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Deliverable D2.1
JTC 2017 call documents (public part)

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Description of content		This deliverable gathers the public part of the JTC 2017 call documents, namely the call page, the call pre-announcement and announcement, and the proposal forms.		
Publishable abstract		The FLAG-ERA Joint Transnational Call (JTC) 2017 was pre-announced on 6 December 2016 and published on 11 January 2017. The pre-announcement, announcement and proposal forms were published on the FLAG-ERA web site (www.flagera.eu).		
Keywords		Joint Transnational Call, call documents, call announcement		

Introduction

This document gathers the documents published for the FLAG-ERA Joint Transnational Call (JTC) 2017. These documents are:

- The pre-announcement
- The call announcement
- The pre-proposal form and the associated Flagship partnership proposal forms (in two versions depending on the Flagship)
- The full proposal form and the associated Flagship Partnering Project application forms (in two versions depending on the Flagship)

These documents are available on the call web pages referenced below. They are also provided in annex of the present document.

- https://www.flagera.eu/flag-era-calls/jtc-2017/pre-announcement/
- https://www.flagera.eu/flag-era-calls/jtc-2017/call-announcement/

These documents are similar to the JTC 2015 ones. The main novelties are:

- The introduction of a sub-call on applied research and innovation for the Graphene topic;
- The transition to a two-step process, in the framework of the ERA-NET Cofund instrument;
- The reuse of the existing Flagship association procedure, which simplifies the final part of the call procedure.

Joint Transnational Call 2017

for transnational research projects in synergy with the two FET Flagships

Graphene Flagship & Human Brain Project

Call pre-announcement

(Version of 24/12/2016: Addition of Latvian participation in the HBP sub-call)

FLAG-ERA (the Flagship ERA-NET) will present its second Joint Transnational Call (JTC) for collaborative research projects in synergy with the two FET Flagships on **January 12th, 2017** at a networking event organised **in Madrid**, Spain. The call announcement will be published beforehand at www.flagera.eu and other sources of information. The purpose of this pre-announcement is to enable interested parties to start building their consortia and preparing their proposals. It provides a tentative timeline, the foreseen list of participating funding organisations, contact points, main eligibility rules and call procedures, and descriptions of the call topics[1].

FLAG-ERA gathers National and Regional Funding Organisations (NRFOs) in Europe and beyond with the goal of supporting, together with the European Commission, the FET Flagship initiatives, i.e., the Graphene Flagship and the Human Brain Project (HBP) Flagship. One of its main aims is to allow researchers to complement the current Flagship projects and to collaborate towards the achievement of their vision through the use of existing or dedicated transnational, national and regional calls. In particular, FLAG-ERA aims at launching dedicated JTCs allowing researchers from several countries to jointly contribute to the Flagship goals. Note that researchers interested to work in the framework of the Flagships can also do so using other sources of funding in combination with the Flagship association mechanisms[2].

Tentative Timeline

A two-step submission procedure will be used: Applicants are invited to submit short pre-proposals; Applicants who are selected in this first step are invited to submit full proposals. A tentative timeline is provided below.

Early January 2017	Call announcement publication
14 March 2017	Pre-proposal submission deadline
End May 2017	Notification of accepted short proposals
July 2017	Full proposal submission deadline
Oct 2017	Notification of accepted full proposals
Dec 2017 - March 2018	Project start

[1] Note that this pre-announcement is for information purposes only. It does not create any obligation for the FLAG-ERA consortium nor for any of the participating funding organisations, and the official call announcement shall prevail.

[2] http://graphene-flagship.eu/project/partnering/Pages/Partnering-Mechanisms-under-Horizon-2020.aspx, https://www.humanbrainproject.eu/partnering-projects.

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Participating NRFOs and indicative budgets

The table below provides the list of NRFOs participating to the call. Note that the list of participating NRFOs depends on the Flagship and, for the Graphene Flagship, on the sub-call (basic research or applied research and innovation). Budgets figures are indicative.

			Graphene (k€)		HBP (k€)
Country		Funding organisation	Basic research	Applied research and innovation	Basic and applied research
BE	Belgium[i]	FNRS	200	-	200
BG	Bulgaria	BNSF	175	-	175
DE	Germany	DFG	2000	-	-
ES	Spain	MINECO	560		560
FR	France	ANR	1250		1250
GR	Greece	GSRT	500	200	-
HU	Hungary	NKFIH	250		250
IT	Italy	MIUR	-	100	100
LT	Lithuania	LMT	100		100
LV	Latvia	VIAA	200		200
NL	Netherlands	FOM	1000	-	-
PL	Poland	NCBR	-	500	-
RO	Romania	UEFISCDI	250		250
SE	Sweden	VR & VINNOVA	500	500	500
SI	Slovenia	MIZS	210		420
SK	Slovakia	SAS	240		240
TR	Turkey	TUBITAK	1000		1000
		Total:	9735		5045

[i] French-speaking community only

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[1] French-speaking community only

For further information, please visit us on the FLAG-ERA website: http://www.flag-era.eu.
For general questions about the JTC and national eligibility criteria, please contact your national or regional contact point (see above).
For technical questions regarding the JTC (electronic submission, etc.), please contact the Joint Call Secretariat: fabien.guillot@agencerecherche.fr.

