

# A customizable framework for neurophysiology data management and provenance tracking

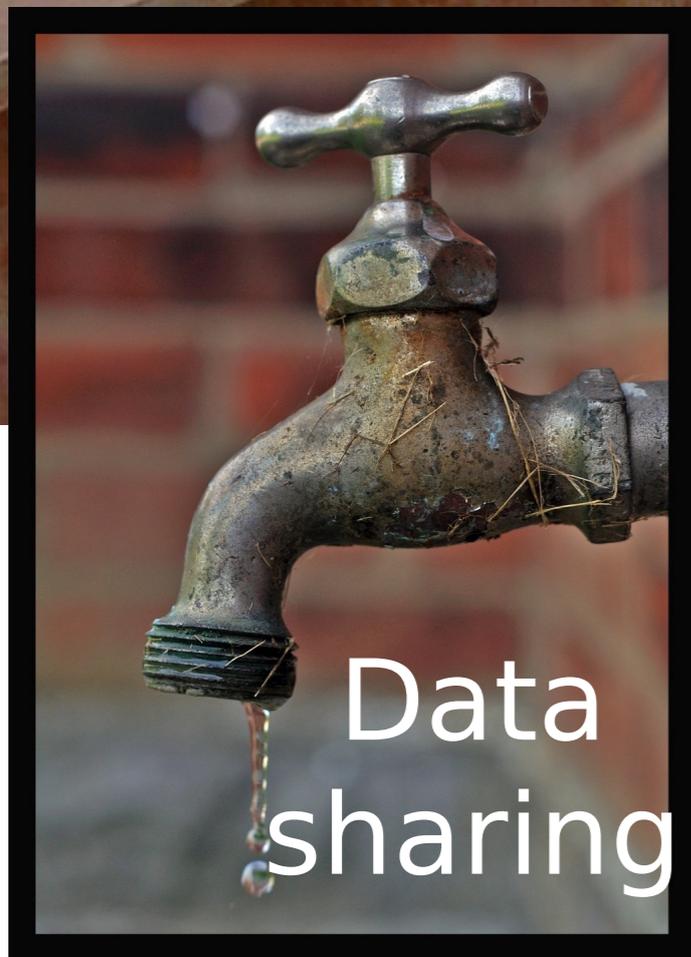
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- Orsay, OSI Day 26<sup>th</sup> October 2015





