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Abstract:	The prototype, available for use by members of the HBP Consortium, comprises alpha releases of the following components of the platform: the dataset search, documentation about data standards and HBP-core models, links to tools for the analysis of structural and functional brain data, and access to the HBP Mouse/Rat Brain Atlas and Human Brain Atlas via a 2D Atlas viewer.

Keywords:	HBP-core, data integration, search, tools, ontologies

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1. The Aim of this Document

This document provides the information needed to access the Neuroinformatics Platform alpha release - preliminary release for internal Consortium use (Deliverable D5.8.3, Milestone 105).

2. How to Access the HBP Neuroinformatics Platform

The Neuroinformatics Platform alpha release is accessible at the following address: https://nip.humanbrainproject.eu (username: visitor, password: hUm4nbr41n).

The current alpha release of the Platform is a preliminary release for internal Consortium use. If you do not have the necessary login and password, please contact: data.nip@humanbrainproject.eu.

All HBP Platforms will also be accessible via the HBP Collaboratory.

Collaboratory:

https://collab.humanbrainproject.eu/#/collab/19/nav/403

Neuroinformatics Platform on the Collaboratory:

https://collab.humanbrainproject.eu/ - /collab/47/nav/236

3. Overview

The Neuroinformatics Platform homepage gives an overview of datasets that are currently integrated in the HBP KnowledgeGraph, and are accessible through the Search application. The HBP KnowledgeGraph serves as the common data store and provenance tracker for all types of data, models, and literature produced and consumed by other services, tools and Platforms in the HBP. On the Neuroinformatics Platform homepage, users are invited to contribute data, and are provided with a link to request support (see Figure 1 in Annex 2 below). The Navigation bar gives direct links to search, tools released by SP5 and documentation.

4. Help and User Feedback

To contribute data or to provide feedback, please contact: data.nip@humanbrainproject.eu.

User feedback on the expected search criteria will be very valuable. It will help the Platform team to optimise the search application, and ensure that the proper metadata is captured.

The HBP core model is being developed based on W3C PROV. This captures metadata that describe how a dataset was obtained, who contributed to it, and details about the specimen used. Most of the metadata are described by ontologies, allowing comparisons between datasets. Textual and spatial search services are being built based on the metadata to enable data exploration and discovery. Feedback on the methodology and possible ontology extensions would be welcome.

5. Annexes

1) Tools & Features Available in this Platform Release
2) Screenshots of Tools & Features Available in this Platform Release

Annex 1: Tools & Features Available in this Platform Release

Tool / Feature	Responsible	Milestone / Remarks	Keywords	Available at	Description/Screenshot
Tools for Brain Atlases	WP5.1 Sean HILL	MS87 Alpha version of atlas registration and navigation tools including search of KnowledgeGraph. Tracking of dataset registration.	Search	Search	Brain Atlas Search. Search based on curated metadata
			Atlas viewer	Atlas	Brain Atlas Viewer. Web-based application to visualise image stacks at multiple resolution.
			Registration tracker (Internal use)	Data tracker	Data tracker
Tools for Structural Data Analysis	WP5.2 José M. PEÑA	Alpha release of structural analysis tools.	Structural analysis tools	Tools, EspINA	Structural Data Analysis Tools
Tools for Functional Data Analysis	WP5.3 Sonja GRÜN	MS95 Alpha release of functional analysis tools	Functional analysis tools	Tools, Elephant	Functional Data Analysis Tools. Elephant is a package for the analysis of neurophysiology data based on Neo.
Brain Atlases	WP5.5 Jan BJAALIE	MS101 Alpha versions of mouse and human atlases released - Waxholm Space rat brain atlas - High resolution architectonic atlas of rat hippocampal region - BigBrain/JuBrain	Atlas, Waxholm template	Atlas	Waxholm Brain Atlas
			Rat hippocampal region	Tools, Rodent Workbench	Rodent Workbench. The workbench is a mesh-based viewer for Rodent atlases.
			BigBrain	Atlas	BigBrain
			JuBrain	JuBrain	
		Atlasing registration tools. Tool for anchoring 2D experimental image to 3D atlas templates. Scalable Brain Atlas	Atlas registration	Tools, AligNII, QuickNII, Scalable Brain Atlas	Atlas registration tool. Online and standalone tools for anchoring of 2D experimental image data to 3D atlas template.
User documentation	WP5.7 Sten GRILLNER	MS109 Alpha release of user documentation	Documentation	Documentation	Documentation

