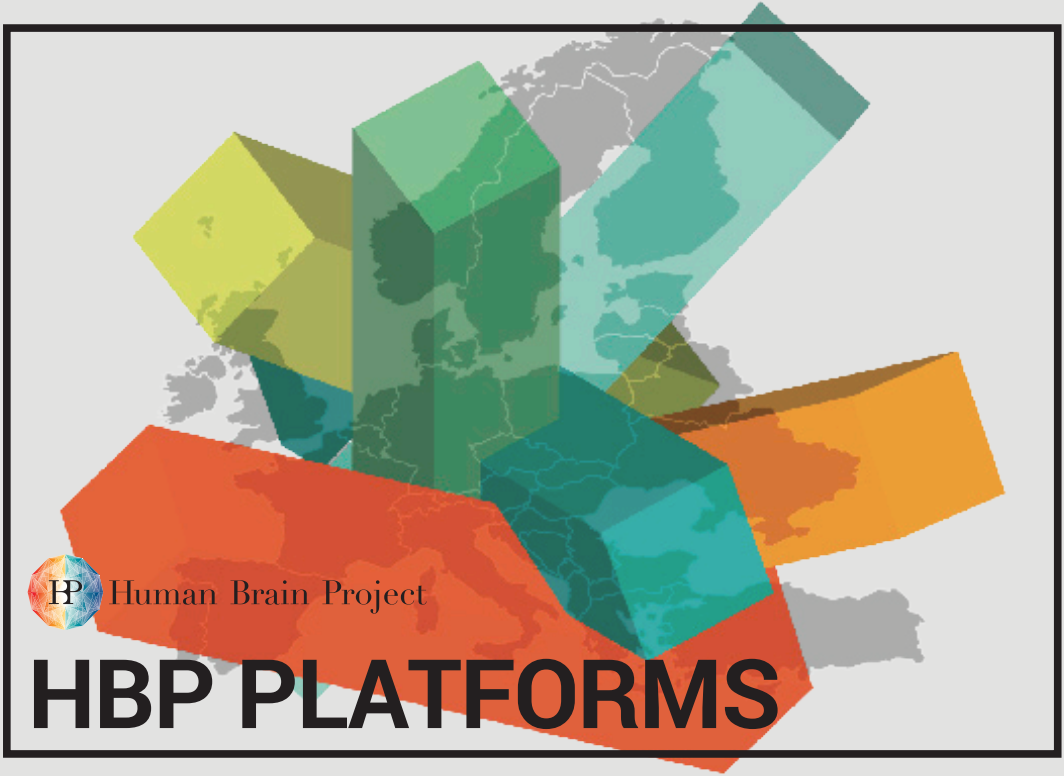

Human Brain Project
HBP PLATFORMS

Co-funded by
the European Union

The worldwide scientific community can now start exploring the initial versions of the HBP's six ICT Platforms.

The Platforms reflect the HBP's key objectives : to gather and disseminate data describing the brain, to simulate and build models of the brain, to develop brain-inspired computing and robotics, and to create a global scientific community around the developing research infrastructure.

The Platforms consist of prototype hardware, software tools, databases, programming interfaces, and initial datasets, which will be refined and expanded on an on-going basis in close collaboration with end users.

The Platforms are the result of an extensive multidisciplinary effort, involving more than 750 scientists and engineers from over 100 institutions.

Learn more at **https://www.humanbrainproject.eu/platforms-overview**

@HumanBrainProj **/HumanBrainProj** **/TheHumanBrainProject**


Human Brain Project
HBP COLLABORATORY

HBP Collaboratory

Co-funded by
the European Union

The HBP Collaboratory collects tools from the HBP Platforms in one place and allows you to organise them into your own collaborative workspace or 'collab'. Users can:

- Create a collab, a collaborative scientific workspace
- Build a team
- Describe a project for the collab team and the world
- Collect and organise tools
- Share data
- Use Jupyter notebooks to share ideas, code and workflows

