



EBRAINS



European Brain ReseArch INfrastructureS

Website

<https://www.ebrains.eu>

Headquarters

EBRAINS AISBL
Chaussée de la Hulpe 166, 1170
Brussels, Belgium

Legal Status

Established (ERIC, AISBL,
GmbH, Others)

Type

distributed

Access

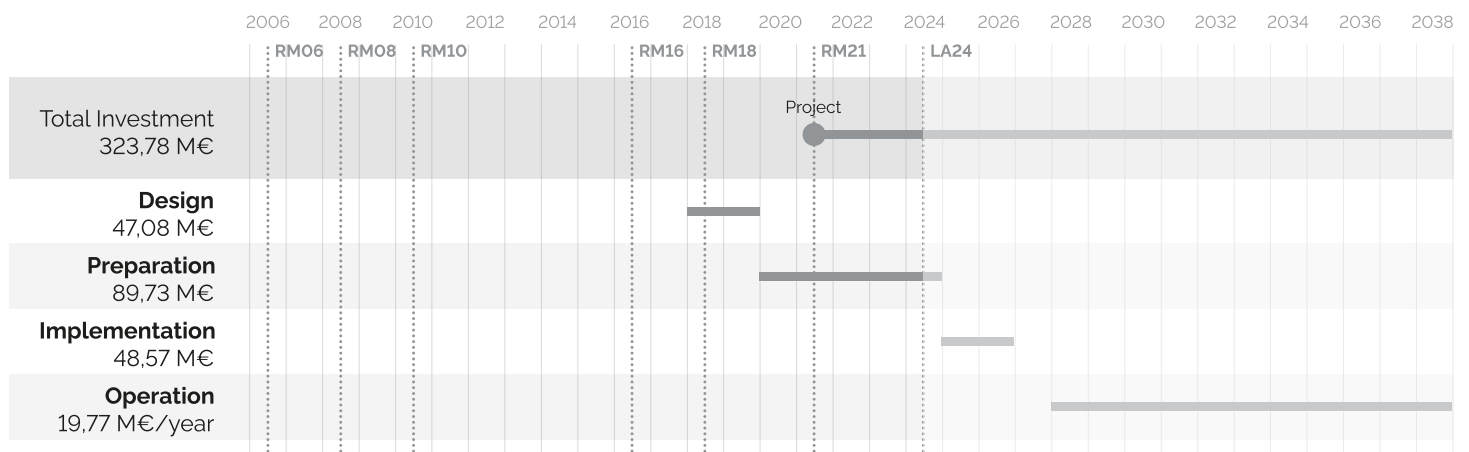
remote,
virtual

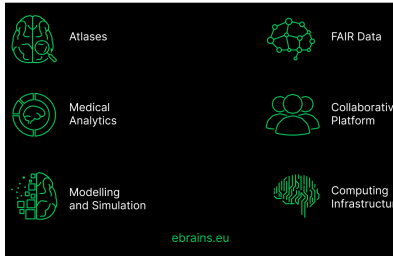
DESCRIPTION

EBRAINS is a new digital research infrastructure, a legacy of the EU-funded Human Brain Project (HBP), that gathers an extensive range of data and tools for brain-related research. It draws on cutting-edge neuroscience, big data, computing, robotics and related technologies to help translate the latest scientific discoveries into innovation in medicine and industry, for the benefit of patients and society. EBRAINS' ambition is to provide the scientific community with an open, state-of-the-art capability that fosters collaborative brain science, opens the way to ground-breaking discovery, and aims to secure Europe's leading position in the dynamically growing field of multidisciplinary brain research and its exploitation. EBRAINS was officially launched in 2019. Two years later, in 2021, EBRAINS was included in the Roadmap of the European Strategy Forum on Research Infrastructures (ESFRI). Since 2022, EBRAINS is also a member of the European Open Science Cloud (EOSC). After the conclusion of the HBP in 2023, EBRAINS will now complete the transition into a sustainable infrastructure. At the current phase, EBRAINS aims to create a new standard for brain atlases from the micro- to the macro-scale, link foundational multi-level data and connectomes in the healthy and pathological brain with atlases and models, create digital twins through modelling and simulation, and provide unique, excellent, and preferred services for

FAIR neuroscience data. EBRAINS offers researchers access to an extensive array of curated multi-modal data sets, a comprehensive multi-level human brain atlas, cutting-edge tools for data analysis, brain modelling and simulation, high-performance computing resources, and neuroinformatics platforms. These integrative services empower neuroscientists to overcome barriers in handling the immense complexity and heterogeneity of brain data. The main recipients of EBRAINS' services are researchers, clinicians, and experts from various disciplines. To ensure that their needs are met, EBRAINS aims to foster an inclusive "EBRAINS Community" that maximises the research infrastructure's use by gathering users, collaborators, experts and stakeholders in a common environment. EBRAINS is structured around a central hub, the EBRAINS AISBL, headquartered in Brussels, Belgium. This hub coordinates a pan-European network of distributed facilities and services. It currently has 11 National Nodes located in Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Norway, Spain, Sweden, and Switzerland. EBRAINS aims to expand its reach by integrating additional national nodes across Europe to create a truly pan-European research infrastructure and to integrate "best-in-class" resources, creating synergies and building upon scientific developments nationally.

