



# Neo

## The NeuralEnsemble Community

 A standard library for handling neurophysiology data in Python

### TECHNOLOGY DESCRIPTION

Neo is a library providing a standardized representation of electrophysiology and optophysiology data in Python, together with support for reading a wide range of neurophysiology file formats, including Spike2, NeuroExplorer, AlphaOmega, Axon, Blackrock, Plexon, Tdt, and support for writing to a subset of these formats plus non-proprietary formats including NIX and NWB.

Neo improves interoperability between Python tools for analyzing, visualizing and generating electrophysiology data by providing a common, shared object model. Neo objects behave just like normal NumPy arrays, but with additional metadata, checks for dimensional consistency and automatic unit conversion.

**Neo can read data from most of the widely-used file formats in neurophysiology, including community standards such as NWB**

**Neo objects behave just like normal NumPy arrays, but with additional metadata, checks for dimensional consistency and automatic unit conversion**

### AREAS

Electrophysiology | Optophysiology |  
Computational Neuroscience





## COMPETITIVE ADVANTAGES

- **Flexibility:** Allows neuroscience researchers to choose the best analysis tool for the task, not limited to those that support their file format
- **Interoperability:** Provides a common basis for neurophysiology software in Python, enabling easy data exchange
- **Rigour:** Reduces errors due to incorrect handling of units and sampling rates
- **Metadata:** Enables annotations and metadata to accompany the data throughout the analysis pipeline.

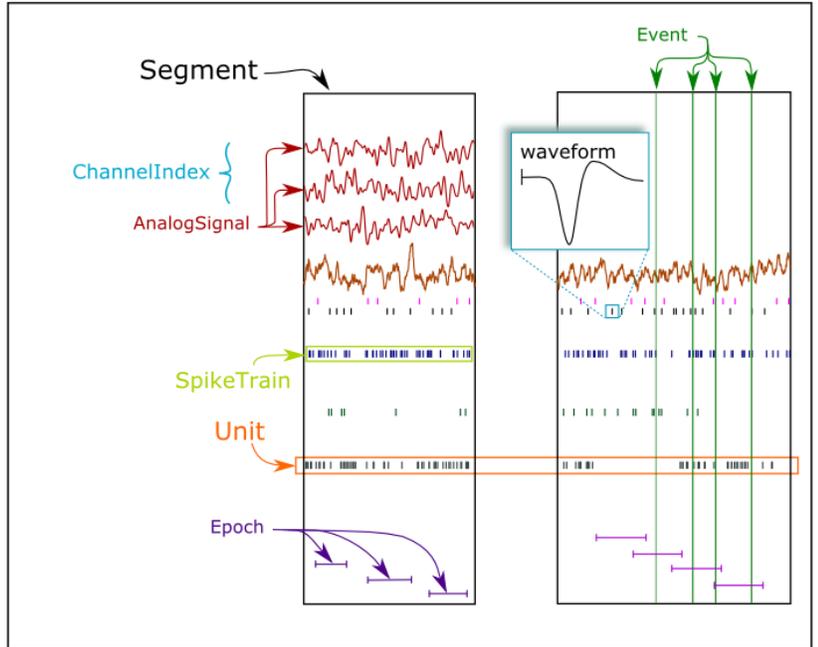
Neo is a community project, with over 30 contributors from 16 institutions

## APPLICATION & MARKET POTENTIAL

- Neo is open source software, distributed under the BSD 3-clause licence. It is free for academic and commercial use, and may be redistributed.
- Any neuroscientist working with electrophysiology, calcium imaging or voltage sensitive dye imaging data will benefit from Neo's file format support.
- Developers of neurophysiology software will gain greater interoperability by using Neo as their object representation.



Block



## TECHNOLOGY READINESS LEVEL



## REFERENCES

- Neo is a dependency for over 140 repositories on GitHub.
- Neo is downloaded over 8000 times per month (statistics from <https://pypistats.org>) and is packaged by the NeuroDebian and NeuroFedora Linux distributions.
- Neo has a well established, mature codebase with over ten years development effort.
- Software using Neo includes Elephant (data analysis), PyNN (neural simulation), SpiNNaker (neuromorphic computing) and Neurotic (curation and visualization of behavioural electrophysiology data).

## CONTACT

Andrew Davison  
 CNRS, Gif-sur-Yvette, France  
[andrew.davison@cns.fr](mailto:andrew.davison@cns.fr)