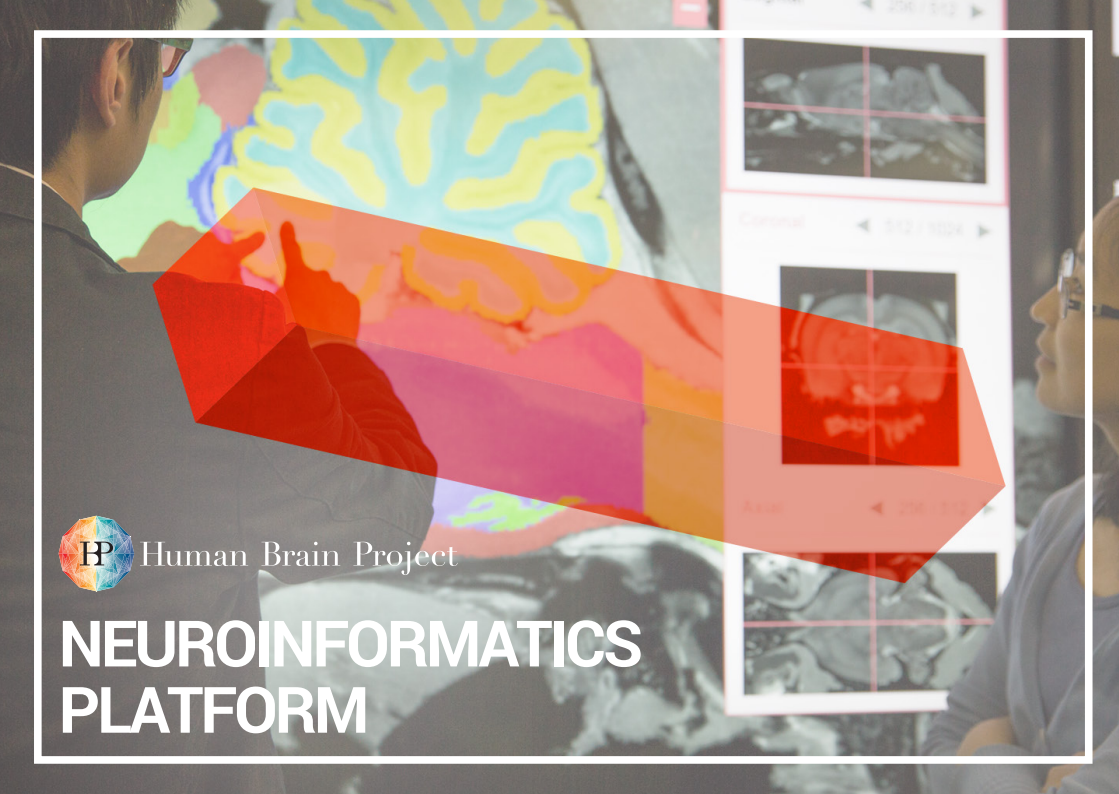
Anyone with an HBP Identity Account can access the Collaboratory and create a collab.

HBP Identity Accounts are available by invitation. This account does not make you an HBP Member, but it gives you access to many of the tools produced by the HBP.

There are three ways to receive an invitation:

- You can be invited by a current HBP Identity Account holder.
- If you are an HBP Project Member, please contact your SP Manager to receive an HBP Identity Account invitation.
- You can request an invitation by sending an email describing your interest in the HBP Platforms to platform@humanbrainproject.eu.

It's important to note that the use of the HBP Collaboratory and the HBP Platforms is subject to some restrictions. In most cases these restrictions are due to the limited computing or storage capacity powering the Platform service offerings. It may be possible to expand resource allocations for particular services if a strong scientific case can be made for the increased allocation.


Human Brain Project
NEUROINFORMATICS
PLATFORM

Neuroinformatics Platform

Co-funded by
the European Union

The Neuroinformatics Platform serves as the Human Brain Project's search engine for distributed data, curated data repositories, brain atlases and knowledge about the brain. The Platform consists of APIs for querying and a web-based platform and application programming interface (APIs), i.e. a set of standards, protocols and tools for building software applications.