Annex 2: Screenshots of Tools & Features Available in this Platform Release

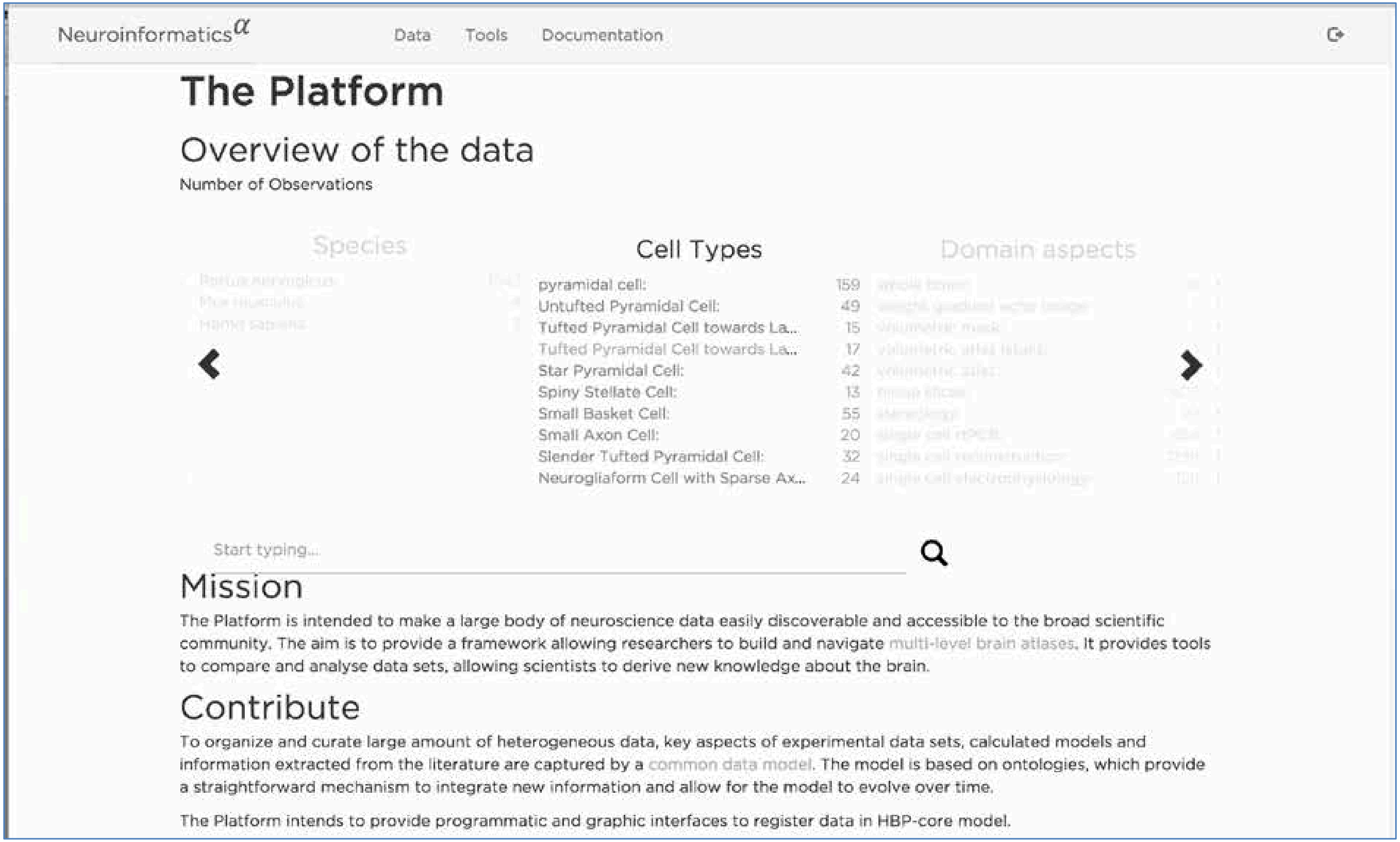


Figure 1: Screenshot of the Neuroinformatics Platform Homepage

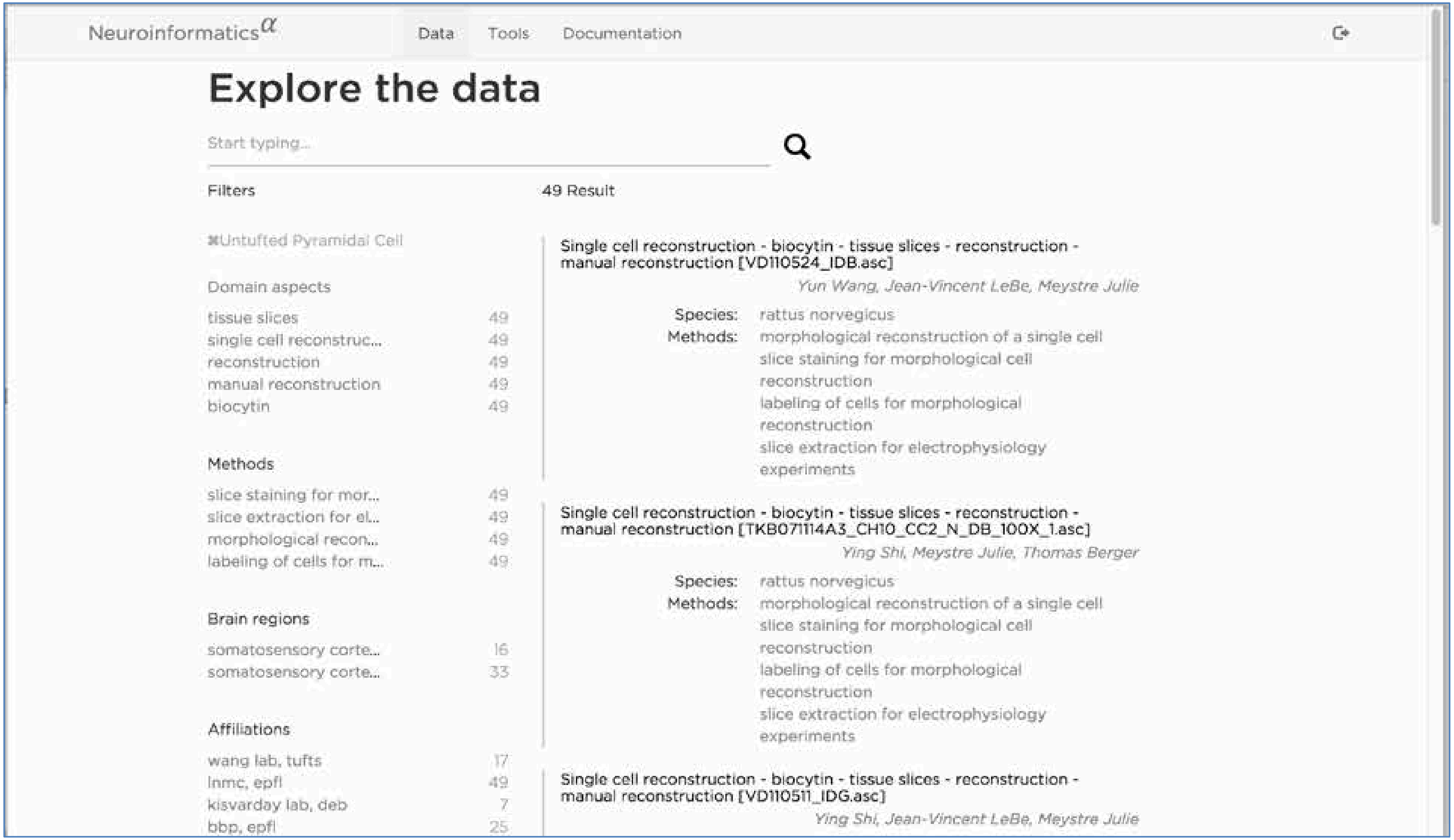


Figure 2: Screenshot of Brain Atlas Search

Figure 3: Screenshot of Brain Atlas Tools

term

Search

active cases

id	task	short description	final n	TODOs	why	who	when	what	where	how	contact	domain types	species
6	1.2.2	distribution of purkinje cells in the mouse cerebellum	1	13	✓	✓	✓	✓	✓	✓	Ludovico Silvestri	images stack, cell distribution	
22	x.x.x	single cell human morphology reconstructions	3 specimens, 94 observations	10	✓	✓	✓	✓	✓	✓	ruth benavides-piccione	cellular reconstructions	
24	1.2.4	3D reconstruction with Neurolucida Hippocampus & BONUS (ephys & image stacks	20-50	8	✓	✓	✓	✓	✓	✓	Attila Gulyas	electrophysiology, reconstruction, imagestack	
26	1.2.3	Numbers and distributions of excitory and inhibitory neurons and glia - Automated 3D segmentation with Confocal microscope	1+	1	✓	✓	✓	✓	✓	✓	ruth	synaptome, reconstruction	
38	none	open connectome	2+	0	✓	✓	✓	✓	✗	✗	kunal lillaney	EM-stack,connections	mus musculus,c. elegans
42	2.1.6	Infant Template MR volume	1+	0	✓	✓	✓	✓	✓	✓	Timo Dickscheid		
52	1.1.3	The cellular and synaptic proteome - Mass Spectrometry Analysis of PSD protein samples	1+	0	✗	✗	✗	✗	✗	✗	nathan	proteome, synapse, mass spec	
53	1.1.3	The cellular and synaptic proteome - distribution of synapses in space.	1+	0	✗	✗	✗	✗	✗	✗	nathan	imaging	