Eligibility of Consortia

Each consortium submitting a proposal must involve at least **3 partners from 3 different countries** and fulfil at least one of the following two options:

- At least 3 partners requesting funding from 3 different countries participating in the JTC, or
- At least 2 partners requesting funding from 2 different countries participating in the JTC plus a Flagship Core Project partner from a different country, not requesting funding in the framework of the JTC and securing its own funding.

While applications will be submitted jointly by groups from several countries, each group will be funded by its respective national or regional funding organisation. The applications are therefore subject to **eligibility criteria of individual funding organisations**.

Duration

Projects may be funded for a period of **up to 3 years** and according to individual funding organisation regulations.

Procedure

A **two-step submission procedure** applies. At each step, a **joint transnational proposal** (or pre-proposal for the first step) shall be prepared by the applicants, and must be submitted electronically by the coordinator. The proposal shall include a draft application to become a Flagship Partnering Project.

Evaluation and Selection of Proposals

Proposals are assessed by an independent international Scientific Evaluation Panel with the help of external reviewers. They are evaluated and ranked according to the following criteria:

1. Relevance to the JTC (first step only);
2. Scientific and/or technological quality;
3. Implementation;
4. Potential impact.

On the basis of the ranking and of available funding, the Call Steering Committee, composed of the NRFOs participating in the JTC, will prepare a list of projects invited to submit a full proposal (after the 1st step) or recommended for funding (after the 2nd step).

Association to the Flagship

Projects recommended for funding will be invited to proceed with the formal association to the Flagship, using the Flagship standard association procedure. Any issue at this stage will be treated through classical project risk management.

Research areas

The FLAG-ERA JTC 2017 comprises two topics, one for each Flagship. The Graphene part of the call is sub-divided into two sub-calls, one for basic research and one for applied research and innovation. There are thus three sub-calls in total. Each sub-call covers a specific list of research areas listed below and described in the following pages. Relevant parts of the Flagship and contact points for each area are provided on the call web page.

Graphene JTC areas (Basic research)
1. Synthesis and characterization of Layered Materials (LMs) beyond graphene
2. Large scale production of heterostructures based on LMs
3. Vertical and lateral epitaxy of Graphene and Related Materials (GRMs) for optoelectronics
4. Functional ceramics incorporating GRMs
5. Inks for printing stable, GRM-based, semiconducting thin films
6. Modelling charge and heat transport in GRM-based composites
7. Ecotoxicology of GRMs
8. Nanofluidics using GRMs
9. Novel device concepts based on GRMs for quantum communication
10. Beyond CMOS switches and new computing paradigms based on GRMs
Graphene JTC areas (Applied research and innovation)
1. In-situ and ex-situ quality control of GRMs
2. Controlling doping in high quality large-area graphene
3. GRMs for smart textiles
4. Functional coatings using GRMs
5. GRMs for corrosion prevention and as lubricants
6. GRMs for thermal management and thermoelectrics
7. Biorecognition of specific disease markers using GRMs
8. Highly selective gas sensors based on GRMs
9. GRM-based bioelectronic technologies
HBP JTC areas (Basic and applied research)
1. Human brain intracranial data and their relationship to other aspects of brain organisation
2. Comparing morphology and physiology of cortical cell types in human and non-human primates
3. Comparative aspects of brain function and connectivity
4. Cross-species multi-scale data constraints for visuo-motor integration
5. The neural bases of spatial navigation and episodic memory
6. Models of auditory processing
7. Representation of perceived or memorised information in multi-level systems
8. Modelling dendrites within active networks
9. Testing predictive coding and attractor network models
10. Biological deep learning
11. Disease modelling and simulation
12. Innovative modelling for allosteric drug discovery
13. Integration of simulation tools, neuromorphic computing and robotics with brain and behavioural studies for developing next-generation brain-computer interfaces
14. Text mining of cellular, synaptic, connectomic or functional properties of the brain

Graphene – Basic research

1. Synthesis and characterization of LMs beyond graphene

Layered materials (LMs) are crystals where robust chemical bonding within the planes coexists with weak van der Waals coupling of those layers to the environment or in heterostructures, with properties suitable for electronics and optoelectronics applications. Further capability building is needed in:

- growth of atomically thin stable LMs (such as hBN, MoS_2, $MoSe_2$, $MoTe_2$, WSe_2, GaS, GaSe, GaTe, and InSe) using molecular beam epitaxy (MBE), chemical vapour deposition (CVD) and/or atomic layer deposition (ALD);
- finding chemical routes for repairing defects and damage in LMs produced by growth or exfoliation from bulk layered crystals;
- synthesis of novel semiconducting and metallic layered compounds that can be exfoliated into monolayers.

