FLAG-ERA

Pre-announcement of Joint Transnational Call 2023

Anticipated Call Deadline:	**1 June 2023, 17:00 CET**
Documents and procedures:	**http://www.flagera.eu**
Call information:	Lina Bentakouk-Bernard +33 1 7354 8246 - **lina.bentakouk-bernard@anr.fr**
Indicative budget:	Approx. 9 M€

The national and regional research funding organisations in FLAG-ERA will publish in March 2023 their 5th Joint Transnational Call (JTC) for collaborative research projects in synergy with the two large-scale European initiatives: *Graphene Flagship* and *Human Brain Project - EBRAINS*. The official Call Announcement will be available at www.flagera.eu.

The call is divided into two sub-calls supporting *Graphene Flagship* and one sub-call supporting *Human Brain Project – EBRAINS*:

- Sub-call Graphene Flagship (basic research)
- Sub-call Graphene Flagship (applied research and innovation)
- Sub-call Human Brain Project – EBRAINS (basic and applied research)

Proposals are evaluated by a joint Scientific Evaluation Panel (one per sub-call) based on criteria of *Relevance to the Topic*, *Excellence*, *Implementation* and *Impact*. Each partner is funded separately by the funding organisation they are applying to.

The purpose of the Call Pre-announcement is to enable interested parties to start building their consortia and preparing a proposal. The call requires that projects are submitted by international consortia with minimum of three eligible and independent partners requesting funding to organisations in the call from at least three different participating countries. Additional partners from other countries may be part of a consortium if they can secure their own funding. The list of countries and funding organisations, which have shown preliminary interest in participating in the call, is provided in Annex.

Note that this pre-announcement is for information purposes only. It does not create any obligation for FLAG-ERA. The official Call Announcement, to be published later, shall prevail.

FLAG-ERA is supported by the European Union

Tentative timeline

March 2023	Call publication
16 March 2023	Information webinar
1 June 2023	Proposal submission deadline
15 November 2023	Notification of accepted proposals
December 2023 - February 2024	Project start

Call topics

Sub-call Graphene Flagship (basic research)

The goal is to lay the foundations for the graphene and 2D materials technologies of the future. The focus is on basic research, and the projects should explore novel phenomena, concepts, resources, protocols, algorithms, and/or address major challenges that prevent broad applications of some graphene and 2D materials technologies. The following topics fall within the scope of the sub-call:

1. Graphene-related materials-based scaffolds for living cells integration;
2. Graphene related materials for neuromorphic photonics;
3. Layered materials for quantum sensing;
4. Neuromorphic circuits based on layered materials;
5. Graphene-related materials-based field effect transistor sensors for viral surveillance;
6. Layered material-based antiviral, antibacterial and antifungal coatings;
7. Tunneling magnetoresistance in layered materials-based spintronic devices.

Motivations, target outcomes and expected impacts of each topic are detailed in Annex of the present Call Pre-Announcement.

Sub-call Graphene Flagship (applied research and innovation)

The goal is to take known graphene and 2D materials effects and established concepts from basic research, translate them into technological applications. These could be novel devices that are based on known effects and that will serve a novel application, or devices and systems that translate known applications into products and industrial applications. The following topics fall within the scope of the sub-call:

1. Graphene-related materials-based scaffolds for living cells integration;
2. Graphene-related materials-enhanced industrial sensors;
3. Properties of graphene-related materials suspensions;
4. Flexible substrates with enhanced thermal dissipation enabled by layered materials;
5. Graphene-related materials-based field effect transistor sensors for viral surveillance;
6. Layered material-based antiviral, antibacterial and antifungal coatings.

Motivations, target outcomes and expected impacts of each topic are detailed in Annex of the present Call Pre-announcement.

Sub-call Human Brain Project – EBRAINS (basic and applied research)

This sub-call focuses on *Preclinical and clinical neuroscience research through data reuse*.

It targets research proposals using cross dataset analysis as well as the development of robust modelling and simulations to address ambitious and novel research objectives. Proposals should be primarily based on pooling, harmonisation, transformation and/or reanalysis of existing research datasets or a combination of them.