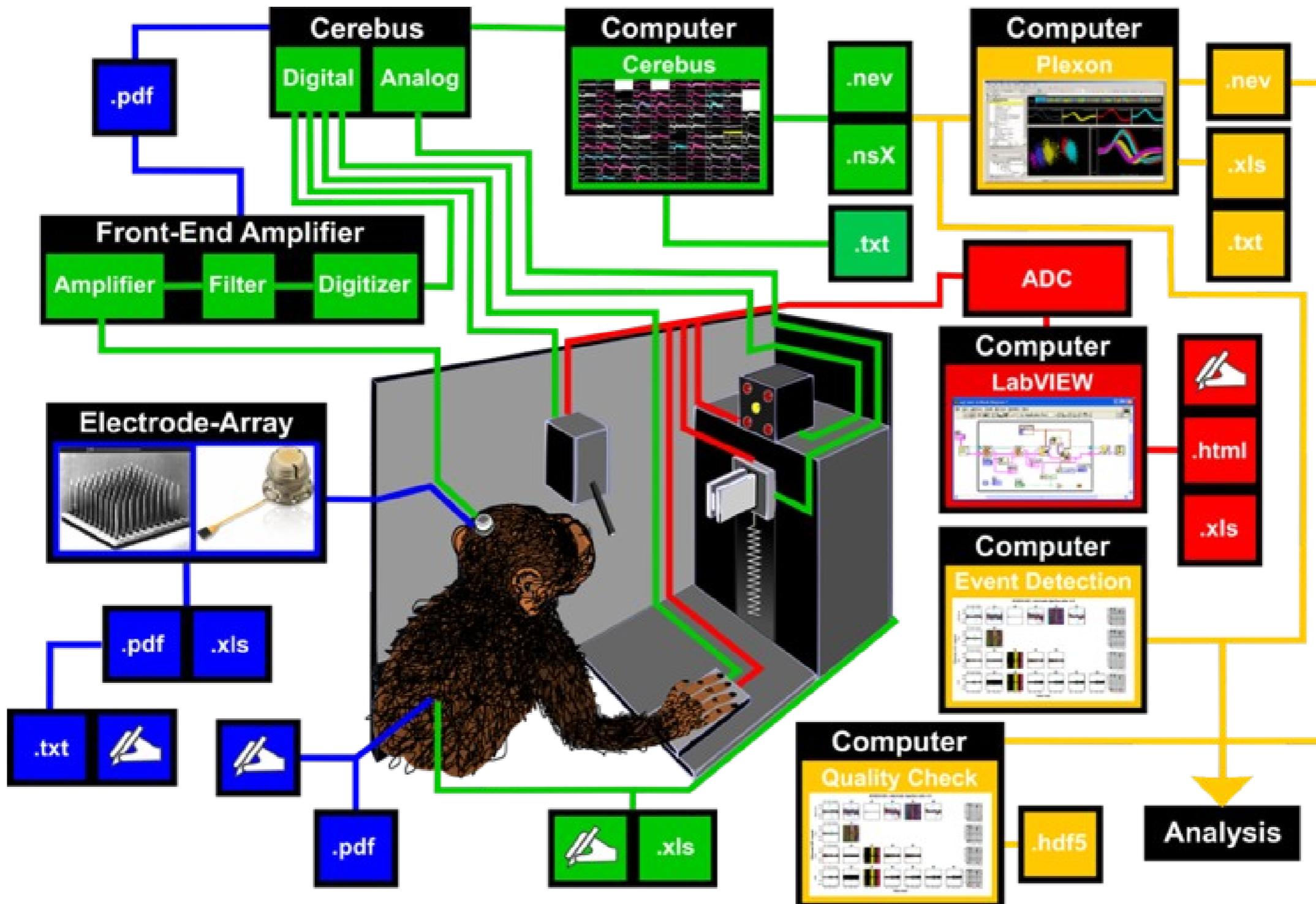
Neuroscience data



Data  
sharing

Neuroscience produces a lot of data  
but it is difficult to share it.  
Why?

