HBP SCIENCE MARKET

NEURO-INFORMATICS PLATFORM

SP5

What we do

Understanding the brain requires that huge amounts of complex data collected at many levels of investigation and with a multitude of methods be combined. Such data integration can be compared to a multi-dimensional puzzle consisting of data about genes and molecules, cells, connections and networks, regions of and the whole brain, plus cognition and behaviour. Fitting data together from this puzzle into meaningful information – a gigantic challenge - is one of the main goals of the Human Brain Project (HBP).
We provide the informatics tools and services that make data integration in HBP possible. Data from the brain produced in other Subprojects are organized and managed, then made available for collaborative use by all researchers in HBP and the wider neuroscience community. The online web services that will make this possible are being established stepwise and we will demonstrate several of the tools and services that are currently in place.
SP5 tools are used to tag the data with important additional information. Such "metadata" explain what the data are about, how they are collected, where in the brain they are from, and what they represent. This will make it possible to search and find data, aimed at advanced analysis of new combinations of data. Data are stored at the supercomputer centres in Europe managed by SP7, and the same computing services will embed analytical tools and workflows from SP5, providing increased capacity and capability for analysis of brain data, feeding information into the computational modelling and simulation of the brain taking place in other HBP Subprojects.

How we are organised

WP5.1 DATA CURATION SUPPORT LAB. We aim to make HBP data and models discoverable and accessible (already pledged to the HBP community), via metadata enrichment and storage in a federated data infrastructure. Users can curate and share data or models with other HBP researchers in the open data domain and reach high data consistency levels.
WP5.2 MULTI-LEVEL ATLAS OF THE RODENT BRAIN. This WP aims to integrate heterogeneous multi-level rodent brain data in common reference atlases, and provide services for exploration, enrichment and analysis. Spatially anchored data, organized in the KnowledgeGraph, can be shared with the research community for use in data mining and predictive neuroinformatics.
WP5.3 MULTI-LEVEL ATLAS OF THE HUMAN BRAIN. This WP does for the human brain what WP5.2 does for that of the mouse.

WP5.4 DATA AND ATLAS CURATION TOOLS. The aim of this WP is to deliver a suite of tools for data curation, spatial integration or 2D and 3D viewing of multi-level human/rodent brain image data.
WP5.5 COMMUNITY-DRIVEN NEUROINFORMATICS PLATFORM AND INFRASTRUCTURE OPERATIONS. We aim to develop and operate the service infrastructure required for an engaging, community centric, multi-level, multi-modal open data ecosystem.
WP5.6 DATA MINING AND ANALYSIS NEUROINFORMATICS CAPABILITIES. This WP brings learning-based image analysis to HBP neuroscientists by creating the ilastik toolkit, a simple, user-friendly tool for interactive image classification, segmentation, and analysis of neural images.
WP5.7 TOOLS AND CURATION FOR INTEGRATED PARALLELIZED ANALYSIS OF ACTIVITY DATA. We aim to enable users to work with dynamic functional data from experiments or simulations by providing tools and services to integrate and analyse activity data, e.g. those from neuron spiking.
WP5.8 MANAGEMENT AND COORDINATION. This WP coordinates SP activities and maintains an efficient and proactive relationship with other SPs and the broader science community, including securing integration of the Neuroinformatics Platform into other relevant services.

SP LEADER Jan BJAALIE
DEPUTY SP LEADER Sten GRILLNER
WORK PACKAGE LEADERS
- WP5.1 Data Curation Support Lab: Martin TELEFONT
- WP5.2 Multi-level Atlas of the Rodent Brain: Jan BJAALIE
- WP5.3 Multi-Level Atlas of the Human Brain: Timo DICKSCHEID
- WP5.4 Data and Atlas Curation Tools: Jan BJAALIE
- WP5.5 Community-Driven Neuroinformatics Platform and Infrastructure Operations: Jeff MULLER
- WP5.6 Data Mining and Analysis Neuroinformatics Capabilities: Fred HAMPRECHT
- WP5.7 Tools and Curation for Integrated Parallelized Analysis of Activity Data.: Sonja GRÜN
- WP5.8 Management and Coordination: Jan BJAALIE

SP MANAGER Sofia ANDERHOLM STRAND

Publication highlights:

Amunts K, Hawrylycz MJ, Van Essen DC, Van Horn JD, Harel N, Poline JB, et al. *Interoperable atlases of the human brain.* Neuroimage. 2014;99:525–532.