Ongoing projects funded through FLAG-ERA and other national, European or international initiatives such as the ERA-NET NEURON and the JPND are encouraged to broaden their initial objectives by exploring and making use of existing datasets.

This sub-call is intended to contribute to the transformation of neurosciences research landscape enabled by Open Science opportunities, such as EBRAINS. Applicants are encouraged to exchange with the EBRAINS infrastructure (flag-era.JTC2023@ebrains.eu). A non-exhaustive list of datasets which can be exploited and further analysed in the context of this sub-call, together with an overview of some of the available EBRAINS services are mentioned in Annex of the present Call Pre-announcement. A complete list of FAIR data discoverable via EBRAINS is found here: Data and Knowledge - EBRAINS.

Tentative list of participating funding organisations

Country	Funding organisation	Graphene Flagship (basic research)	Graphene Flagship (applied research and innovation)	Human Brain Project – EBRAINS (basic and applied research)	Contact
Belgium	FNRS	Yes	No	Yes	international@frs-fnrs.be
Bulgaria	BNSF	Yes	Yes	Yes	Milena.Aleksandrova@mon.bg
Estonia	ETAg	Yes	No	Yes	Margit.Suuroja@etga.ee
France	ANR	Yes	Yes	Yes	Lina.Bentakouk-Bernard@anr.fr
Germany	DFG	Yes	No	No	Michael.moessle@dfg.de Martin.Winger@dfg.de
Israel	Innovation Auth	No	Yes	Yes	Dan@iserd.org.il
Lithuania	LMT	Yes	Yes	Yes	Saulius.Marcinkonis@lmt.lt
The Netherlands	ZonMw	No	No	Yes	Durrani@zonmw.nl
Romania	UEFISCDI	No	Yes	Yes	Cristina.Cotet@uefiscdi.ro Domnica.Cotet@uefiscdi.ro
Slovakia	SAS	Yes	Yes	Yes	Panisova@up.upsav.sk
Slovenia	MIZS	Yes	Yes	Yes	Andrej.Ograjensek@gov.si
Sweden	VINNOVA	No	Yes	No	Maria.Ohman@vinnova.se
Sweden	VR	Yes	No	No	Tomas.Andersson@vr.se
Taiwan	NSTC	Yes	Yes	Yes	cmtom@nstc.gov.tw

Annex – Topic descriptions

Graphene Flagship (basic research) topics

1. Graphene-related materials-based scaffolds for living cells integration

Abstract	Integration of living cells with nonbiological surfaces of scaffolds and implants poses severe restrictions on interface quality and properties. The scaffold material must support cellular viability, preserve sterility, and at the same time allow real-time analysis and control of cellular activity. Unfavourable reactions due to tissue scar fuel the search for a viable alternative to silicon, conventionally used in biomedical research. Micro- and nanostructured graphene-related materials offer such an alternative for the development bioscaffolds due to their chemical neutrality, the opportunity to control the physical/chemical properties and nanotopography. The target is to expand the materials base for living cells integration by exploiting novel GRM based scaffolds.
Keywords	Bio-scaffolds, biocompatibility
Application sectors	Biomedical research

2. Graphene related materials for neuromorphic photonics

Abstract	Growing demand for data processing is pushing the computing industry towards new paradigms, such as artificial neural networks and neuromorphic computing, enabling advances in Artificial Intelligence (AI) and Deep Learning (DL). However, speed and power limitations of electronic interconnects cannot support the ever-growing future demands. Neuromorphic photonics aims to address these challenges by incorporating the high-bandwidth and low-energy interconnect capabilities of photonic integrated circuits (PICs) in neuromorphic platforms. Graphene-related materials, thanks to their tunable optical properties and fast electron interactions, are expected to further boost performance when integrated as the active material in different functional layers. The target is to exploit graphene-related materials to improve metrics (computational speed, energy efficiency, footprint, cost) compared to state-of-the-art GPUs, TPUs and neuromorphic engines. The expected impacts are to contribute to the long-term viability of the European industry, foster the emergence of new technologies and markets (DL chipsets, GRM/CMOS photonics integration, fast reconfigurable and non-volatile weights, etc.).
Keywords	Graphene-related materials, integration, neuromorphic, photonics, deep learning, training, inference
Application sectors	Neuromorphic computing, big data/cloud computing, AI/DL, cybersecurity

