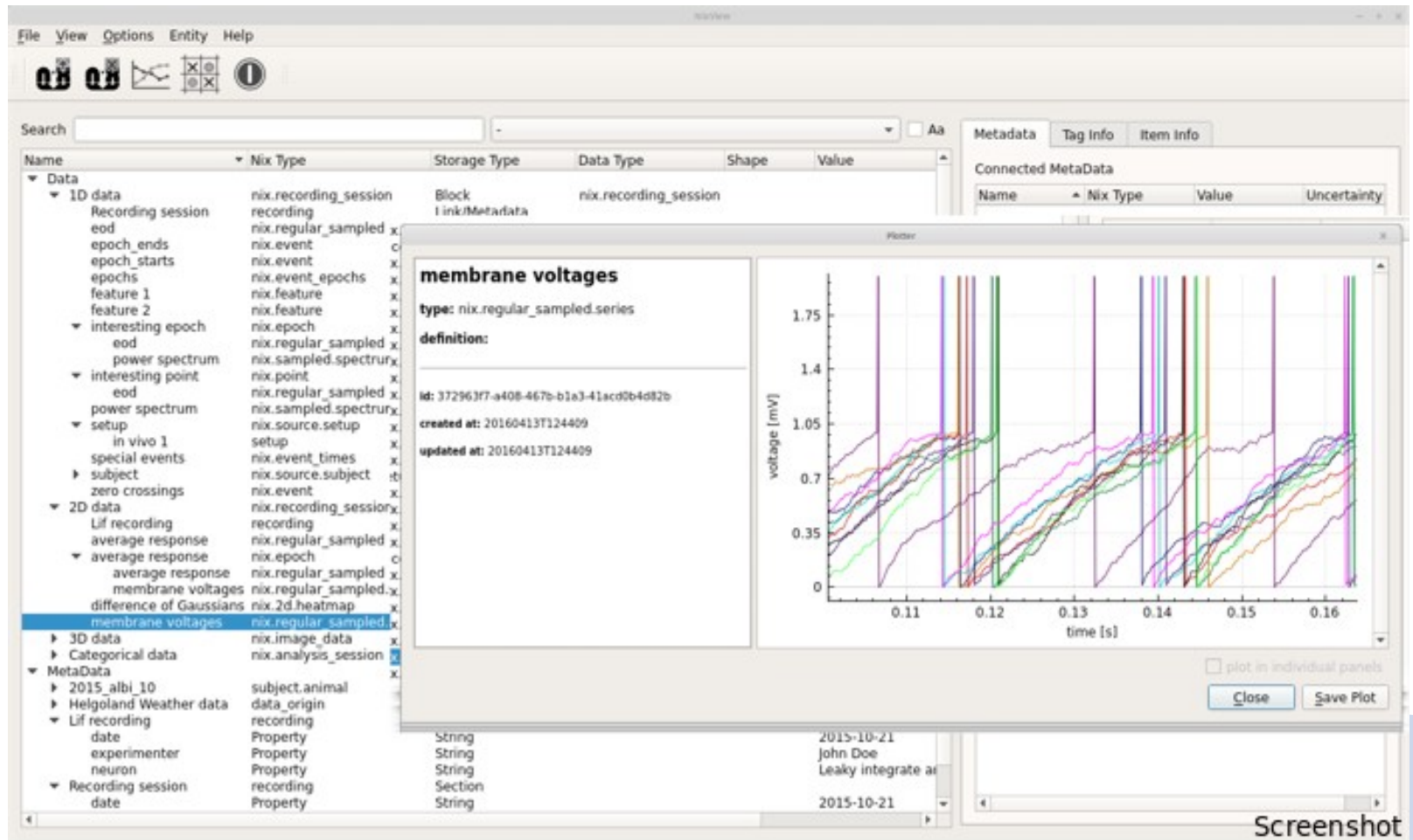
- Statistics
  - 1195 repositories (459 public)
  - 1138 users
  - Data size (all repositories): 13.17TiB



- gin-doi <https://doid.gin.g-node.org>
  - free data publication service
  - 112 published data sets
  - Total published data size: 1.2TiB
- gin-valid <https://valid.gin.g-node.org>
  - automatic file validation of new data on GIN
  - submit and use custom validators