Amunts K, Lepage C, Borgeat L, Mohlberg H, Dickscheid T, Rousseau MÉ, et al. *BigBrain: an ultrahigh-resolution 3D human brain model.* Science 2013;340:1472–1475.
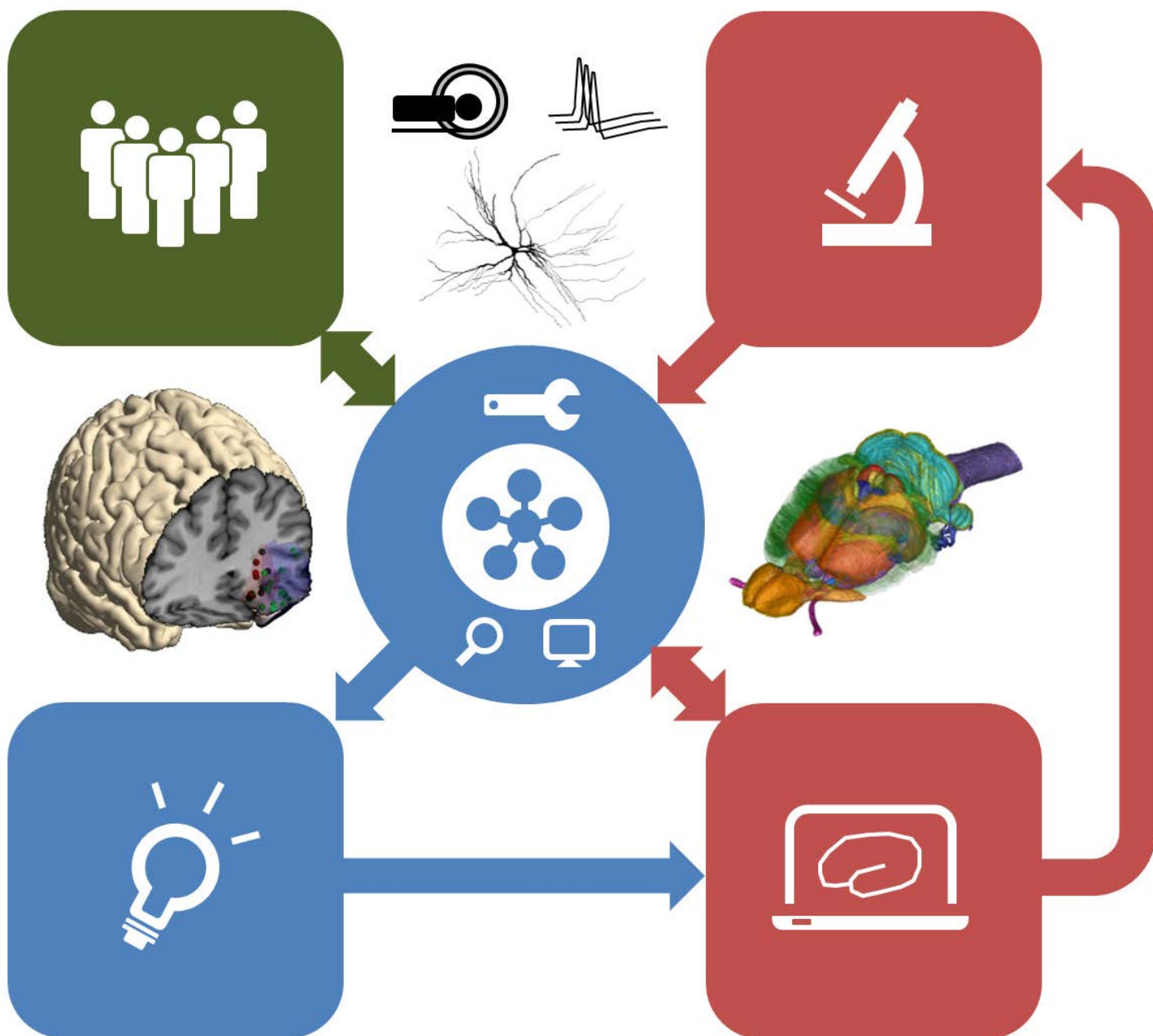
Grillner, S. *Megascience efforts and the brain.* Neuron 2014;82:1209-1211.

Papp EA, Leergaard TB, Calabrese E, Johnson GA, Bjaalie JG. *Waxholm Space atlas of the Sprague Dawley rat brain.* Neuroimage 2014;97:374–386.

Tiesinga P, Bakker R, Hill S, Bjaalie JG. *Feeding the human brain model.* Curr Opin Neurobiol 2015;32:107–114.

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