3. Layered materials for quantum sensing

Abstract	Transition metal dichalcogenides (TMDs) and hexagonal boron nitride (hBN) have potential as novel magnetic sensors by taking advantage of the optical selection rules or applying optically detected magnetic resonance. Spins proximal to optomechanical membranes would allow to entangle non-classical states of motion with quantum two-level systems for quantum sensing. hBN defects with spin can be used as sensors. They can be optically initialised and read out, and manipulated by microwaves. They are sensitive to temperature, magnetic fields, and pressure, and could be used as detectors for these quantities. Defects in monolayer hBN can be in very close proximity to a magnetic substrate, enhancing spatial resolution, as well as detecting stray fields from a weaker magnetisation. TMDs can also be used as magnetic probes by placing them in close proximity to magnetic materials, and exploiting their polarisation-dependent optical selection rules. The target is to expand materials base for the quantum sensing by developing new quantum sensors based on layered materials.
Keywords	Spintronics, topological superconductivity, quantum sensors, quantum technology
Application sectors	Sensing

4. Neuromorphic circuits based on layered materials

Abstract	The ever-increased demand for image, language and pattern recognition applications requires neuromorphic circuits, enabling efficient computation with reduced power consumption. Neuromorphic computing is an emerging field with potential for future ICT applications, which could open new applications especially, if such devices could be included in portable and embedded systems, which require to work at reduced energy consumption. The aim is to develop new classes of neuromorphic circuits and devices based on layered materials, leveraging the potential of this technology to work with reduced power requirements. This includes design and fabrication of devices and circuits based on graphene-related materials for neuromorphic computing and computing sensor systems, new architectures such as synaptic weights, new sensors and integrated circuits for (analogue) computing. The target is to develop innovative solutions and new functionalities for neuromorphic circuits and sensor systems with improved performance, exploiting layered materials. The expected impacts are low-power neuromorphic systems.
Keywords	Neuromorphic computing, synaptic weights, integrated circuits
Application sectors	Machine Learning, electronics, ultra-low power computing and sensor systems, image and pattern recognition, Internet-of-Things

5. Graphene-related materials-based field effect transistor sensors for viral surveillance

Abstract	Devices capable of high sensitivity, multiplexed measurements of viruses for environmental monitoring and diagnostic applications at point of care, could be key in preventing future pandemics. Next generation diagnostic devices will need to be sensitive to unexpected and/or unknown pathogens, reusable, rapid, cost-effective, compact, and semiautomatic. The aim is to develop a multi-targeting and multipurpose sensor exploiting graphene-related material-based field effect transistors. Multitargeting means that the device must detect a spectrum of viruses, including unknown and unexpected viral species. Multipurpose implies the applications should range from prevention and environmental monitoring, to point of care diagnostics. Graphene-related material-based electrical platforms are ideal candidates as cost-effective, highly sensitive, miniaturized devices for the analysis of viruses in small sample volumes. The target is to create a disruptive technology in biosensing. Production of high-performance graphene-related material devices, controlled derivatization of graphene-related material protocols should be demonstrated through scalable processes, with virus recognizing elements compatible with diverse sample media, and able to maximize the interaction with the target. The developed technology should reach experimental proof-of-concept for detecting a representative group of viruses. The expected impacts: Multitargeting and multipurpose sensing devices will revolutionize the market of rapid test now restricted to well characterized pathogens. *In vitro* diagnostics and point of care testing. Research for vaccines or therapies that could prevent viral infections and future pandemics. Detection of biomarkers as new diagnostic tool in diverse diseases.
Keywords	Virus, viral surveillance, biosensing, graphene-related material-based field effect transistors
Application sectors	Point of care testing, *in vitro* diagnostics, biosecurity