Users can search and collate high quality neuroscience data generated within and outside the HBP. Data can be examined by species, contributing laboratory, methodology, brain region, and data type, thereby allowing functionality not currently available elsewhere. The data are predominantly organised into atlases (HBP Strategic Rodent Brain Atlases and HBP Human Brain Atlases) and linked to the KnowledgeSpace – a collaborative community-based encyclopaedia linking brain research concepts to the latest data, models and literature.

Please contact us at data.nip@humanbrainproject.eu if you would like to integrate your data into our community.

Learn more at **https://www.humanbrainproject.eu/nip**
NIP forum **https://forum.humanbrainproject.eu/**

@HumanBrainProj **/HumanBrainProj** **/TheHumanBrainProject**


Human Brain Project
BRAIN SIMULATION
PLATFORM

Brain Simulation Platform

Co-funded by
the European Union

Released in April 2016, the Human Brain Project's Brain Simulation Platform (BSP) is one of six internet-accessible ICT Platforms for collaborative brain research. The goal is to offer scientists user-friendly tools to reconstruct and simulate data-driven models of neurons and whole brain tissue. The Platform is the result of a co-design process in which HBP scientists and engineers worked hand in hand to provide an effective technical solution that satisfied the scientists' needs. A key driver was the Blue Brain Project's work to reconstruct and simulate neocortical microcircuitry in somatosensory cortex (Markram *et al*., *Cell*, 2015), and the application of Blue Brain techniques and workflows to other brain regions, notably cerebellum, hippocampus and the basal ganglia.

The Platform provides reconstruction and simulation pipelines, packaged into web-accessible workflows or showcased as use cases. Many of the fundamental software packages are freely available as open-source software. The BSP hosts team-science Collabs that use these workflows to model different types of neurons and synapses, and different brain regions. The unique functionality of the Platform also allows members of the worldwide neuroscience community to create their own Collabs, accelerating collaborative brain research and tackling research questions that are difficult to address through other means.

Learn more at **https://www.humanbrainproject.eu/bsp**
Technical questions/support at **bsp-support@humanbrainproject.eu**

@HBPBrainSim **/HumanBrainProj** Search for: **HBP Brain Simulation**

HIGH PERFORMANCE ANALYTICS AND COMPUTING PLATFORM

High Performance Analytics and Computing Platform

Co-funded by
the European Union

The High Performance Analytics and Computing (HPAC) Platform provides neuroscientists with the high performance computing (HPC), storage and data processing capabilities they need to run simulations of sophisticated, detailed brain models and to analyse large, complex datasets. It also provides software tools and frameworks for scientific visualisation, interactive and visual data analytics, performance analysis of parallel applications, data management, time-series analysis, dynamic load balancing, parallel programming models, and numerical models for brain simulations.