Figure 4: Screenshot of Data Tracker

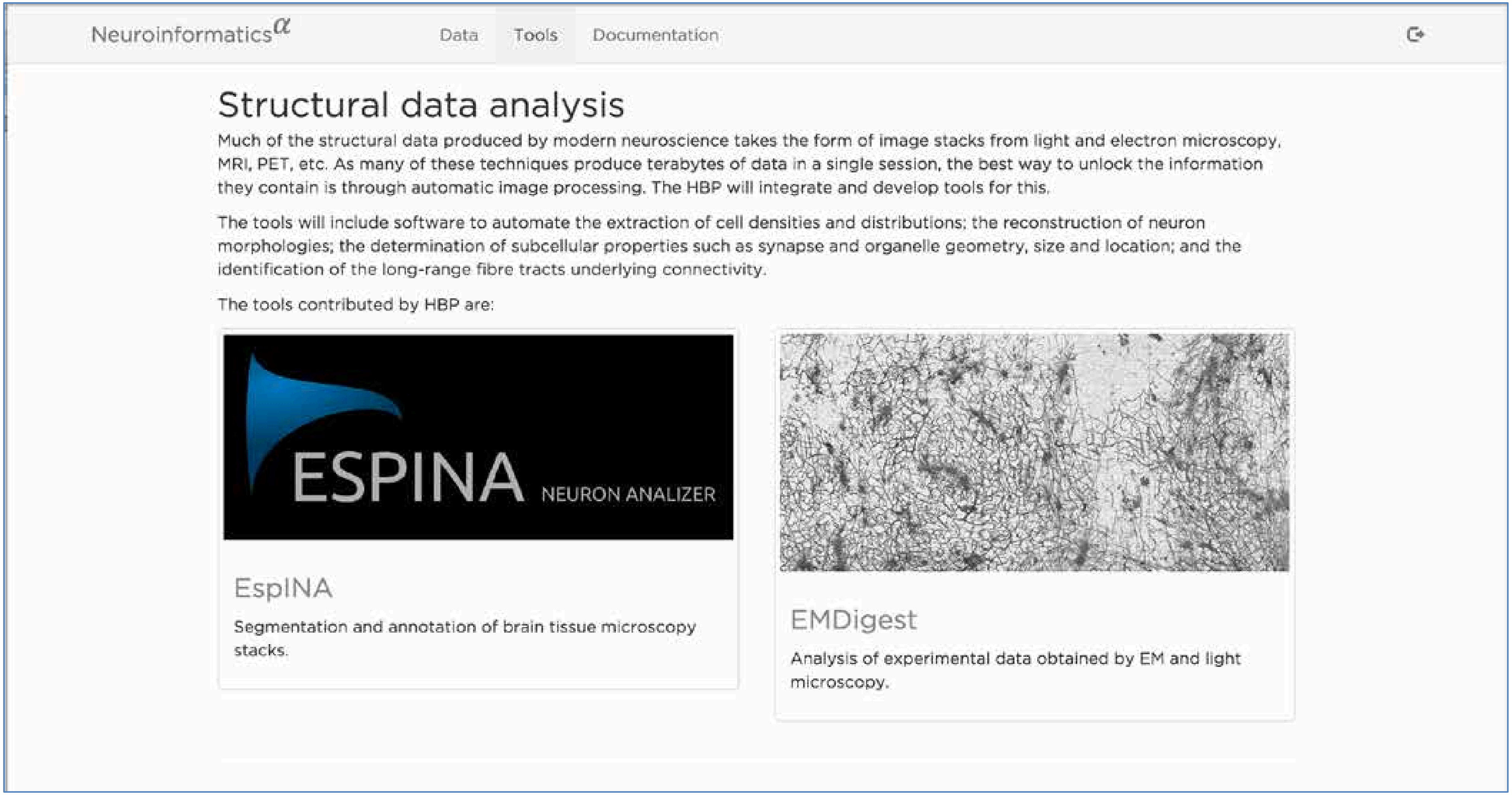


Figure 5: Screenshot of Structural Analysis Tools

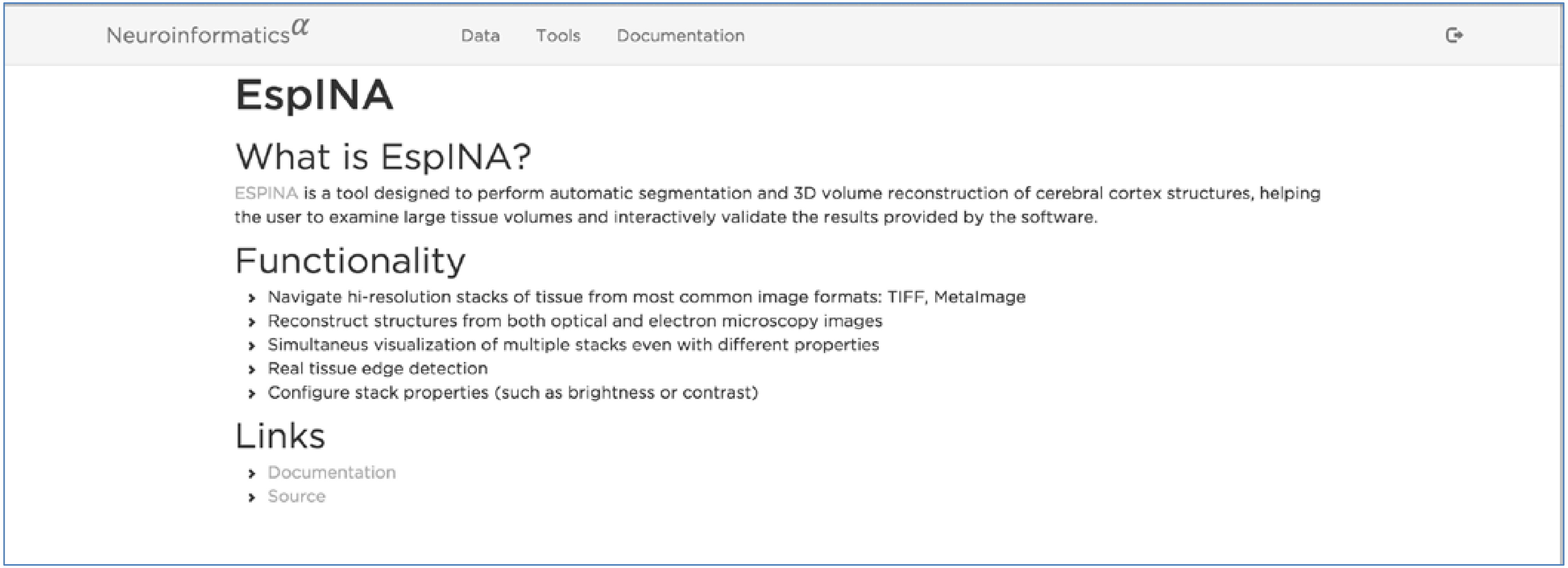


Figure 6: Screenshot of Structural Analysis Tools

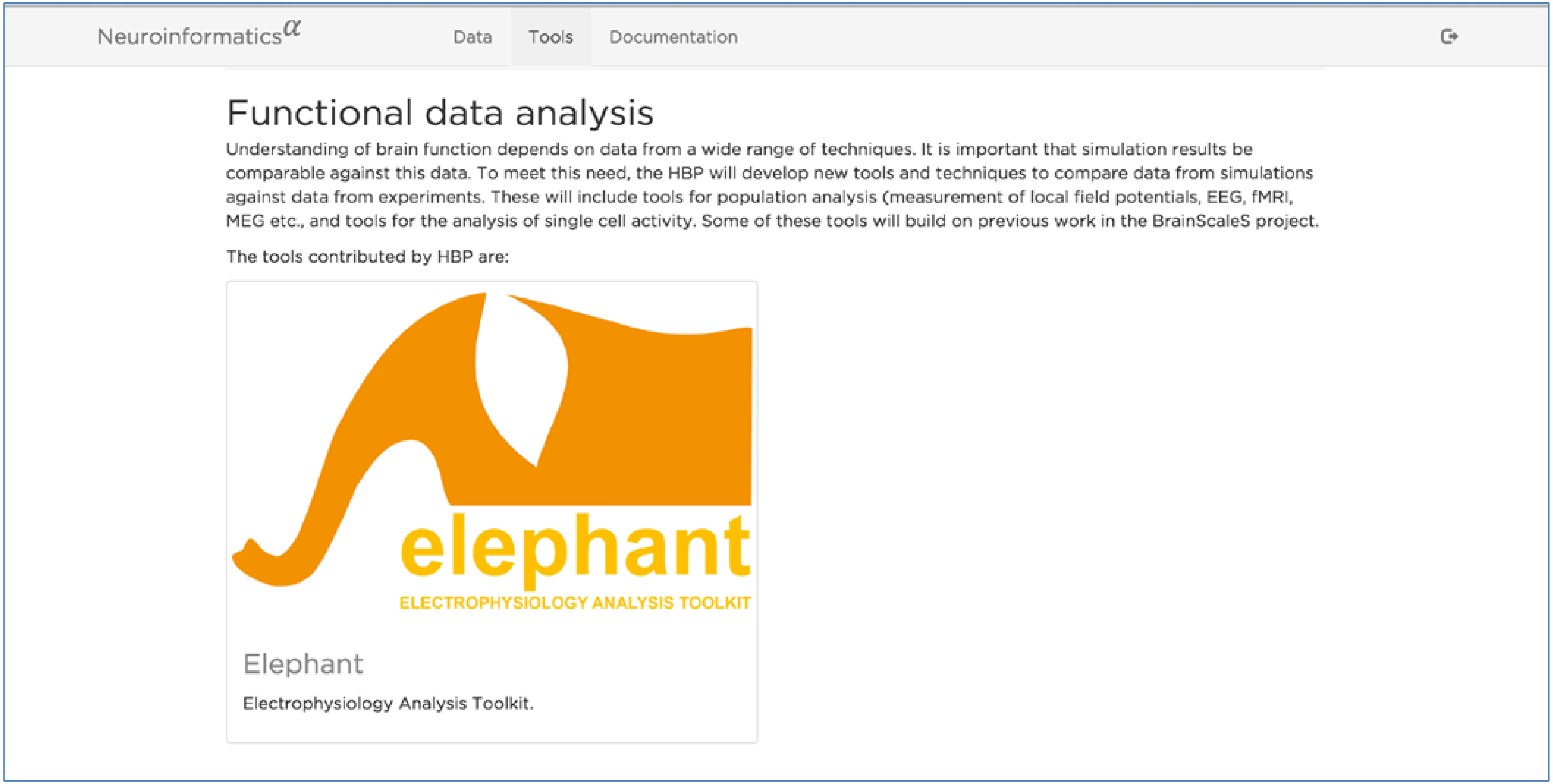
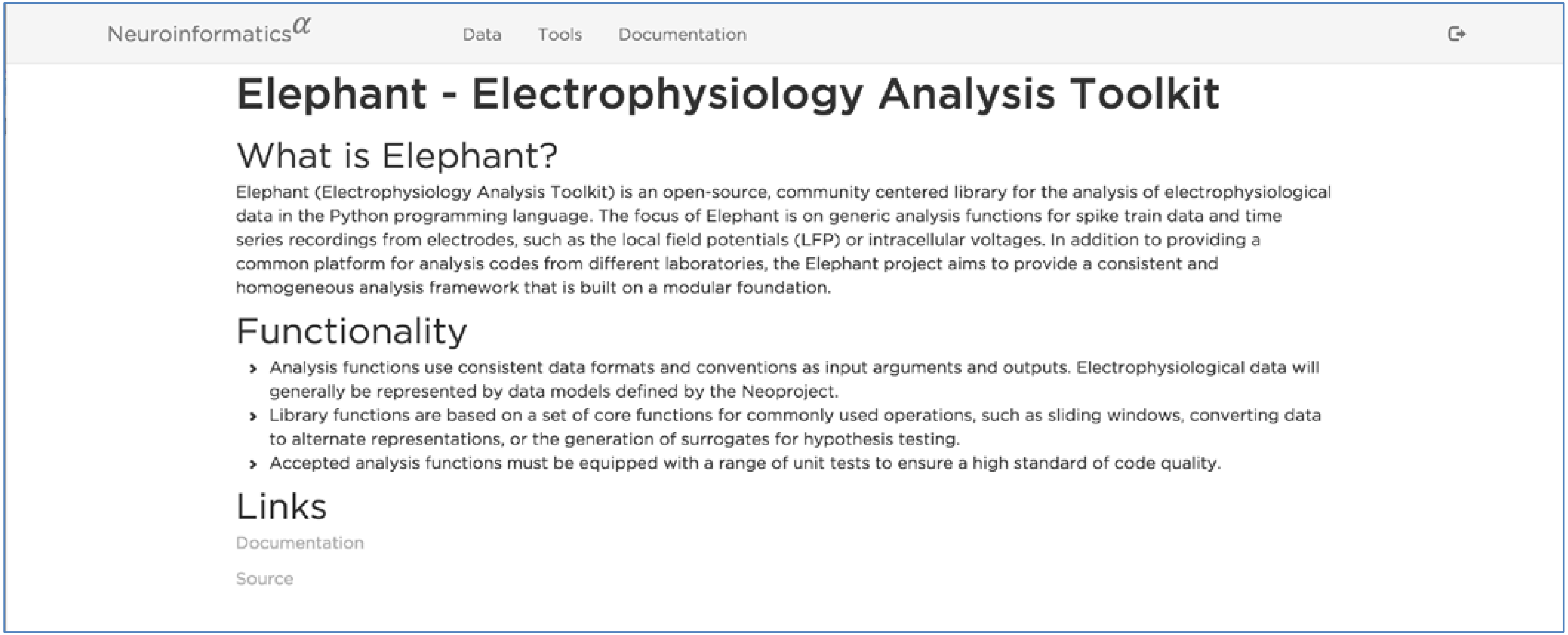


Figure 7: Screenshot of Functional Analysis Tools



Neuroinformatics α Data Tools Documentation

Elephant - Electrophysiology Analysis Toolkit

What is Elephant?

Elephant (Electrophysiology Analysis Toolkit) is an open-source, community centered library for the analysis of electrophysiological data in the Python programming language. The focus of Elephant is on generic analysis functions for spike train data and time series recordings from electrodes, such as the local field potentials (LFP) or intracellular voltages. In addition to providing a common platform for analysis codes from different laboratories, the Elephant project aims to provide a consistent and homogeneous analysis framework that is built on a modular foundation.

Functionality

- Analysis functions use consistent data formats and conventions as input arguments and outputs. Electrophysiological data will generally be represented by data models defined by the Neoproject.
- Library functions are based on a set of core functions for commonly used operations, such as sliding windows, converting data to alternate representations, or the generation of surrogates for hypothesis testing.
- Accepted analysis functions must be equipped with a range of unit tests to ensure a high standard of code quality.