# Neuroscientific experiment



# Data-sharing as a problem

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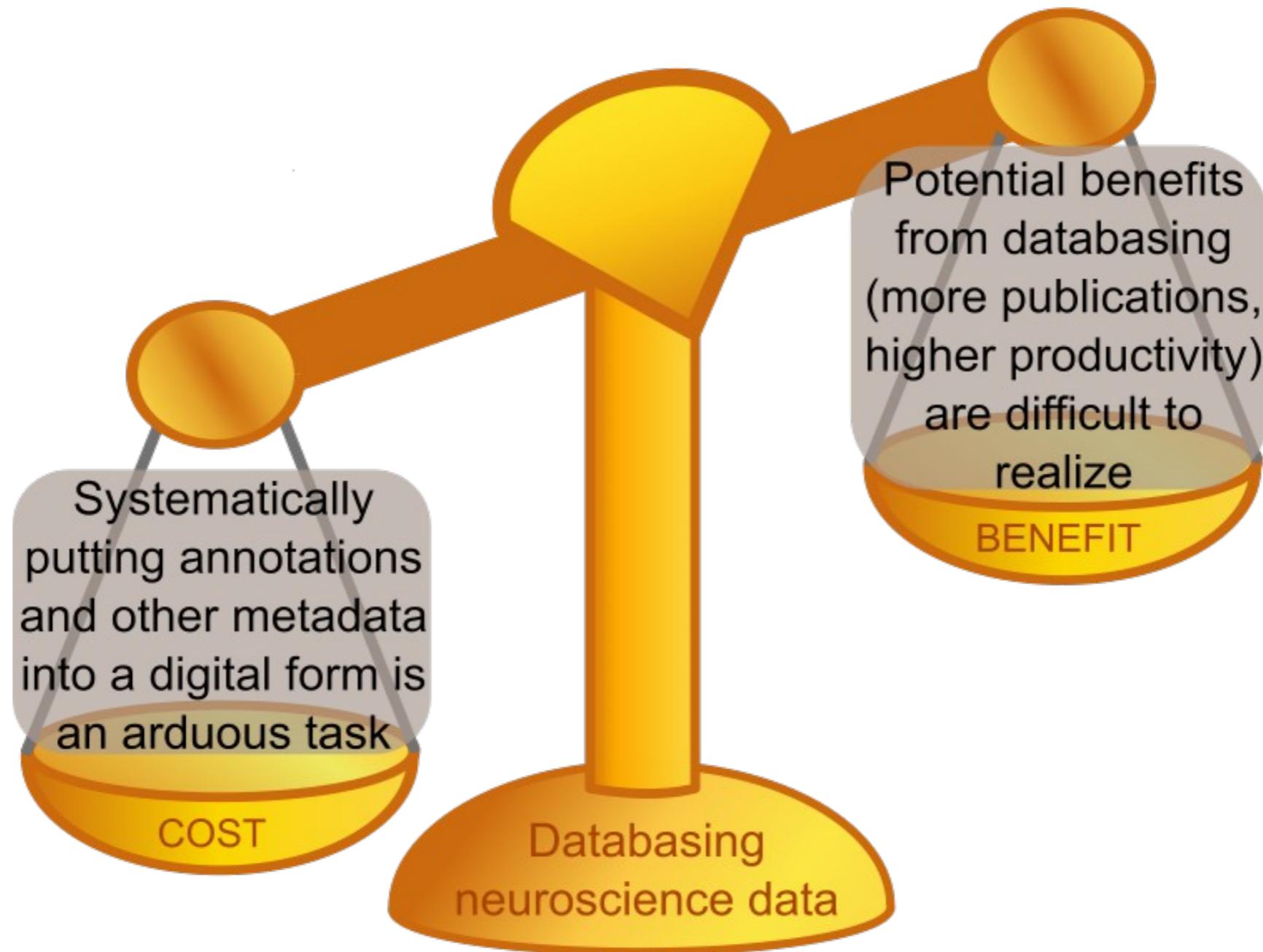
- Many ways to do experiments
- Many devices
- Many source of data recording
- Many storage formats
- Many softwares

How to organize and share the data?

*Annotations!*

# Annotations

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**We have to reduce cost and increase benefit**

# Constraints

# Requirements

Experimental protocols and methods of data acquisition are **extremely diverse**

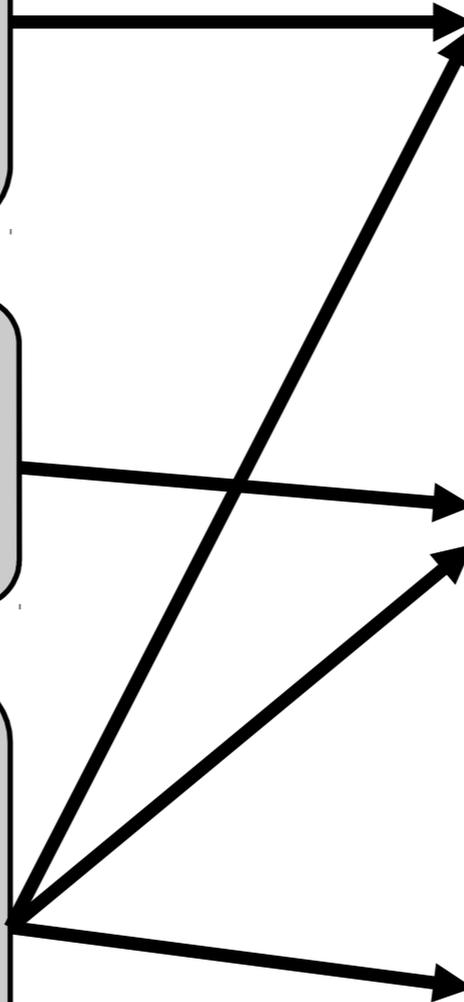
A scientist should obtain **immediate benefits** from annotating their data

A scientist should be able to **easily annotate** their data with minimal disruption to their workflow

The metadata stored should be **customizable** but there should be a **common core to ensure interoperability**