TIMELINE & ESTIMATED COSTS





POLITICAL SUPPORT

Lead

FR

Prospective memberBG, CH, DK, ES, GR, HR, IT, NL,
NO, PT, SE

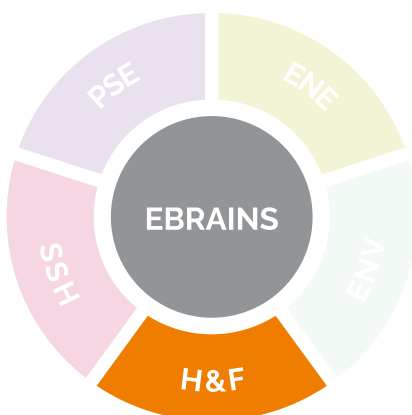
IMPACTS

EBRAINS powers the new paradigm of Digital Neuroscience, with impacts on basic research, brain medicine, AI and computing. The most comprehensive human brain atlas has been created to support research and brain medicine. Modelling and simulation have been brought to the next stage, creating the basis for the first uses of personalised Digital Patient Twin approaches. For this, computational technologies, digital brain atlases and cutting-edge clinical science are combined to create individualised computer models of a patient's brain. Such models have broad applicability on brain diseases, from diagnosis to therapy, to enhancing the precision of neuro-stimulation and brain implants. Molecular simulation in combination with supercomputing have identified new pharmacologically active substances, to develop new drugs faster, and make them more effective. The well-curated neurodata available on EBRAINS in a GDPR-compliant framework is also key for driving medical AI applications and specialised AI foundational models for science. EBRAINS drives a strong integration of neuroscience and technology: Through EBRAINS, supercomputers, big data analytics, simulation, neuromorphic computing, robotics and AI are becoming a more integral part of modern neuroscience and continue transforming the field. In turn, the improved understanding of the brain and its unique capabilities is also changing these technologies, from brain-inspired AI and neuromorphic computing to cognitive robotics with high relevance for industry. As these integrated efforts advance, collaboration across deeply ingrained borders of different sub-disciplines and communities is becoming ever more seamless. This is the unique benefit of an integrated infrastructure – it helps us connect scales, efforts and people.

SERVICES

The RI offers an Open Science Toolsuite to support researchers and the scientific community. The Atlases service provides detailed atlases for the human, macaque monkey, rat, and mouse brain, offering comprehensive maps of brain regions defined based on structure, function, and neural connections. These atlases are essential for understanding the complexity of the healthy brain, studying brain disorders, and seeking to develop new treatments. The Medical Analytics service facilitates the discovery, sharing, and collaborative work on medical and clinical brain data in a secure, GDPR-compliant environment. The Modelling and Simulation services empower researchers to create computational models of the brain, stimulate brain activity, and study its behaviour and function, unlocking new avenues for understanding the complexities of the human mind. The Fair Data service streamlines the process of finding and sharing brain data, providing access to a free and open database of neuroscience data for researchers, clinicians, scientists, and students. The Collaborative Platform encourages community engagement. It allows researchers to shape the development of services and tools through a co-design approach, ensuring their needs are met. Additionally, the RI provides access to cutting-edge Computing Infrastructures, enabling researchers to leverage powerful computational capabilities for their research, simulations, and analyses. Through this comprehensive suite of tools, the RI aims to facilitate groundbreaking research, foster interdisciplinary collaboration, and drive innovation in neuroscience, healthcare, and technology.

INTERCONNECTIONS



COOPERATION WITH OTHER RIS

Cooperation with complementary Research Infrastructures is critical for EBRAINS to drive progress in brain research and brain health innovation across Europe. EBRAINS actively collaborates to promote synergies, facilitate data and resource sharing, and foster cross-disciplinary studies. Current joint activities include projects that integrate large datasets and cohorts from multiple sources to accelerate scientific discoveries. EBRAINS also participates in initiatives that align translational research efforts aimed at developing solutions for brain disease prevention, diagnosis, treatment, and care. Importantly, EBRAINS is building tools and frameworks that enable the seamless integration of complementary data from external brain atlases and databases into its analysis pipelines. This promotes interoperability and maximises the value of resources across different brain research initiatives. Looking ahead, EBRAINS plans to intensify strategic cooperation with other RIS to avoid duplication of efforts, maximise efficient utilisation of funds, and combine complementary expertise to achieve better results that would not be possible for individual initiatives alone.