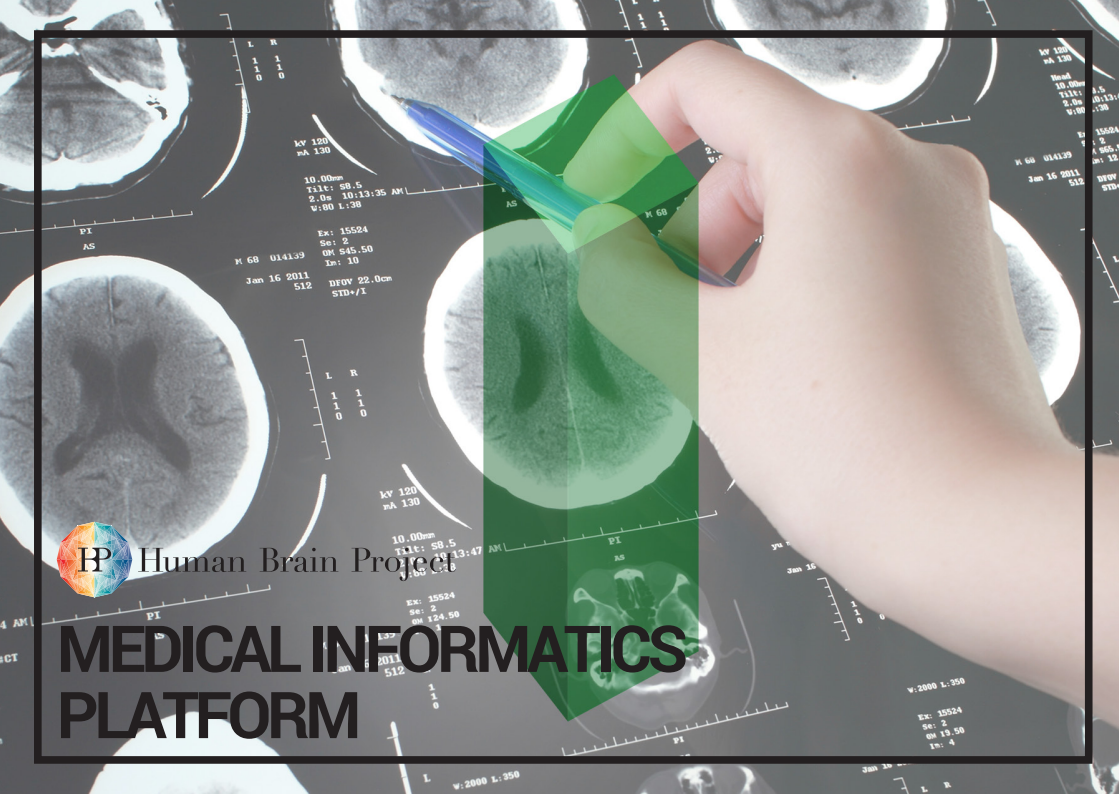
Some HPAC Platform users need computing resources themselves; others also would like to access datasets and results produced and stored at the HPC centres. The HPAC Platform offers software tools developed by the Platform partners for both groups of users. The execution of some of these tools, for example for visualisation and data management, does not necessarily require a supercomputer, but they can be used on standard computers and notebooks. Other software, like parallel programming frameworks, can be used on both types of architectures. Neuroscientists who would like to use a supercomputer need experience in programming with languages like C, C++, Python or Fortran. First experience with HPC is very helpful, but the HPC centres also offer introductory courses and support.

Learn more at **https://www.humanbrainproject.eu/hpac**

@HumanBrainProj

/HumanBrainProj

/TheHumanBrainProject


Human Brain Project
MEDICAL INFORMATICS PLATFORM

Medical Informatics Platform

Co-funded by
the European Union

The aim of the Medical Informatics Platform is to provide researchers with the ability to access and analyse large amounts of anonymised clinical data from hospital, research, and pharmaceutical clinical trial databases through an innovative data management system.

The system integrates heterogeneous data formats seamlessly and federates data sources into a harmonised virtual database with a customised interface for navigation and data mining. The patterns discovered in the data ("biological signatures" which uniquely identify diseases) will generate new hypotheses about brain diseases for investigation, and will lead to novel disease classifications based on biological, physiological and anatomical features, in addition to the classical patterns of phenomenology expressed in symptoms, signs and syndromes. The data will also be available to answer public health and medical epidemiological questions proposed by the community of medical scientists and planners. In the long run, we believe that unlocking the wealth of information stored in medical and research databases will provide a credible and rapid path to precision (or personalised) medical care.