# NIX - Neuroscience Exchange format

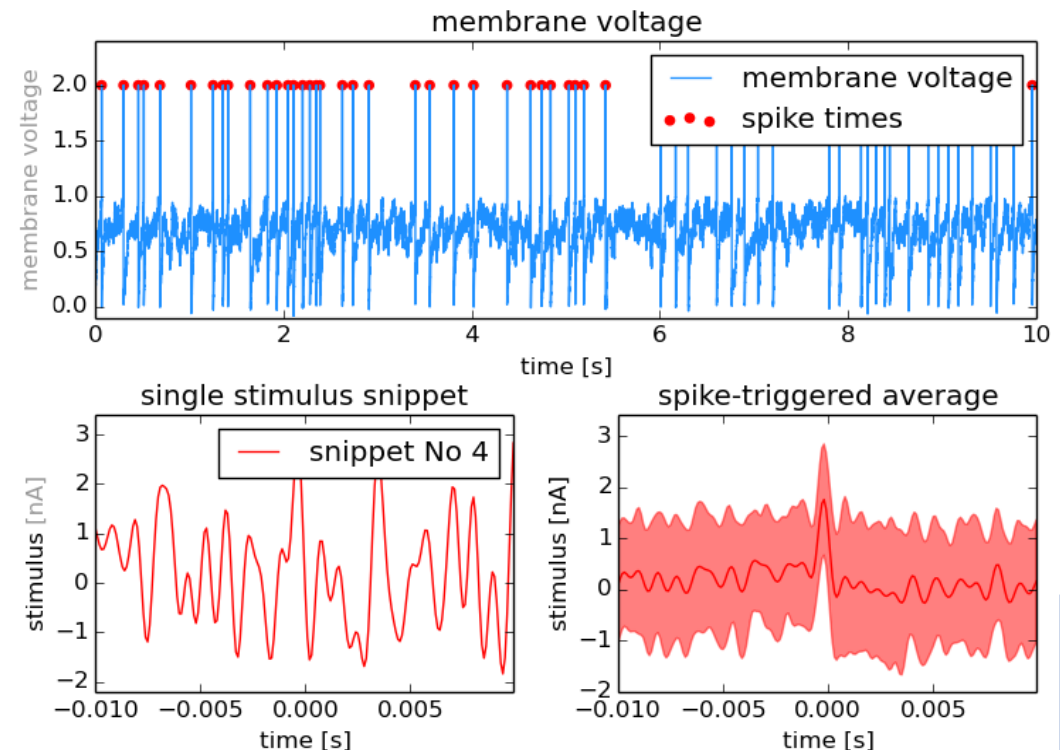


Open neuroscience file format

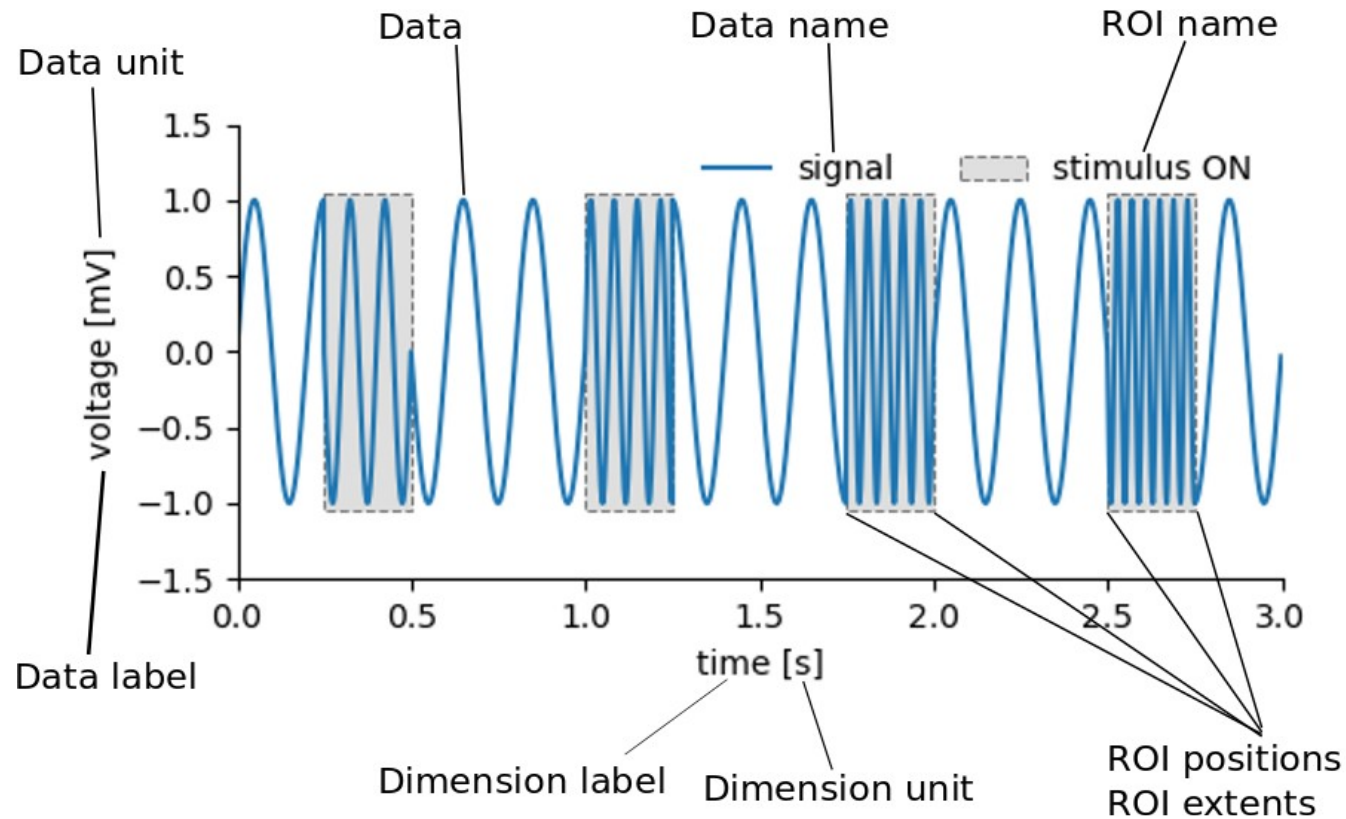
<http://bendalab.github.io/NixView>

- Flexible data model for various kinds of data
- Data and metadata in the same HDF5 file
- Descriptive association between data and metadata
- Multiple language support and tools

Raw and analysed data in one file







The fully annotated file contains all information required to understand and interpret the data and their properties.



# NIX interoperability

- NEO ephys format reader integration
- MNE - EEG/MEG data analysis and visualization
- Neurodata without borders (NWB) format
- SpikeInterface (Open ephys)

neo

<http://neuralensemble.org/neo>



<https://mne.tools>

MEG + EEG ANALYSIS & VISUALIZATION

<https://www.nwb.org>