6. Layered material-based antiviral, antibacterial and antifungal coatings

Abstract	In order to limit the spread of infectious diseases, hygiene standards must include effective anti-infective approaches and tools. This is currently done by wearing personal protective equipment and by disinfecting surfaces. Disinfection is an important tool, but it is difficult to be continuously applied in many circumstances. Viruses, bacteria and fungi have a remarkable ability to survive for extended periods of time on various surfaces. It is therefore vital to redesign functional surfaces to prevent infection by indirect contact, reducing the need of constant disinfection. Antiviral, antibacterial and antifungal coatings offer a compelling solution to these issues.

	The target is to exploit multifunctional layered materials to develop next generation antiviral, antimicrobial and antifungal surfaces. These will include liquid processable, electrically and thermally conducting layered materials, chemically modified with organic moieties capable of i) efficiently binding viruses and bacteria, ii) irreversibly damaging the pathogens, iii) hampering biofilm formation, and iv) exploiting electrical and thermal properties to inactivate pathogens and regenerate an active surface. List of expected impacts: limit the risk of spreading infections from harmful pathogens thereby providing safer living and working environments, hence improving EU's citizen health. Such actions will have an enormous societal impact by generating economic benefits and providing commercial opportunities for the private sector, ultimately offering an impetuous to EU research, development and innovation.
Keywords	(corona)viruses, multidrug resistant bacteria and fungi, pandemics, biofilms, antifouling
Application sectors	Applied research

7. Tunneling magnetoresistance in layered materials-based spintronic devices

Abstract	Spintronics is at the heart of widely distributed applications such as hard drive read heads and MRAMs and is a candidate for beyond CMOS architectures including spin-logic, neuromorphic, stochastic and quantum technological layers. Layered materials offer a range of electric and magnetic functionalities, with great potential for integration into electronic devices. The use of layered materials in magnetic tunnel junctions is promising for spintronics applications such as atomically defined interfaces, barriers free of defects, spin filtering, perpendicular anisotropy and spin-orbit torques modulation. The target is to increase the magnetoresistance signal in layered-materials based spintronic devices, by combining large spin filtering and long spin diffusion lengths. The work should also focus on processes to incorporate air instable layered materials (i.e. black phosphorous) in spin valves, to unlock the investigation of yet be explored materials. The expected impacts are device miniaturization, performance engineering and new architectures, as crucial building blocks for spintronics post-CMOS architectures.
Keywords	magnetic tunnel junctions, spintronics, post-CMOS
Application sectors	Nanoelectronics/Spintronics: beyond CMOS architectures, spin-logic, neuromorphic, stochastic and quantum technological devices
Target TRLs	2-4

Graphene Flagship (applied research and innovation) topics

1. Graphene-related materials-based scaffolds for living cells integration

Abstract	Integration of living cells with nonbiological surfaces of scaffolds and implants poses severe restrictions on interface quality and properties. The scaffold material must support cellular viability, preserve sterility, and at the same time allow real-time analysis and control of cellular activity. Unfavourable reactions due to tissue scar fuel the search for a viable alternative to silicon, conventionally used in biomedical research. Micro- and nanostructured graphene-related materials offer such an alternative for the development bioscaffolds due to their chemical neutrality, the opportunity to control the physical/chemical properties and nanotopography. The target is to expand the materials base for living cells integration by exploiting novel GRM based scaffolds.
Keywords	Bio-scaffolds, biocompatibility
Application sectors	Biomedical research

2. Graphene-related materials-enhanced industrial sensors

Abstract	Sensing is rapidly advancing and there exists a broad range of sensing platforms based on photoionization, ion mobility, impedance spectroscopy and other techniques. The relevant devices rely on sensing elements (usually membranes) that change properties in presence of target molecules. The sensitivity of graphene-related materials to external influence, combined with recent achievements in the integration graphene-related materials into integrated circuits, make them ideal candidates to improve existing sensor platforms. The target is to improve existing sensing platforms performance by integrating graphene-related materials.
Keywords	Chemical pollutants, impedance spectroscopy
Application sectors	Chemical sensing