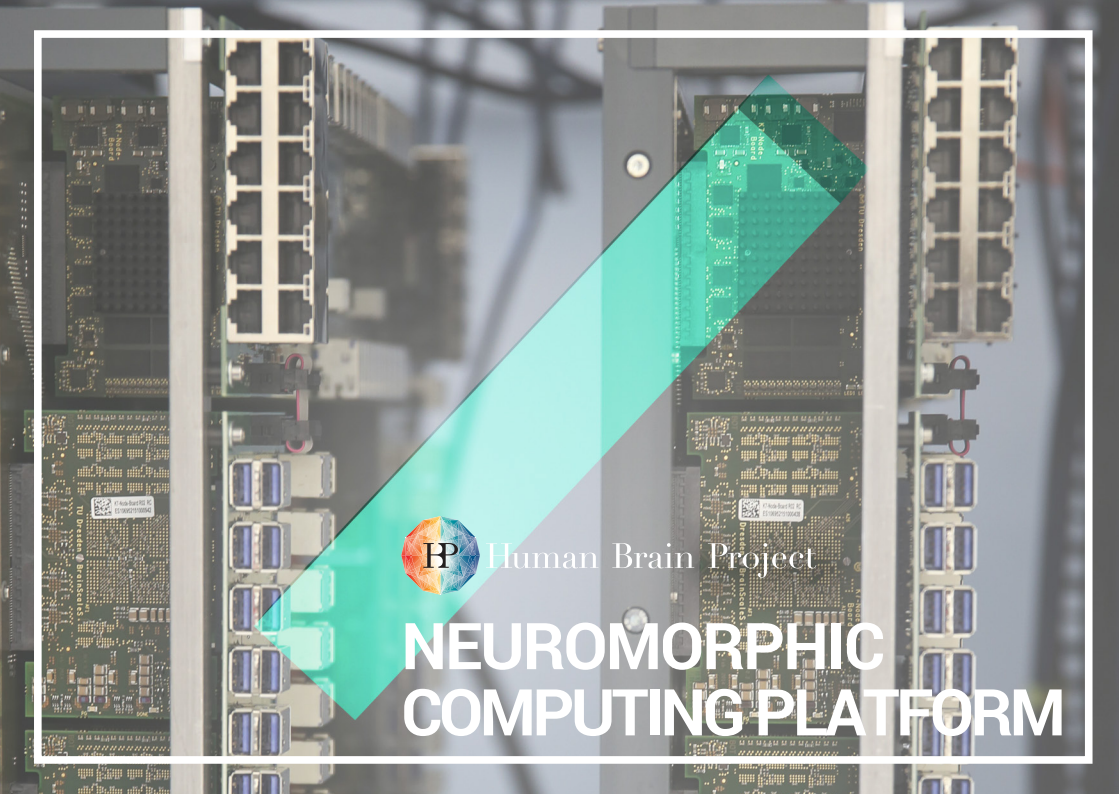
Our interaction with the computing and neuroscience components of the HBP will serve to test with lesion models the functional and structural brain models and artifacts they produce.

Learn more at **https://www.humanbrainproject.eu/mip**

@HumanBrainProj

/HumanBrainProj

/TheHumanBrainProject


Human Brain Project
NEUROMORPHIC
COMPUTING PLATFORM

Neuromorphic Computing Platform

Co-funded by
the European Union

The Neuromorphic Computing Platform developed in the HBP provides remote access to two complementary, large-scale Neuromorphic computing systems (NCS) built in custom hardware at locations in Heidelberg (the BrainScaleS system) and Manchester (the SpiNNaker system).

The NCS are programmable, brain-inspired computing devices which enable high-speed, low-energy simulations of spiking neural networks with synaptic plasticity.