Links

Documentation

Source

Figure 8: Screenshot of Functional Analysis Tools

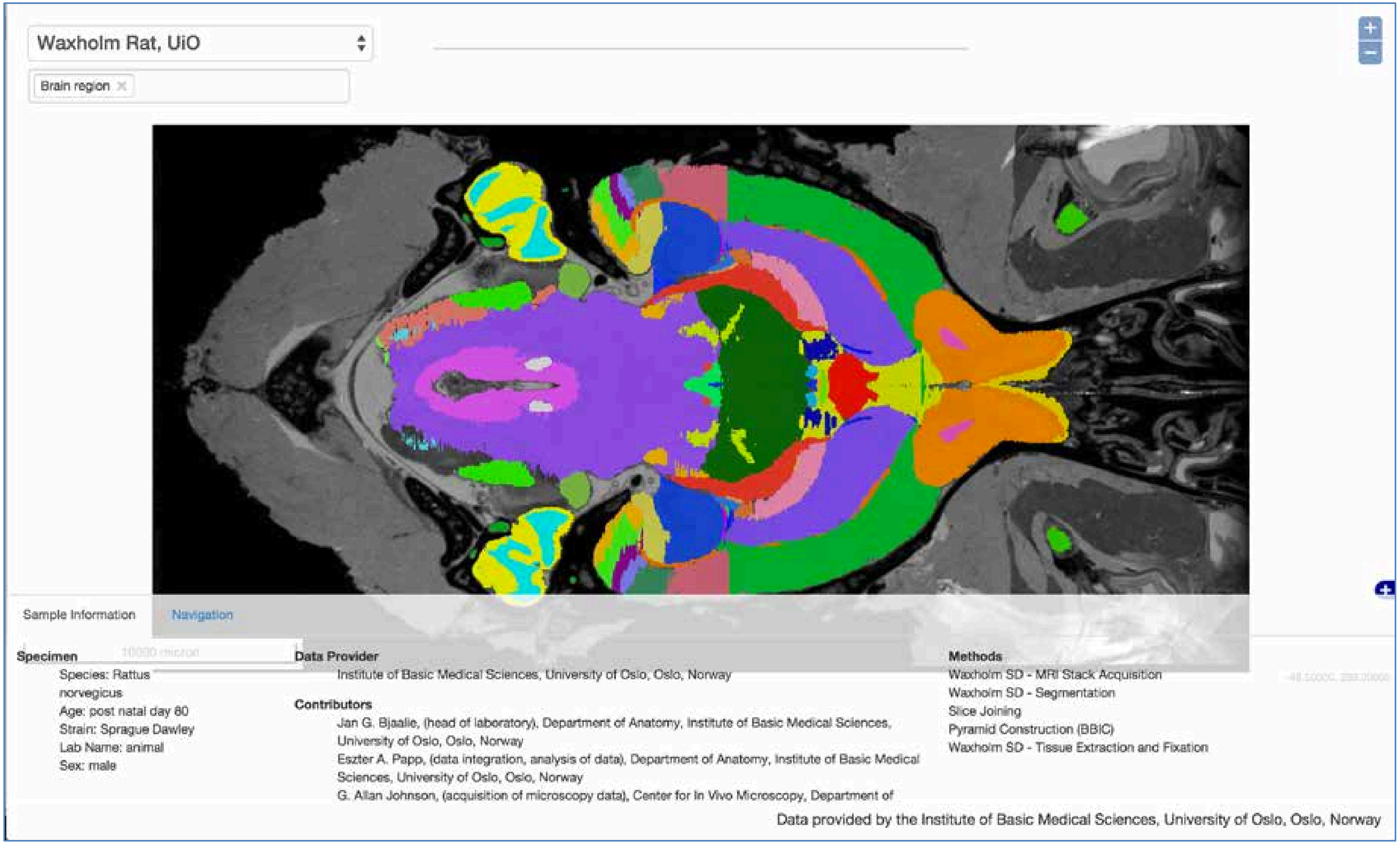


Figure 9: Screenshot of Waxholm Brain Atlas

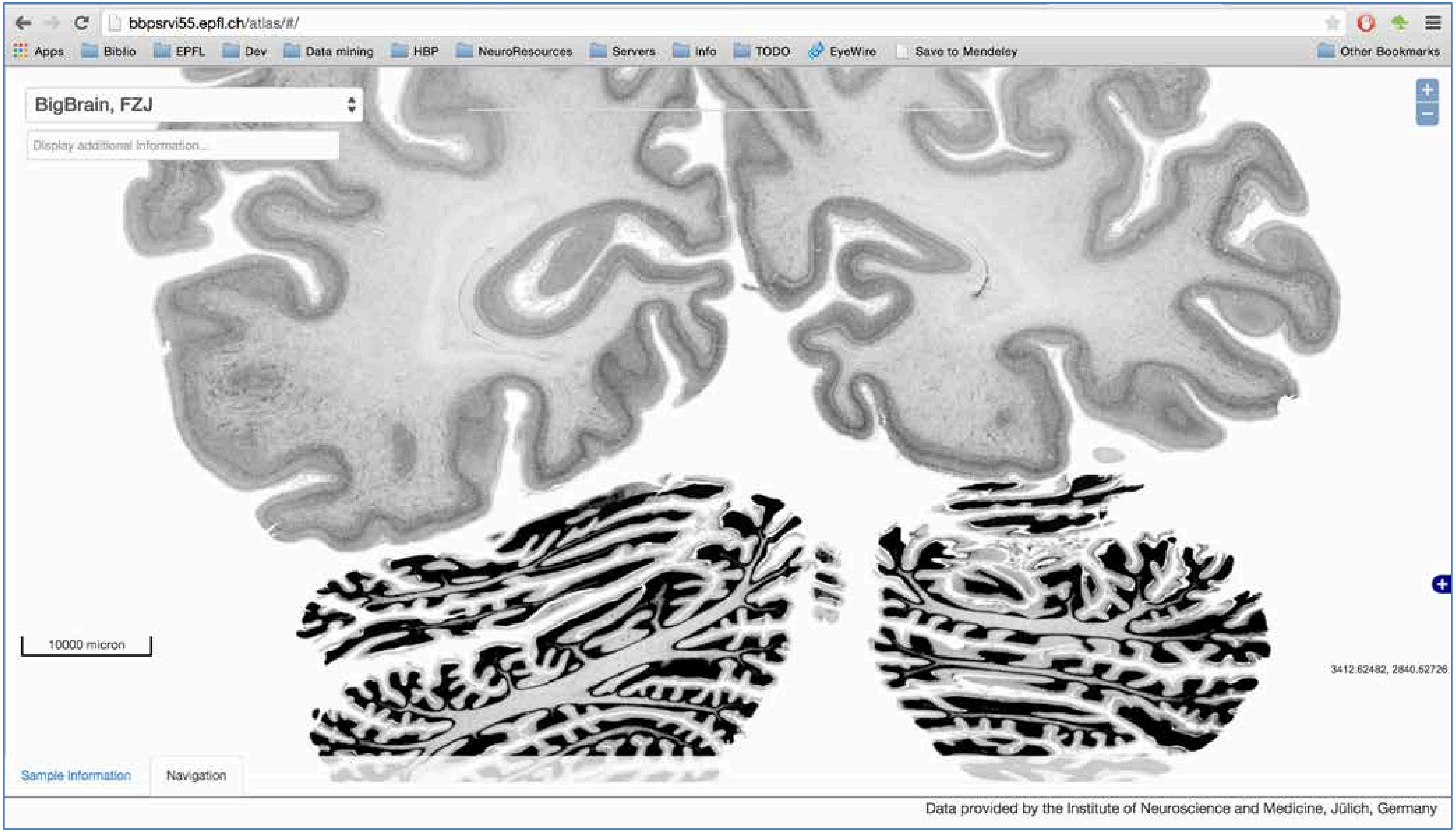
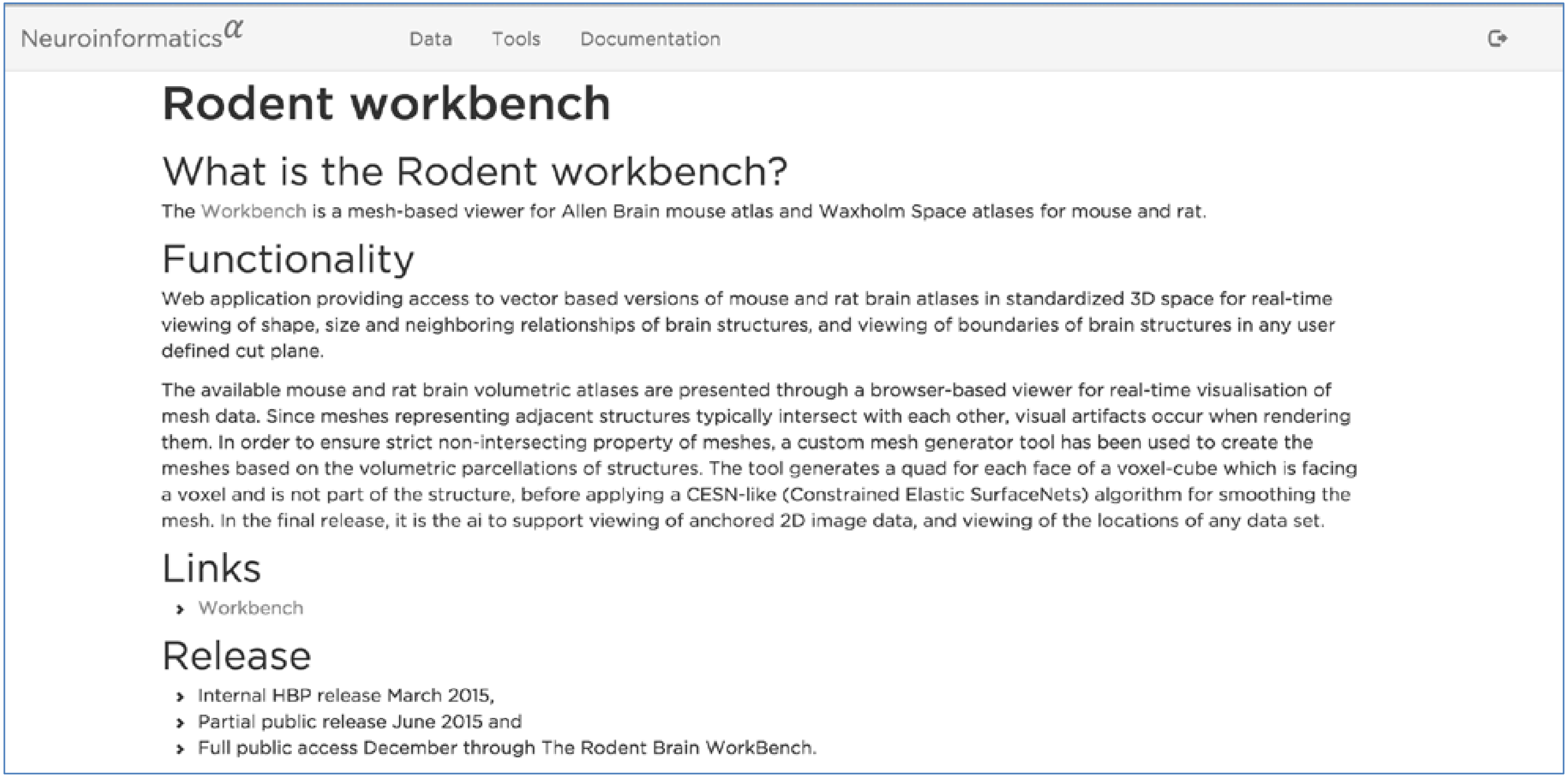


Figure 10: Screenshot of Human Brain Atlas



Neuroinformatics$^{\alpha}$ Data Tools Documentation

Rodent workbench

What is the Rodent workbench?

The Workbench is a mesh-based viewer for Allen Brain mouse atlas and Waxholm Space atlases for mouse and rat.

Functionality

Web application providing access to vector based versions of mouse and rat brain atlases in standardized 3D space for real-time viewing of shape, size and neighboring relationships of brain structures, and viewing of boundaries of brain structures in any user defined cut plane.

The available mouse and rat brain volumetric atlases are presented through a browser-based viewer for real-time visualisation of mesh data. Since meshes representing adjacent structures typically intersect with each other, visual artifacts occur when rendering them. In order to ensure strict non-intersecting property of meshes, a custom mesh generator tool has been used to create the meshes based on the volumetric parcellations of structures. The tool generates a quad for each face of a voxel-cube which is facing a voxel and is not part of the structure, before applying a CESN-like (Constrained Elastic SurfaceNets) algorithm for smoothing the mesh. In the final release, it is the ai to support viewing of anchored 2D image data, and viewing of the locations of any data set.

