# Python in Electrophysiology



Find the community @ http://neuralensemble.org
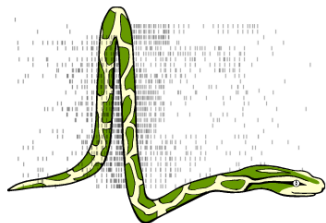
## Data I/O

### Neuroshare Tools

neuroshare

http://g-node.org/neuroshare-tools

Neuroshare is a standardized API for accessing neurophysiology data stored in vendor-specific binary formats in a vendor-neutral way.

- High-level Python library to access Neuroshare compatible data-files
- Automatically detects file types and loads the corresponding vendor library
- Support for GNU/Linux, MacOS X, and Windows
- Neuroshare-WineProxy enables the use of vendor libraries for Windows under GNU/Linux and MacOS X
- Comes with a tool to convert any data file supported by Neuroshare to the HDF5 format

### Neo

neo

http://packages.python.org/neo

Neo provides a common model for representing electrophysiology data in Python. It provides I/O for reading a wide range of neurophysiology file formats (Spike2, NeuroExplorer, AlphaOmega, Axon, Blackrock, Plexon, Tdt) and for writing to a subset of these formats plus nonproprietary formats including HDF5.

Neo implements a hierarchical data model well-adapted to intracellular and extracellular electrophysiology and EEG data with support for multi-electrodes (e.g., tetrodes). Neo's data objects build on the quantities package, which in turn builds on NumPy by adding support for physical dimensions. Thus Neo objects behave like normal NumPy arrays but with additional metadata, checks for dimensional consistency and automatic unit conversion.

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# Python in NeuroImaging



Find the community @ http://www.nipy.org
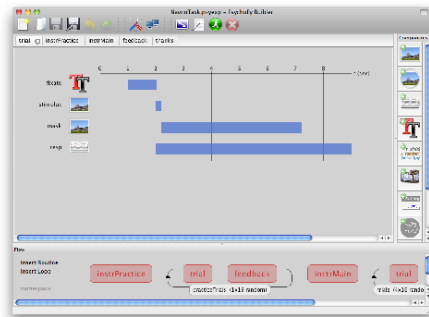
## Stimuli Delivery

### PsychoPy

http://www.psychopy.org



PsychoPy is an easy, precise, platform-independent package for stimulus presentation. Suitable for psychophysics, neuroimaging, and all areas of psychology.

- Huge variety of stimuli generated in real-time
- Cross-platform – run the same script on Linux, Win or OS X
- Flexible stimulus units (degrees, cm, or pixels)
- Coder interface for those that like to program
- Builder interface for those that don't
- Input from keyboard, mouse, joystick or button boxes
- Multi-monitor support
- Automated monitor calibration (supported photometers)



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http://neuro.debian.net

## NeuroDebian is

a Debian project that provides the Neuroscience community with a stable and versatile research platform – the Debian operating system. Since 2005, NeuroDebian integrates neuroscience software into Debian to allow neuroscientists to benefit from the advantages of the universal operating system in their day-to-day research activities. The NeuroDebian repository (http://neuro.debian.net) offers the latest research software for all Debian suites (and various releases of Ubuntu). The combination of a stable generic operating system, Debian, and a variety of conveniently accessible research software creates a versatile research platform for neuroscience that offers the latest methodologies of the field to everyone, for free. These advantages make NeuroDebian increasingly popular among neuroscientists and scientific software developers.

## NeuroDebian is NOT

yet another Debian GNU/Linux derivative distribution. All work done by the NeuroDebian project targets the official Debian operating system. This approach helps to increase the longevity of the project by relying on the efforts of thousands of Debian contributors.

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http://datalad.org

## DataLad

aims to simplify and thus facilitate delivery and sharing of scientific data by establishing a federated data distribution. While initially aiming to deliver public neuroimaging datasets, DataLad will be easy to adopt more neuroscience data or other fields of endeavor.

## DataLad FAQ

**Federated?**

It is impractical to distribute data through *classical* distribution mechanisms, where content is contained within packages available from the central location (or its mirrors). DataLad will only collect, unify, monitor, and expose through convenient interfaces data available across a wide range of data providers

**Distributed?**

DataLad uses distributed version control Git and built on top of it Git-annex for data logistics. Git-annex enables *distributed* operation where clones of the datasets could be made available across multiple sites and media without loosing track of data and meta-information (such as versioning)

## Planned dataset coverage

**OpenfMRI.org**

curated fMRI (and EEG) datasets

**HumanConnectome.org**

anatomical, functional, diffusion MRI data from 1,200 subjects

**CRCNS.org**

curated electrophysiological and neuroimaging datasets

**INDI**

a collation of various datasets and initiatives (functional connectome, *etc.*)