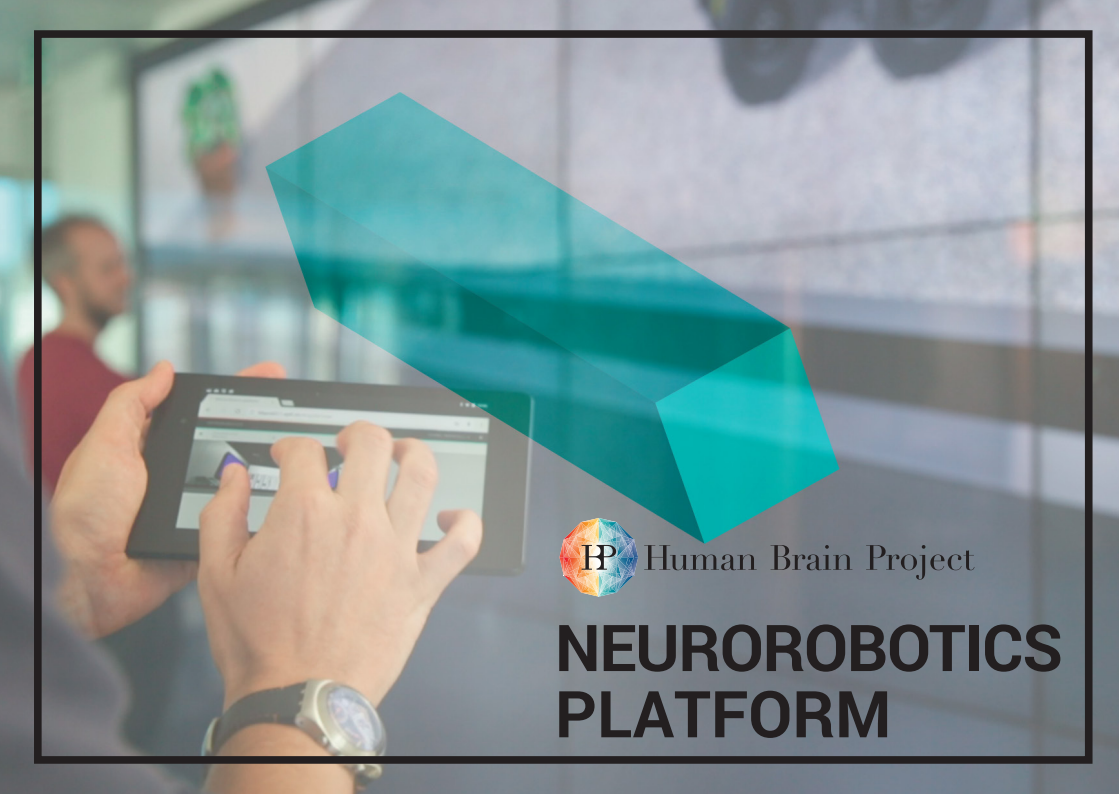
The BrainScaleS system is based on physical (analogue or mixed-signal) emulations of neuron, synapse and plasticity models with digital connectivity, running up to ten thousand times faster than real time.
The SpiNNaker system is based on numerical models running in real time on custom digital multicore chips using the ARM architecture.
Models and simulation experiments are described in a Python script using the PyNN API. Experiments can be submitted in your browser through the HBP Collaboratory or via our web API (Python client available). Similarly, once the simulation is complete you can view the results in your browser, download data files via the web API, or transfer the data to the HBP High Performance Analytics and Computing platform for further analysis.