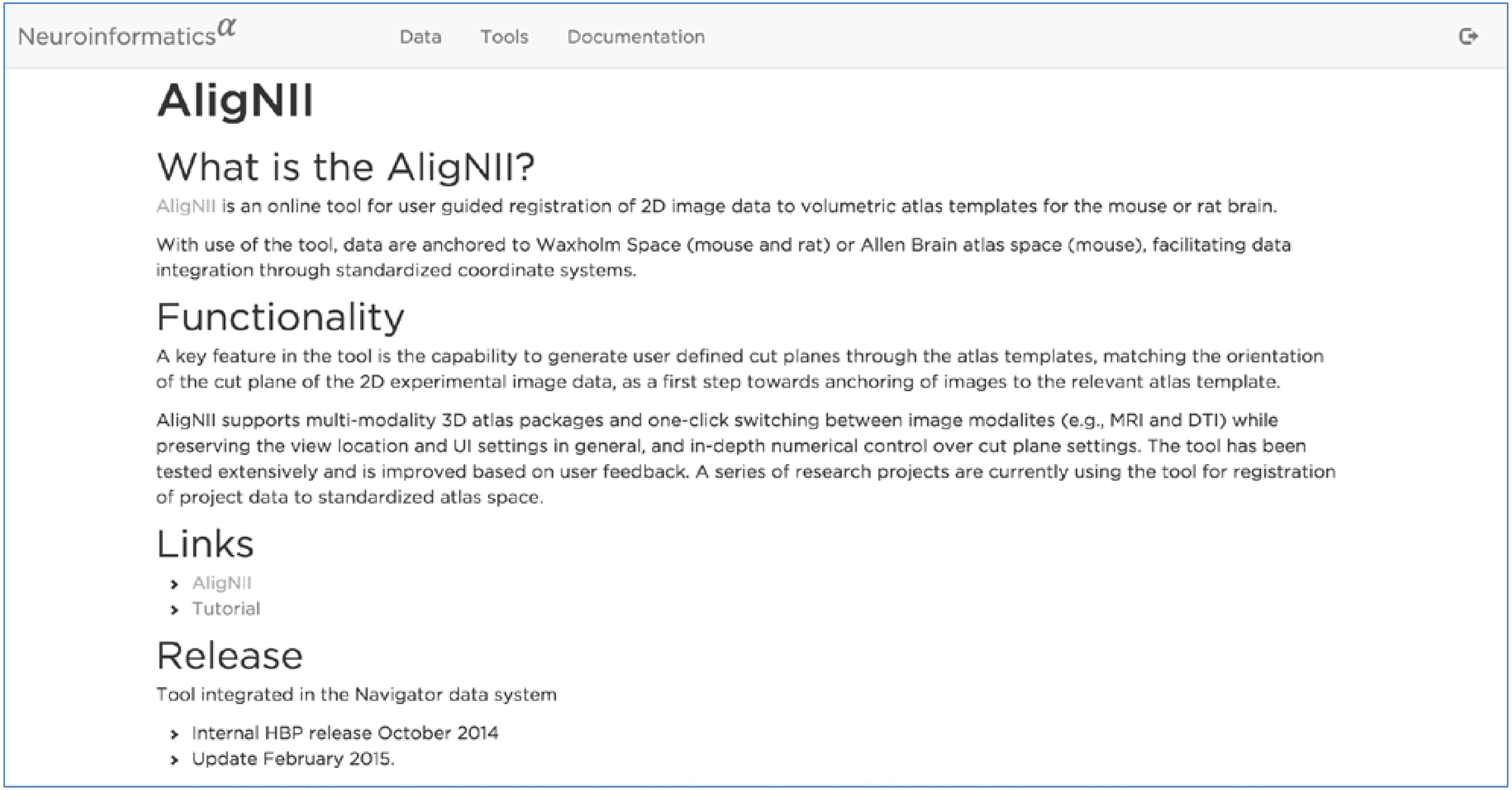
Links

- Workbench

Release

- Internal HBP release March 2015,
- Partial public release June 2015 and
- Full public access December through The Rodent Brain WorkBench.

Figure 11: Screenshot of Rodent Workbench



Neuroinformatics$^{\alpha}$ Data Tools Documentation

AligNII

What is the AligNII?

AligNII is an online tool for user guided registration of 2D image data to volumetric atlas templates for the mouse or rat brain.

With use of the tool, data are anchored to Waxholm Space (mouse and rat) or Allen Brain atlas space (mouse), facilitating data integration through standardized coordinate systems.

Functionality

A key feature in the tool is the capability to generate user defined cut planes through the atlas templates, matching the orientation of the cut plane of the 2D experimental image data, as a first step towards anchoring of images to the relevant atlas template.

AligNII supports multi-modality 3D atlas packages and one-click switching between image modalites (e.g., MRI and DTI) while preserving the view location and UI settings in general, and in-depth numerical control over cut plane settings. The tool has been tested extensively and is improved based on user feedback. A series of research projects are currently using the tool for registration of project data to standardized atlas space.

Links

- AligNII
- Tutorial

Release

Tool integrated in the Navigator data system

- Internal HBP release October 2014
- Update February 2015.