<https://github.com/G-Node/nix-nwb>



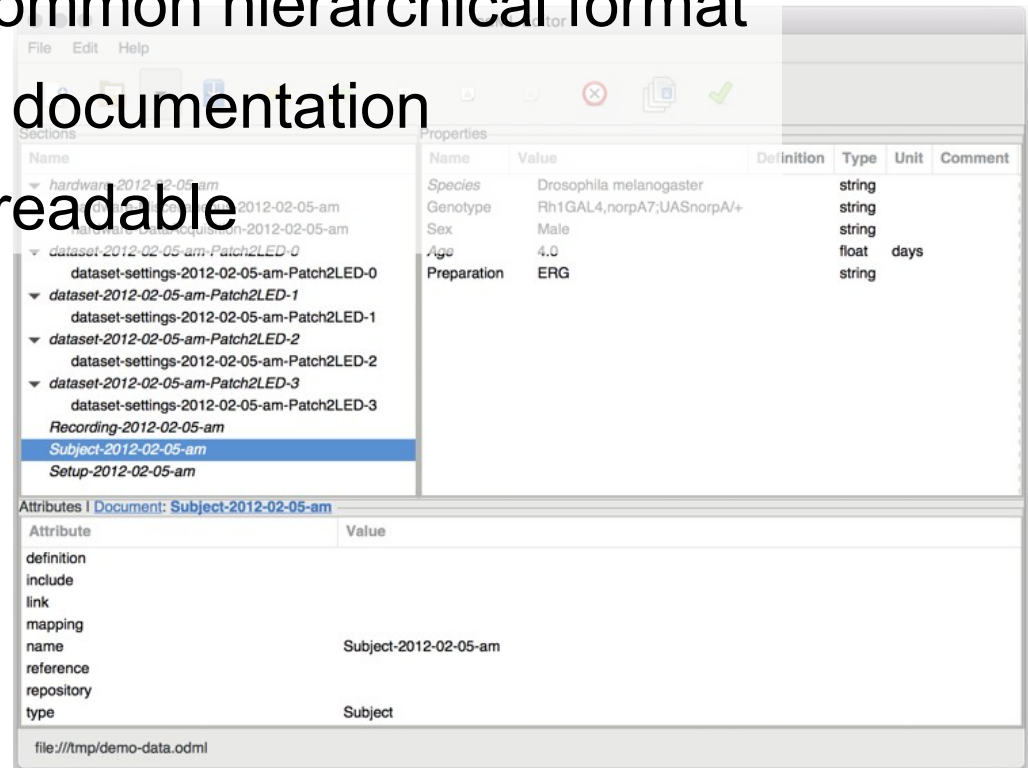
<https://open-ephys.org/spikeinterface>



# odML - open metadata markup language

## open metadata file format

- store metadata in a common hierarchical format
- automate experiment documentation
- human and machine readable
- highly flexible



Grewe et al (2011), doi:10.3389/fninf.2011.00016

<http://g-node.org/odml>



# odML - templates and terminologies

## Automate metadata collection

- terminologies: odML building blocks
- templates: reusable odML documents

odML Templates  
Data model for storing arbitrary metadata

 **open metadata Markup Language**

**odML - Templates**

This repository contains re-usable odML templates. A general introduction to odML and its usage can be found at the [main odML page](#). A brief introduction can be found at the bottom of the page.