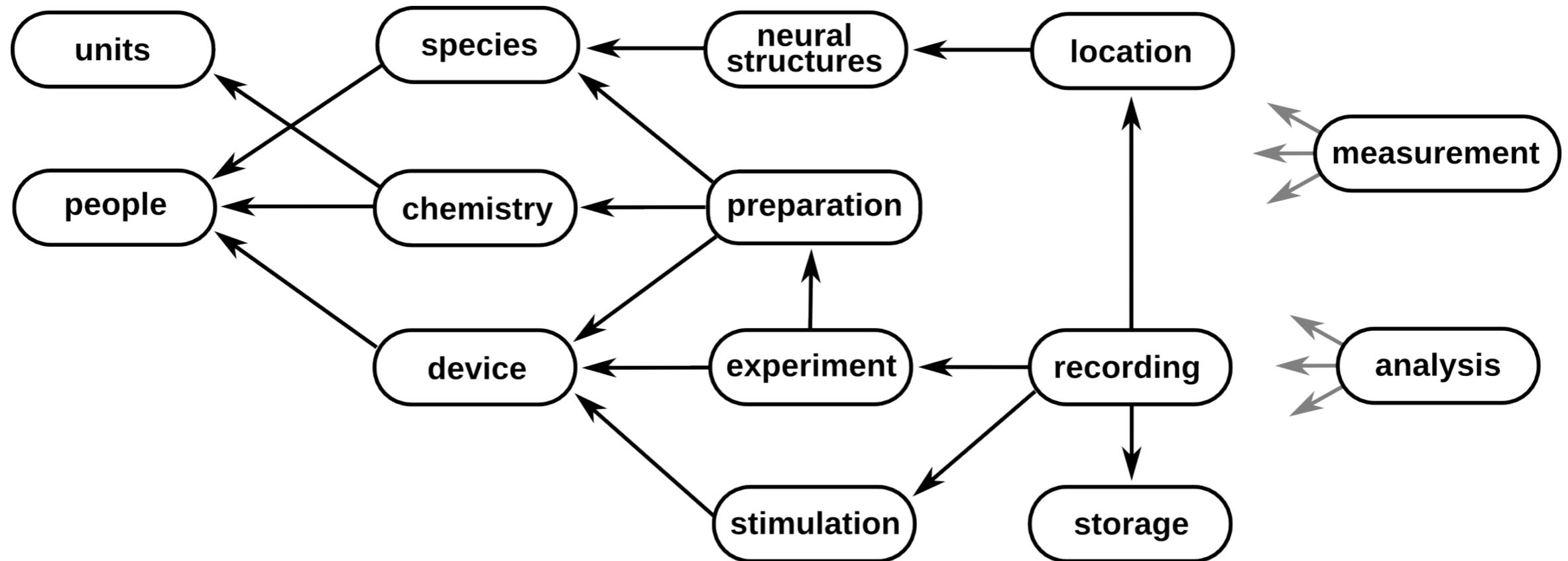
The same tool should be useable both as a **local database** and as a **public resource**

Multiple, easy-to-use **interfaces** are needed for different phases of the workflow



# Helmholtz meta-database

The metadata stored should be **customizable** but there should be a **common core to ensure interoperability**