3. Properties of graphene-related materials suspensions

Abstract	Graphene-related materials in liquid solutions have applications ranging from bulk graphene-related material production and functionalization, down to micro- and nanofluidic devices for biophysical applications. However, experimental characterizations have shown graphene-related material suspensions to exhibit complex behaviours, e.g., shear thinning, phase transitions to liquid crystalline phases etc., which are yet to be fully understood, and that are inherently complex to model. To aid in the development of applications, and tailor graphene-related material

	suspensions to meet the diverse range of requirements, a deeper understanding of the physics of graphene-related material suspensions is needed. This necessitates finding ways to efficiently model rheological properties of graphene-related material suspensions using fluid dynamic simulations and understand how the details of functional groups on the atomistic level influence physical properties, reaction pathways etc. The target is to develop models that can describe the rheological behaviour of graphene-related material suspensions in bulk and/or microfluidic flow regimes and that can be used as a basis for application design and optimization. These should be accompanied by experimental verification of how composition and/or functional groups affect the behaviour of graphene-related material suspensions. The expected impacts are improved and more efficient large-scale graphene-related material fabrication, enhanced efficiency of device operation in applications where at least part of the functionality makes use of graphene-related material suspensions, and improved performance and reliability of graphene-related material-based microfluidic devices.
Keywords	Graphene-related material suspensions, rheology, characterization, multiphase flows, modelling, (bio)sensors
Application sectors	Liquid phase graphene-related material exfoliation, functionalization, ink-jet printing, micro- and nano-fluidic devices, (bio)-physical applications of functionalized graphene-related materials

4. Flexible substrates with enhanced thermal dissipation enabled by layered materials

Abstract	Portable electronics requires lower power consumption and higher thermal dissipation. Even a few mW of power dissipated into heat can turn into a reliability issue, limiting or degrading device performance if no thermal path is provided. Current flexible electronics substrates are not good thermal conductors, but rather are thermal insulators. The aim is to develop new flexible thin substrates based on layered materials where thermal conductivity is improved, as validated by theoretical and experimental approaches, while keeping an electrical insulating nature compatible with RF applications (lower dielectric losses). The target is to develop flexible substrates with improved thermal conductivity, while retaining electrical insulating properties, exploiting the properties of layered materials. The expected impacts are new class of flexible substrate, suitable for wearable and wireless circuits.
Keywords	Flexible electronics, heat dissipation, insulating flexible substrates, composite materials
Application sectors	Flexible electronics, power electronics, Radio Frequency applications

5. Graphene-related materials-based field effect transistor sensors for viral surveillance

Abstract	Devices capable of high sensitivity, multiplexed measurements of viruses for environmental monitoring and diagnostic applications at point of care, could be key in preventing future pandemics. Next generation diagnostic devices will need to be sensitive to unexpected and/or unknown pathogens, reusable, rapid, cost-effective, compact, and semiautomatic. The aim is to develop a multi-targeting and multipurpose sensor exploiting graphene-related material-based field effect transistors. Multitargeting means that the device must detect a spectrum of viruses, including unknown and unexpected viral species. Multipurpose implies the applications should range from prevention and environmental monitoring, to point of care diagnostics. Graphene-related material-based electrical platforms are ideal candidates as cost-effective, highly sensitive, miniaturized devices for the analysis of viruses in small sample volumes. The target is to create a disruptive technology in biosensing. Production of high-performance graphene-related material devices, controlled derivatization of graphene-related material protocols should be demonstrated through scalable processes, with virus recognizing elements compatible with diverse sample media, and able to maximize the interaction with the target. The developed technology should reach experimental proof-of-concept for detecting a representative group of viruses. The expected impacts: Multitargeting and multipurpose sensing devices will revolutionize the market of rapid test now restricted to well characterized pathogens. *In vitro* diagnostics and point of care testing. Research for vaccines or therapies that could prevent viral infections and future pandemics. Detection of biomarkers as new diagnostic tool in diverse diseases.
Keywords	Virus, viral surveillance, biosensing, graphene-related material-based field effect transistors
Application sectors	Point of care testing, *in vitro* diagnostics, biosecurity