If you would like to contribute and provide a new template to be shared with the community, please open an issue or even create a Pull Request with your template on the corresponding [github repository](#).

1. template/blackrock - type, name: Blackrock
2. template/datche - type, name: Datche/CROAS
3. template/datche - type, name: Datche/G-Node
4. template/eeg/setup - type, name: BASIL
5. template/eeg/setup - type, name: Car-sim
6. template/eeg/setup - type, name: ERP-eeg-response

**A brief introduction to odML and metadata**

odML (open metadata Markup Language) is a framework, proposed by [Grewe et al. \(2011\)](#), to organize and store experimental metadata in a human- and machine-readable, XML based format (odml). In this tutorial we will illustrate the conceptual design of the odML framework and show hands-on how you can generate your own odML metadata file collection. A well organized metadata management of your experiment is a key component to guarantee the reproducibility of your research and facilitate the provenance tracking of your analysis projects.

**What are metadata and why are they needed?**

Metadata are data about data. They describe the conditions under which the actual raw-data of an experimental study were acquired. The organization of such metadata and their accessibility may sound like a trivial task, and most laboratories developed their home-made solutions to keep track of their metadata. Most of these solutions, however, break down if data and metadata need to be shared within a collaboration, because implicit knowledge of what is important and how it is organized is often underestimated.

While maintaining the relation to the actual raw-data, odML can help to collect all metadata which are usually distributed over several files and formats, and to store them unitedly which facilitates sharing data and metadata.

**Key features of odML**

- open, XML based language, to collect, store and share metadata
- Machine- and human-readable
- Python-odML library
- Interactive odML-Editor

odML metadata terminology

**Document info**

Author:  
Date: 2011-01-21  
Version: 1.0  
Repository: <https://terminologies.g-node.org/v1.1/terminologies.xml>

**Structure**

[Leaky integrate and fire \(type: model/lif\)](#)

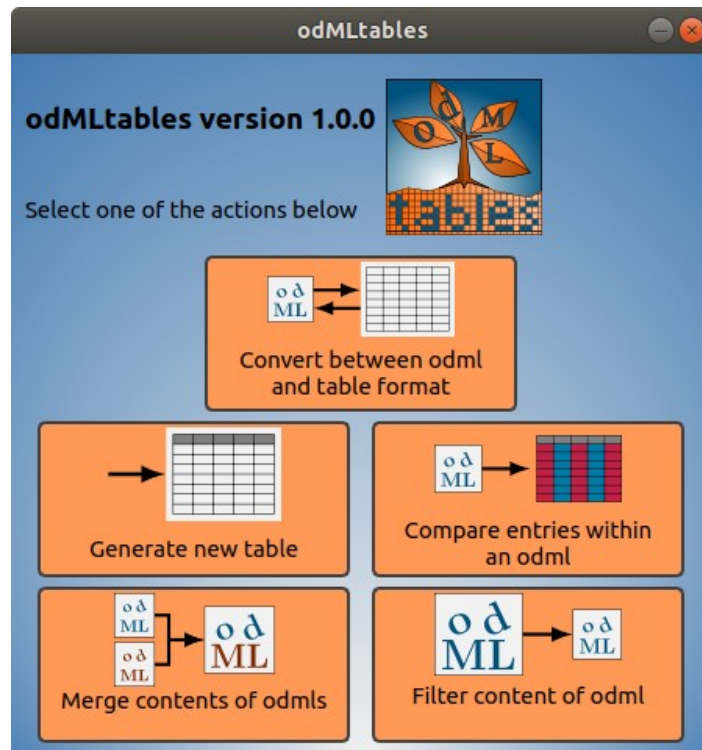
**Content**

**Leaky integrate and fire Section**

Type: model/lif  
Repository: <https://terminologies.g-node.org/v1.1/terminologies.xml>  
Link:  
Include:  
Definition: Properties to describe a leaky integrate and fire neuron model.

Name	Value	Unit	Type	Definition	Dependency	Dependency Value
Author			person	The author of this model.		
Date			date	The simulation date.		
Program			string	The program name.		

<https://terminologies.g-node.org>  
<https://templates.g-node.org>  
<http://g-node.org/odml>



- odML ↔ table conversion
- odML document filter
- odML files comparison
- command line and GUI

# Get in touch

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- ask any question here at the booth

Achilleas Koutsou, Michael Sonntag

- join our poster presentation

#77, Open tools and services for efficient data  
management, collaboration and data publication  
Wed, Sep 30, 18:00 – 19:15

- email us at

info@g-node.org