Learn more at **https://www.humanbrainproject.eu/ncp**

@HumanBrainProj

/HumanBrainProj

/TheHumanBrainProject


Human Brain Project
NEUROROBOTICS
PLATFORM

Neurorobotics Platform

Co-funded by
the European Union

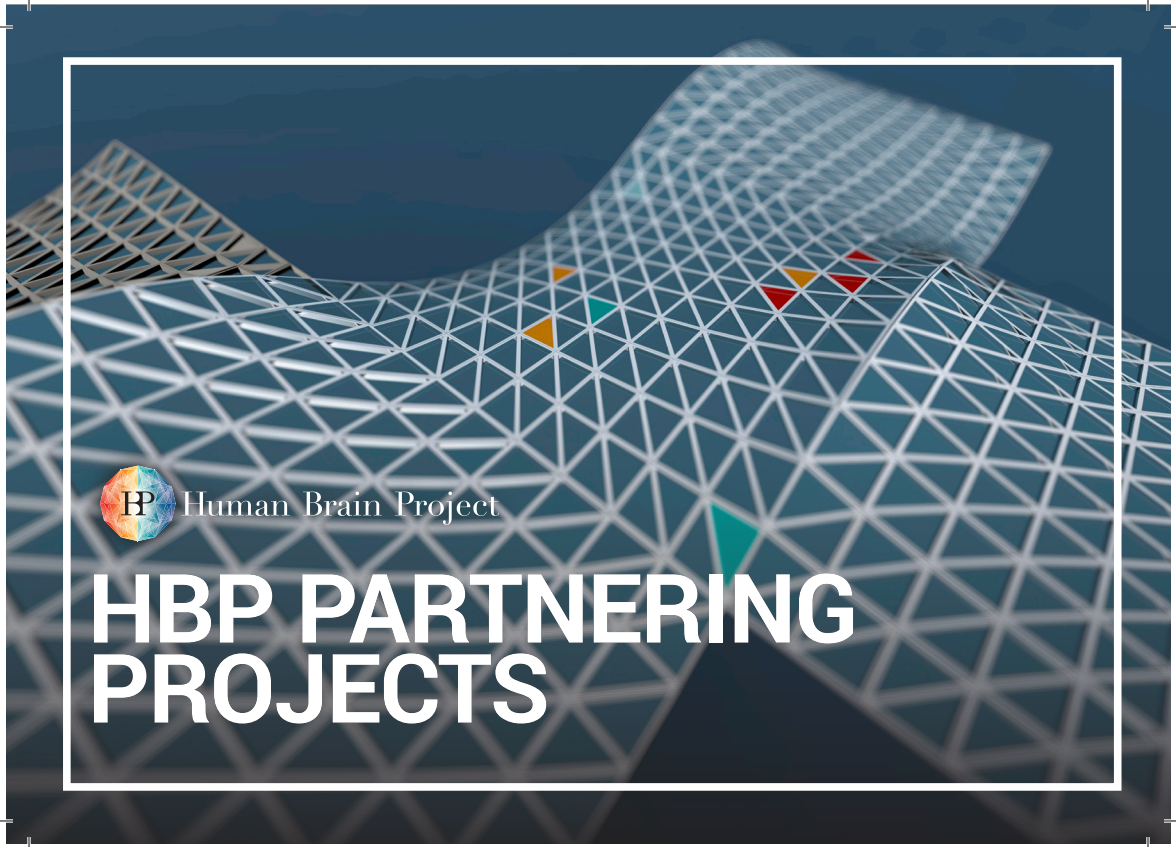
The Neurorobotics Platform (NRP) is an Internet-accessible simulation system that allows the simulation of robots and environments controlled by spiking neural networks.

The Platform enables simple virtual closed-loop experiments in cognitive neuroscience to be performed using brain models developed within the HBP, with the capability to customise several variables, such as the environmental and physical parameters, using a Robot Designer, Environment Builder and a Closed Loop Engine.

The Neurorobotics Platform is a collaborative tool that enables researchers to easily share and re-use experiments.

Learn more at **https://www.humanbrainproject.eu/nrp**
http://neurorobotics.net

@HBPNeurorobotic **/neurorobotics** **/TheHumanBrainProject**


Human Brain Project
HBP PARTNERING PROJECTS

HBP Partnering Projects

Co-funded by the European Union

The HBP's main objective is to facilitate and support a global, united effort to understand the brain by providing platforms and tools along with neuroscientific and medical data, to study the brain, its diseases and to catalyze new brain-inspired technologies.

We welcome research and innovation initiatives in Europe and beyond that share our aims and objectives to join us as a Partnering Project.

A Partnering Project is independently funded and undertakes research, innovation and networking activities of mutual interest in cooperation with members of the HBP, including:

- Research that adds novel capabilities to the 6 ICT platforms
- Research that uses the ICT platforms to address previously intractable issues in neuroscience
- Develop novel computing and robotics technologies and applications
- Improve understanding, diagnosis and treatment of brain disorders
- Use the ICT platforms to innovate in any field profiting from technology and tools developed by the Core Project

Learn more at **www.humanbrainproject.eu/partnering-projects**

@HumanBrainProj

/HumanBrainProj

/TheHumanBrainProject