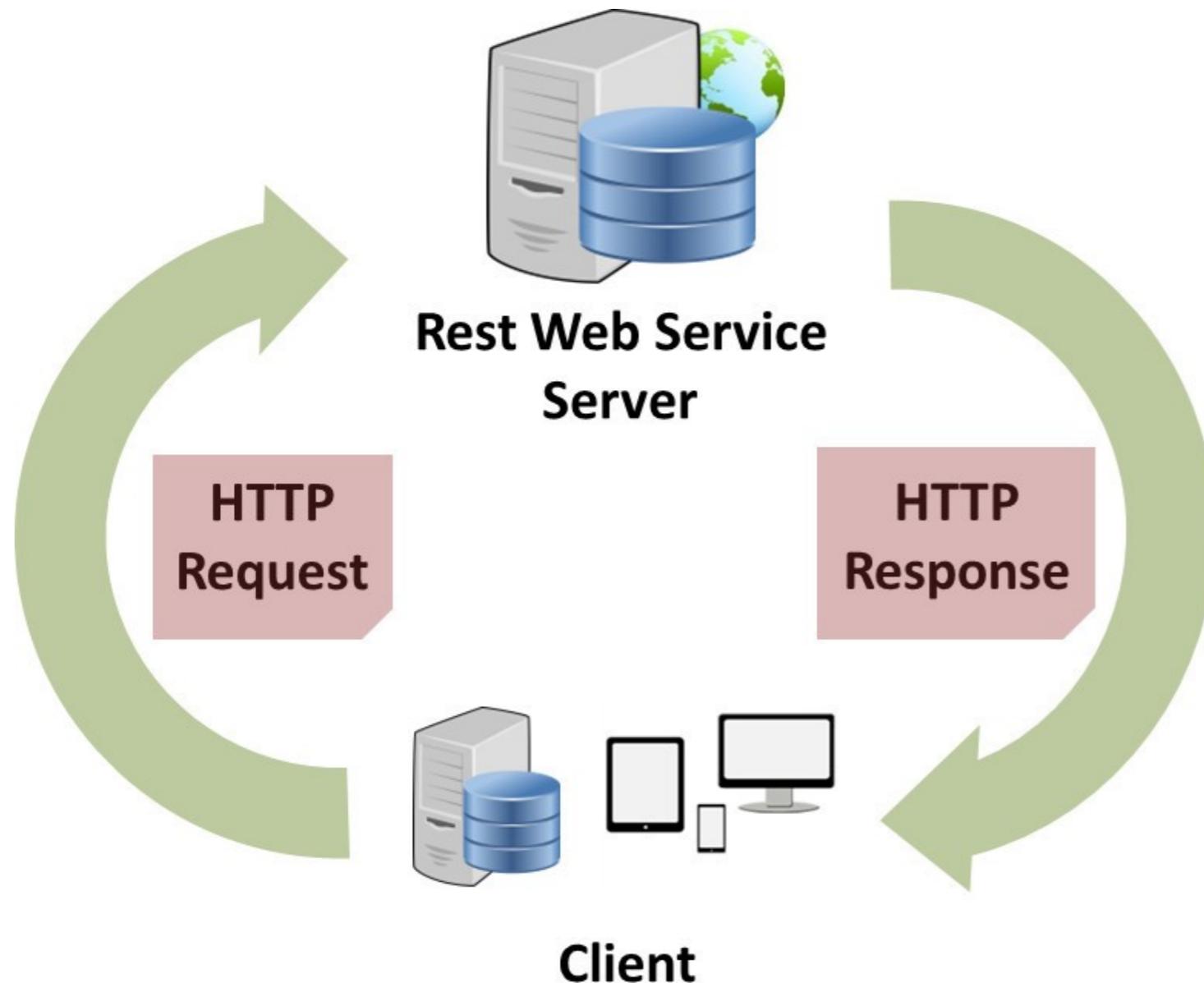


Helmholtz provides core components to handle elements common to all or many domains of neurophysiology

Helmholtz is customizable according to each experimental setup

# RESTful solution

Multiple, easy-to-use **interfaces** are needed for different phases of the workflow