6. Layered material-based antiviral, antibacterial and antifungal coatings

Abstract	In order to limit the spread of infectious diseases, hygiene standards must include effective anti-infective approaches and tools. This is currently done by wearing personal protective equipment and by disinfecting surfaces. Disinfection is an important tool, but it is difficult to be continuously applied in many circumstances. Viruses, bacteria and fungi have a remarkable ability to survive for extended periods of time on various surfaces. It is therefore vital to redesign functional surfaces to prevent infection by indirect contact, reducing the need of constant disinfection. Antiviral, antibacterial and antifungal coatings offer a compelling solution to these issues. The target is to exploit multifunctional layered materials to develop next generation antiviral, antimicrobial and antifungal surfaces. These will include

	liquid processable, electrically and thermally conducting layered materials, chemically modified with organic moieties capable of i) efficiently binding viruses and bacteria, ii) irreversibly damaging the pathogens, iii) hampering biofilm formation, and iv) exploiting electrical and thermal properties to inactivate pathogens and regenerate an active surface. List of expected impacts: limit the risk of spreading infections from harmful pathogens thereby providing safer living and working environments, hence improving EU's citizen health. Such actions will have an enormous societal impact by generating economic benefits and providing commercial opportunities for the private sector, ultimately offering an impetuous to EU research, development and innovation.
Keywords	(corona)viruses, multidrug resistant bacteria and fungi, pandemics, biofilms, antifouling
Application sectors	Applied research

Human Brain Project – EBRAINS (basic and applied research) topic

EBRAINS opportunities in the context of the JTC 2023

EBRAINS

EBRAINS is a digital research infrastructure, created by Human Brain Project (HBP) and made sustainable through continued funding from multiple sources and support from members and partners across Europe. EBRAINS fosters brain-related research and helps translate the latest scientific discoveries into innovation in medicine and industry, for the benefit of patients and society. It draws on cutting-edge neuroscience and offers an extensive range of brain data sets, atlases, modelling and simulation tools, easy access to high-performance computing resources and to robotics and neuromorphic platforms. EBRAINS has been included in the Roadmap of the European Strategy Forum on Research Infrastructures (ESFRI) since 2021. For more information about EBRAINS, visit www.ebrains.eu.

Example of EBRAINS datasets of potential relevance for this topic

- Leblond, C., Cliquet, F., Mathieu, A., Delorme, R., & Bourgeron, T. (2021). Genetic variants in autistic and typically developing individuals [Data set]. EBRAINS. https://doi.org/10.25493/284B-QCD
- Reichmann, F., Pilic, J., Trajanoski, S., & Norton, W. H. J. (2022). Fighting the mirror: Brain transcriptome of high and low mirror aggression zebrafish (v1) [Data set]. EBRAINS. https://doi.org/10.25493/VTP5-8J9
- Wu, J., Eickhoff, S. B., Hoffstaedter, F., Patil, K. R., Schwender, H., Yeo, B. T. T., & Genon, S. (2022). Region-wise Connectivity-based Psychometric Prediction using the Julich-Brain Cytoarchitectonic Atlas (v1.0) [Data set]. EBRAINS. https://doi.org/10.25493/D4HH-VJJ
- Warnat-Herresthal, S., Varga, T., Händler, K., Bourry, S., Hinkley, E., Ulusoy, A., Weber, S., Di Monte, D. A., Schultze, J. L., & Beyer, M. (2020). Characterization of striatal neurons in Parkinson's disease patients and healthy individuals using scRNA-seq [Data set]. EBRAINS. https://doi.org/10.25493/69PP-N32
- Salgueiro-Pereira, A. R., & Marie, H. (2020). Excitability profile of CA1 pyramidal neurons in APPPS1 Alzheimer disease mice and control littermates [Data set]. EBRAINS. https://doi.org/10.25493/YJFW-HPY
- Caspers, S., Röckner, M. E., Jockwitz, C., Bittner, N., Teumer, A., Herms, S., Hoffmann, P., Nöthen, M. M., Moebus, S., Amunts, K., Cichon, S., & Mühleisen, T. W. (2020). Pathway-Specific Genetic Risk Scores for Alzheimer's Disease to Differentiate Regional Cortical Atrophy in Older Adults [Data set]. EBRAINS. https://doi.org/10.25493/X4MV-59J
- Lillehaug, S., Syverstad, G., Nilsson, L., Bjaalie, J. G., Leergaard, T. B., & Torp, R. (2018). Brainwide distribution and variance of amyloid-beta deposits in tg-ArcSwe mice [Data set]. Human Brain Project Neuroinformatics Platform. https://doi.org/10.25493/G6CQ-D4D
- Pavone, F., Mazzamuto, G., & Costantini, I. (2020). Layer-specific excitatory and inhibitory neuronal maps of hippocampus (v1.0) [Data set]. Human Brain Project Neuroinformatics Platform. https://doi.org/10.25493/1GZV-ZU