Figure 12: Screenshot of AligNII: Atlas Registration Tool

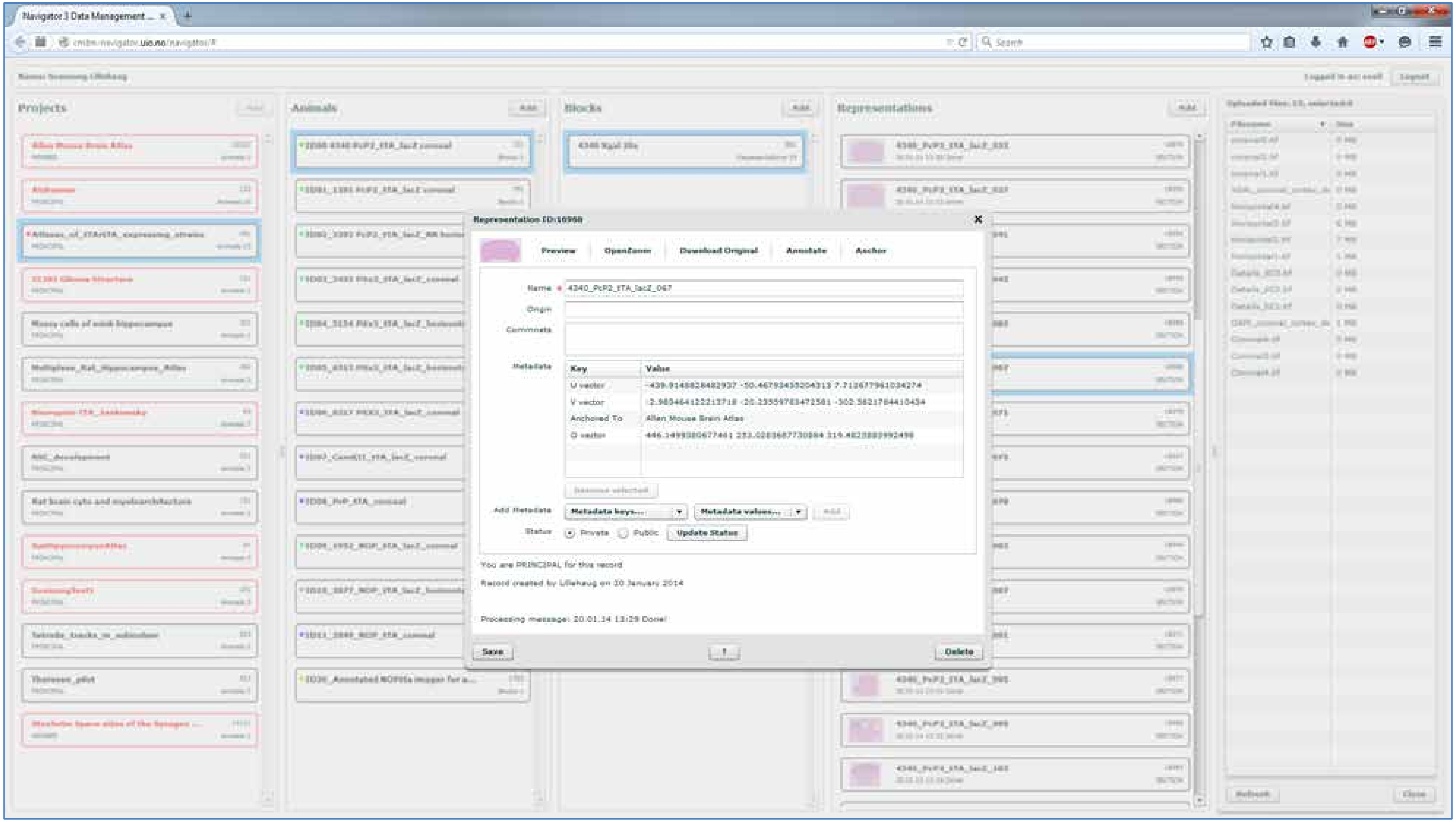


Figure 13: Screenshot of AligNII Showing the Results of Data Anchoring

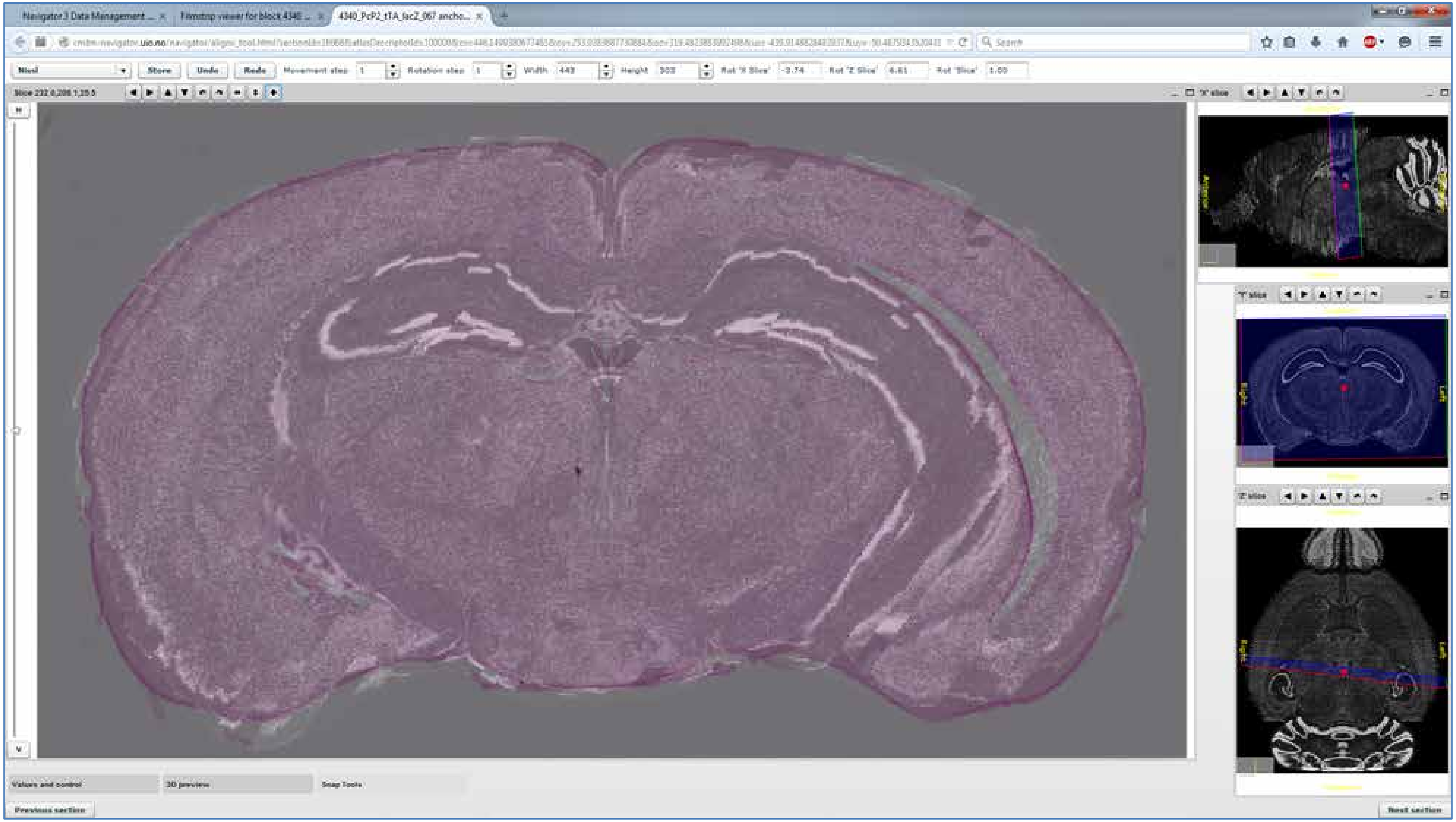


Figure 14: Screenshot of Atlas Viewer in AligNII

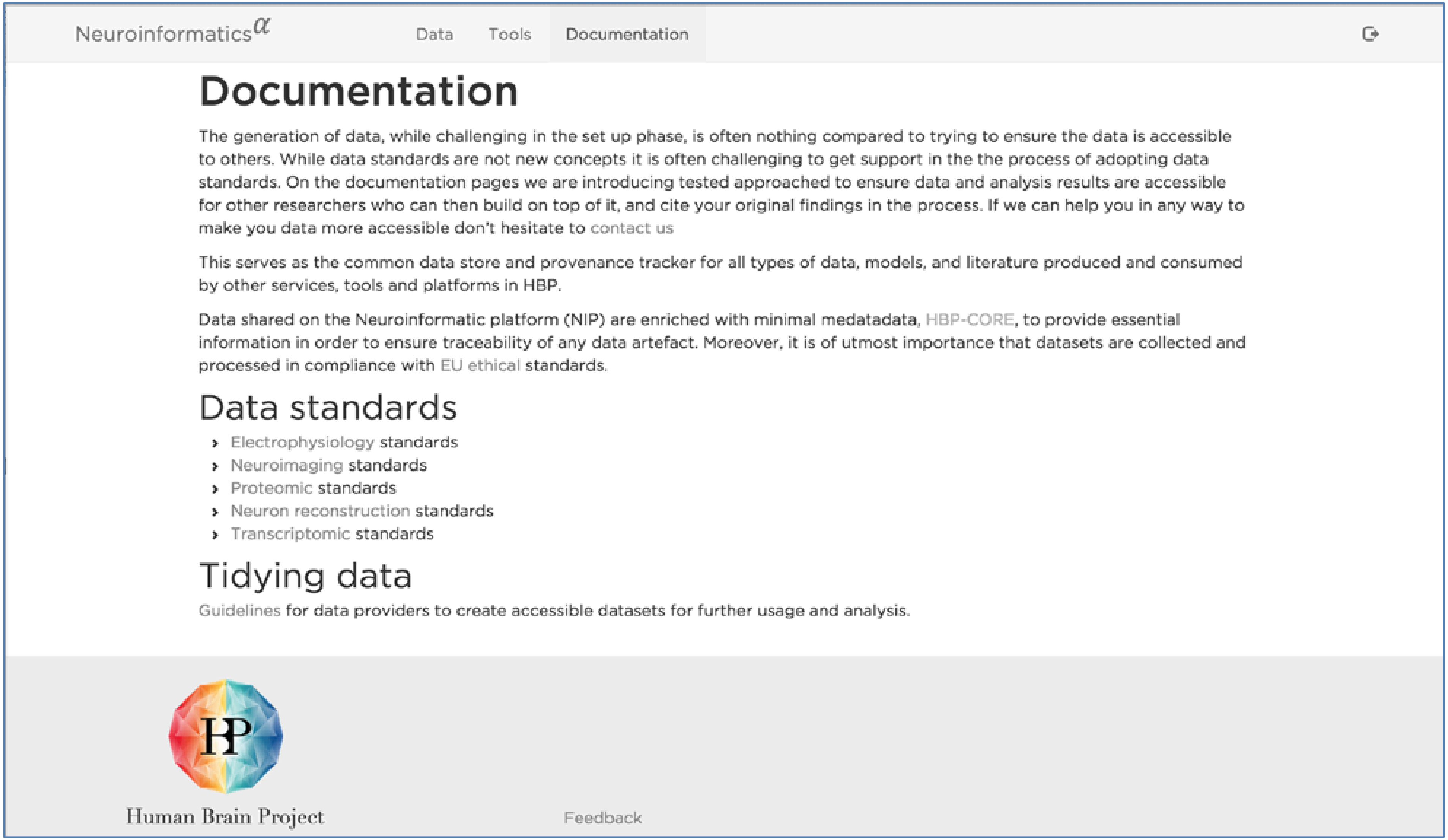


Figure 15: Screenshot of Documentation