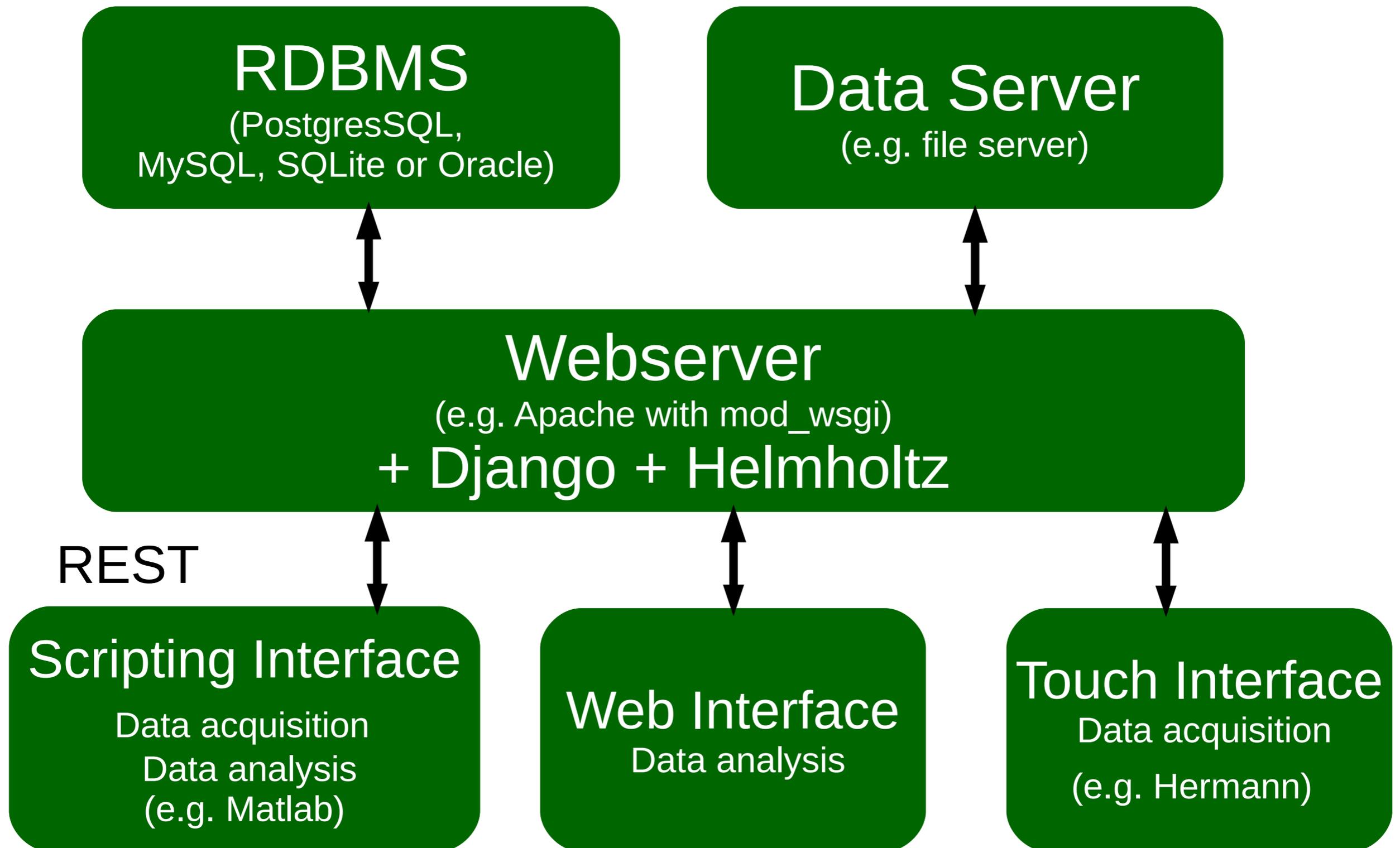


Using RESTful interface:

- Well-known
- Simple (HTTP)
- Many libraries available for many languages and platforms

# Python/Django solution

The same tool should be useable both as a **local database** and as a **public resource**



# Example of data acquisition interface

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Current interaction with experimenters:

- Portable device
- Easy to use due to time constraints during experiment
- This application is built with Bootstrap and AngularJS