- Andlauer, T. F. M., Mühleisen, T. W., Hoffstaedter, F., Teumer, A., Wittfeld, W., Teuber, A., Reinbold, C. S., Bülow, R., Caspers, S., Herms, S., Hoffmann, P., Minnerup, H., Moebus, S., Teismann, H., Völker, U., Berger, K., Grabe, H. J., Nöthen, M. M., Amunts, K., . Cichon, S. (2022). Genetic factors influencing a neurobiological substrate for psychiatric disorders [Data set]. EBRAINS. https://doi.org/10.25493/SHXD-KHE
- Annen, J., Sala, A., Bonin, E. A. C., Sanz, L. R. D., Barra, A., Cecconi, B., Vitello, M., Szymkowicz, E., Cardone, P., Bernard, C., Martial, C., Laureys, S., Gosseries, O., & Thibaut, A. (2021). FDG-PET/CT data of healthy volunteers and patients with disorders of consciousness [Data set]. EBRAINS. https://doi.org/10.25493/7TXP-WCF
- Raimondo, F., Wolff, A., Sanz, L. R. D., Barra, A., Cassol, H., Carrière, M., Laureys, S., & Gosseries, O. (2020). TMS-EEG perturbation in patients with disorders of consciousness [Data set]. Human Brain Project Neuroinformatics Platform. https://doi.org/10.25493/G8E3-DQE
- Brain-Derived Neurotrophic Factor and Insulin-Like Growth Factor 1 Serum Levels in Naive and Medicated Subjects with Autism (v1.0) https://search.kg.ebrains.eu/?facet_type%5b0%5d=Dataset&category=Dataset&q=disorder#94a58fa3-b28c-4b1a-8e9d-fb0f79395c01
- Sorokina, O., McLean, C., Sterratt, D., & Armstrong, D. (2021). A configurable and empirical model of the synaptic proteome (SQLite database) - Extension with ASD mutations [Data set]. EBRAINS. https://doi.org/10.25493/VA01-BRD
- Pimpinella, D., Marchetti, C., Cherubini, E., & Griguoli, M. (2020). NLG3KO mice exhibit deficits in social behavior [Data set]. EBRAINS. https://doi.org/10.25493/9WBS-PK4
- Sanchez-Vives, M. (2019). Cortical activity features in transgenic mouse models of cognitive deficits (Williams Beuren Syndrome) [Data set]. Human Brain Project Neuroinformatics Platform. https://doi.org/10.25493/DZWT-1T8
- Castano-Prat, P., & Sanchez-Vives, M. (2018). Cortical recordings of the Fmr1KO mouse model of Fragile X syndrome during slow wave activity [Data set]. Human Brain Project Neuroinformatics Platform. https://doi.org/10.25493/5VDM-SHH
- Sanchez-Vives, M. (2019). Cortical activity features in transgenic mouse models of cognitive deficits (Fragile X Syndrome) [Data set]. Human Brain Project Neuroinformatics Platform. https://doi.org/10.25493/ANF9-EG3
- Kharabian Masouleh, S., Eickhoff, S. B., & Genon, S. (2021). Structure-phenotype associations for Julich-Brain Cytoarchitectonic Atlas regions [Data set]. EBRAINS. https://doi.org/10.25493/65R0-E9U

