Human Brain Project

THE HUMAN BRAIN PROJECT AND ITS MISSION

The Human Brain Project (HBP) is now in its final phase and has continuously evolved to deliver cutting-edge neuroscience and brain-inspired innovation. Scientifically, we focus on three main interconnected areas: brain networks across different spatial and temporal scales, their significance for consciousness and its disorders, and the development of artificial neural networks and neurorobotics. This research goes hand in hand with creating EBRAINS, a unique European research infrastructure to investigate the brain. By delivering powerful tools for neuroscience in the digital age, EBRAINS creates synergy between brain research, medicine and technology. It serves to accelerate research on understanding the brain, speeds up development of new treatments and diagnostics for patients with brain diseases, and inspires future computing including deep learning. Recently recognized as one of the best-in-class research infrastructures by the influential ESFRI roadmap 2021, EBRAINS is on track to become a fixture in the European Research landscape.

The HBP is a 10-year European Flagship project, aiming at a comprehensive understanding of the human brain. To achieve this, the HBP combines excellent neuroscience research with the development of a joint platform for research and brain-inspired technology development (EBRAINS).

The HBP is following a unique, multi-disciplinary approach to accelerate brain research, brain medicine and brain-inspired technology. The infrastructure makes available a growing range of data, models, software tools and hardware capabilities to scientists and industry.

The HBP draws on the academic prowess of Europe's leading universities and research institutions, backed by the computing and data-analytics power of FENIX, a network of five major supercomputing centres in Europe.

The HBP also looks at the social and ethical implications of its work; this includes reflection on our understanding of consciousness, animal research, patient anonymity, etc., and engages with the public on these issues. It also runs a comprehensive education programme to increase scientists' and engineers' ability to work in cross-disciplinary teams.

Prof. Katrin Amunts
HBP Scientific Research Director

Paweł Świeboda
EBRAINS CEO &
HBP Director General

Brain science and computing: a productive loop

Only possible with ICT
The human brain has 86 billion nerve cells, each with up to 10,000 connections. Modern supercomputers help researchers handle this complexity.

Emulate capabilities
The brain has many unique features that machine learning systems still can't compete with. Brain-inspired chip design and algorithms provide a new avenue for progress.

Advancing brain related medicine
ICT helps us to analyse data from thousands of patients, facilitating diagnosis and opening the way to better treatments.

Boost ICT efficiency
Most modern ICT is programmed slowly, at huge cost. The brain learns quickly and spontaneously, with no need for programming.

Virtual labs
Simulations of the brain allow us to perform experiments that would be impossible in humans or in animals, and help to accelerate the development of new therapies.

Inspire IT flexibility
The brain uses different strategies to solve a problem and learns quickly. Future supercomputing is becoming modular and more flexible to handle complex workflows.
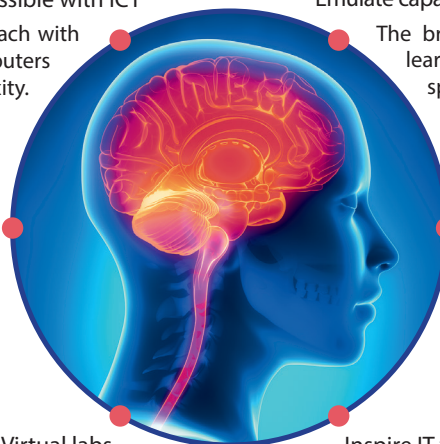
Key figures

Over 100 Partners in 17 countries

Over 68 Associated Members

33 Partnering Projects currently running (64 total)

More than 500 contributing scientists and engineers all over Europe

Estimated EU funding, 2013-2023: EUR 406 million

~ 1500 scientific publications to date

EBRAINS - THE EUROPEAN INFRASTRUCTURE FOR BRAIN RESEARCH

The Human Brain Project has driven the convergence between the neurosciences and modern information technologies in a uniquely large scale, integrative and systematic way. With EBRAINS it now provides a lasting distributed digital research infrastructure that brings together the different neuroscience communities, providing the means to approach the brain from a novel, cohesive, holistic perspective.

EBRAINS offers collaborative workflows spanning neural data, models, and functions, supported by dedicated big- data analytics, cloud and HPC resources (FENIX Infrastructure, fenix-ri.eu). As a research infrastructure, it allows to address extreme levels of complexity, expressed at different spatial and temporal scales. Relying on modern digital tools and a growing resource of high-quality data sets, EBRAINS' driving ambition consists in Digitizing Neuroscience. The services offered empower researchers to overcome barriers in the field of neuroscience, and advance our understanding of mechanisms underlying brain functions and cognitive abilities. They make accessible the means necessary to develop innovative, brain-based technology, with transformative innovation potential in medicine and brain-inspired technologies.

At the same time, new knowledge about the functioning of the brain is becoming a driving force for innovation in the fields of computing, AI and medicine. EBRAINS thus catalyzes new findings in science, innovations in technology development and progress for patients in Europe and worldwide.

EBRAINS has been recognized as one of the best-in-class European research infrastructures and included in the ESFRI roadmap 2021.

Major brain initiatives and years of launch

- EU: The Human Brain Project, 2013
- USA: The BRAIN Initiative, 2014
- Australia: The Australian Brain Alliance, 2016
- China: The China Brain Project, 2016
- Japan: Brain / MINDS project, 2016
- Canada: Government / Brain Canada joint funding, 2017
- Korea: Korea Brain Initiative, 2017
- Founding of International Brain Initiative (IBI), 2017

Jan Bjaalie
HBP Research Infrastructure
Director & IBI Co-Chair

More information

humanbrainproject.eu

ebrains.eu

Follow us

@HumanBrainProj

@humanbrainproj

TheHumanBrainProject

@ebrains_eu

@Ebrains_eu

Contact

Human Brain Project/EBRAINS AISBL
Place du Trône 1
Brussels, 1050
Belgium