# Example of implementation

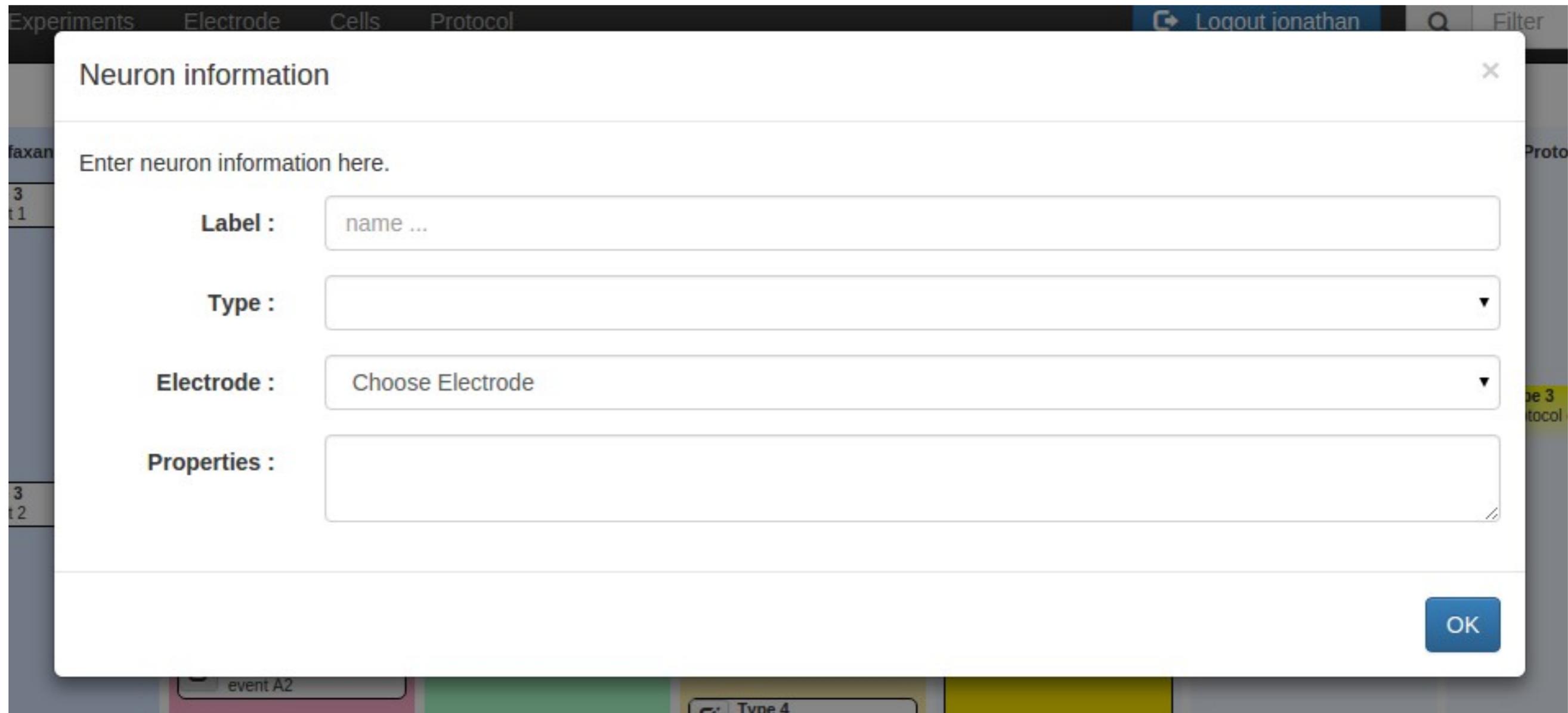
- Timeline of experiment

The screenshot displays a software interface for managing an experimental timeline. At the top, a navigation bar includes the user name 'Hermann', menu items 'Experiments', 'Electrode', 'Cells', and 'Protocol', a 'Logout jonathan' button, and a search bar labeled 'Filter'. Below the navigation bar, the timeline is organized into six vertical columns, each representing a different experimental category. Each column has a header with a plus icon and a list of items, each with a checkmark icon and a text box containing the item name and quantity.

Category	Item	Quantity
Anesthetic	Alphaxan	2 ml
	Isoflurane	0,5 ml
Paralytic	Pancuronium	1,5 ml
	Rocuronium	3 ml
	Vecuronium	1,7 ml
Physiologic	NaCP	0,8 ml
	LRS + G5%	2,3 ml
Electrode	typeA electrode 1	
Neuron	$\mu$ m 352	1st cell
	$\mu$ m 574	2nd cell
Protocol	Drifting Grating protocol exp	

# Example of implementation

- Form to add and edit Cell



The image shows a screenshot of a software application with a modal dialog box titled "Neuron information". The dialog box has a close button (X) in the top right corner. Inside the dialog, there is a text prompt "Enter neuron information here." followed by four input fields:

- Label :** A text input field containing "name ...".
- Type :** A dropdown menu with a downward arrow.
- Electrode :** A dropdown menu with the text "Choose Electrode" and a downward arrow.
- Properties :** A large, empty text area.

At the bottom right of the dialog box is a blue button labeled "OK". The background of the application shows a navigation bar with "Experiments", "Electrode", "Cells", and "Protocol" tabs, and a user profile "Logout ionathan".

# Acknowledgements

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