More datasets can be found on the EBRAINS Knowledge Graph: EBRAINS - Knowledge Graph Search

The Data and Knowledge services for finding and publishing FAIR data

The EBRAINS Data and Knowledge services (https://ebrains.eu/services/data-knowledge) provide services for sharing/publishing and finding and accessing research data from human and rodent brains. The services facilitate research, e.g., on case-control studies, cohort studies, as well as on basic neuroscience and models of disease mechanisms. As far as sensitive data is concerned, restricted access to selected pseudonymized data from human subjects can be provided (Human Data Gateway). For sensitive data in general anonymized metadata can be shared accompanied with information about possible controlled access.

Long-term data storage and high-performance computing resources (https://fenix-ri.eu/about-fenix) are available in combination with other EBRAINS services in areas such as model building and brain simulation. For all projects funded via the present call, EBRAINS offers to publish FAIR data through the EBRAINS Knowledge Graph (https://kg.ebrains.eu/search), and to couple FAIR data with journal publications (https://ebrains.eu/service/share-data/#dataset_and_journal_publication).

EBRAINS also support working with medical data. Nevertheless, due to the nature of that data and where it originates, working with such data would require dedicated solutions. EBRAINS has several of those services available that allow to either work with data in hospitals or data centers on the one hand or to store or process it on the other hand. The scope of the solutions should be discussed with the EBRAINS team (e.g. nature of data, data access) prior to submission. Applicants should contact EBRAINS through the service email for the FLAG-ERA call: flag-era.JTC2023@ebrains.eu, at the latest 3 weeks prior to the submission deadline, if they have any questions.

The Brain Atlas services for integrating and combining data in atlases

The Brain Atlas services (https://ebrains.eu/services/atlases/) offer tools and resources for integrating multiple reference spaces and maps of the human, rodent and mouse brain into a common framework, and for exploring and analyzing data in the atlases. For all projects in the present call, tools are available for registration of new data to the atlases, and for exploring and analyzing data through the interactive Atlas Viewer and a range of analytical tools.

EBRAINS access modalities and services costs

1. The use of the EBRAINS website, its tools, services and data is subject to the terms and policies such as the General Terms of Use, the Access Policy, the Data Use Agreement or the Data Provision Protocol. More information can be found at https://ebrains.eu/terms;
2. Several of the services provided by EBRAINS are openly available online. An EBRAINS account is required for extended access to tools and resources. EBRAINS accounts are available for free to users across the world following EU regulations. Apply for an EBRAINS account here: https://ebrains.eu/register;
3. The Data and Knowledge services will give priority to requests from FLAG-ERA projects for sharing / publishing of research data, including data curation, at no cost. Applicants are invited to contact flag-era.JTC2023@ebrains.eu if they have any questions related to curation needs;
4. Extended services for data management and stewardship can be tailored to the project's specific needs;
5. Projects with high demand for high-performance computing or large data storage: Conditions and procedures for requesting allocation of computing resources can be found at https://fenix-ri.eu/access;
6. Applicants willing to propose new EBRAINS functionalities that go beyond the current EBRAINS services and tools available on the EBRAINS website can engage discussion with EBRAINS.

For points 4 to 6, applicants are invited to contact flag-era.JTC2023@ebrains.eu at the latest 3 weeks prior to the submission deadline. Potential costs associated to the corresponding EBRAINS services or operation can be included in the project budget provided that they meet costs eligibility criteria of the concerned FLAG-ERA funding organisations.