Proposals should foresee a balanced approach to materials fabrication and characterisation and plan for both growth/synthesis activities and suitable structural, optical, scanning microscopy, and/or electronic transport characterisation of the produced LMs. Projects are expected to gather teams with complementary expertise in growth and characterisation, with ready access to the necessary facilities. Developments should be benchmarked against the same materials already produced worldwide, showing that the material quality can advance electronic or optoelectronic devices beyond state of the art.

2. Large scale production of heterostructures based on LMs

The objective is to produce van der Waals heterostructures in a reliable, scalable and reproducible manner. The existence of a wide range of LMs gives the opportunity to create atomically thin pn-junctions, Schottky barriers, or tunnel junctions as these materials have strong intralayer bonding but only exhibit weak van der Waals interactions between adjacent layers. Applications are foreseen in functional electronics or high-end instrumentation development (e.g. detectors or sensors) in industrial sectors such as electronics and energy.

Materials may include mono-atomic layers (graphene, silicene, and phosphorene), compound mono-layers (BN, GaX) as well as other unit-cell thick materials such as transition metal dichalcogenides (TMDs). The scalable synthesis of heterostructures resulting from the formation of atomically sharp interfaces between strongly bonded oxides can also be considered. The approach may be wet-chemical assembly, including layer transfer or direct growth with chemical vapour, as well as physical vapour deposition, molecular beam epitaxy (MBE) or sputtering technologies. It should be explicitly shown that atomically thin interfaces are produced in the fabrication process. In order to assess the properties and functionalities of the heterostructures, characterization of the heterostructures is mandatory.

3. Vertical and lateral epitaxy of GRMs for optoelectronics

Graphene and related material (GRM) heterostructures offer a variety of novel functionalities determined by material choice and structure design, and give high performance due to atomically clean and sharp interfaces. Devices based on these heterostructures enable a wide range of applications such as light-emitting diodes, photovoltaic devices, and photodetectors. To further develop and use combinations of these structures, heteroepitaxial growth is needed for both vertically stacked heterostructures as well as in-plane connected GRM heterostructures.

The quality of the materials, as well as of the heterostructures, needs to be evaluated including the crystal orientation, relative orientation of the different materials and the sharpness of the interfaces. Also important is the evaluation of the interlayer coupling, in the context of the desired applications. The GRM range includes graphene, transition metal dichalcogenides (TMDs) and also GaX. The role of graphene is to be an efficient electrical contact for semi-conducting LMs. Devices fabricated based on the grown structures and demonstration of their functionality for opto-electronic applications, such as photodetectors, modulators, transceivers, light emitting diodes, single photon emitters are required. This includes an evaluation of the performance of the devices, such as efficiency and speed.

4. Functional ceramics incorporating GRMs

The use of GRMs as nano-additives in composites is one of the most mature research areas for these promising materials, with GRM-polymer composites already on the market. GRM-ceramic composites have received comparatively little attention, even if the use of ceramics as coating tiles, refractory material or bio-implants is a major industrial field. Effective development of GRM-ceramic composites is challenging due to the poor processability of both materials and the high temperatures involved in ceramic production.

The goal is to develop new GRM-ceramic composites, using the unique properties of GRMs to have structural, chemical, optical or electronic functionalities that cannot be obtained with other types of additives. Fundamental research is required, as example to better understand and control the (opto)electronic properties of GRM-ceramic interfaces. A clear vision of how the new functionalities developed shall solve existing problems, or allow new technological applications of ceramics, is needed.

5. Inks for printing stable GRM-based semiconducting thin films

Printing and solution processing are established approaches for low cost and high volume manufacturing, but the availability of printable materials exhibiting stable semiconducting properties and high enough charge carrier mobility (>40cm^2/Vs) for practical electronic applications is limited. Solution-based GRMs with semiconducting properties are very promising for the realization of large scale printed electronic applications.

The main challenges that need to be addressed include: manufacturing of semiconducting GRM powders and dispersions in bulk volumes; formulation of semiconducting GRMs into inks with a stable rheology without compromising the electrical properties of the materials; GRM inks

formulation in friendly solvents; printability of the produced inks into stable semiconducting thin films on standard substrates. In addition, the following key processes should be developed: substrate conditioning for optimal printing; post-processing of the printed structures to optimize the electrical performance and/or stability; contacting of the semiconducting thin film. The functionalization of the semiconductor material or thin film for specific properties would also enable further applications such as sensing. Devices utilizing printed semiconducting GRMs should be demonstrated with a mobility > 40cm^2/Vs and an ON/OFF ratio > 10^5, and the performance of the inks should be benchmarked against state-of-the-art materials, using the charge carrier mobility and the devices stability as key performance indicators.

6. Modelling charge and heat transport in GRM-based composites

Charge transport in graphene has been intensively studied. However, most studies focus on charge transport in defect-free graphene, or graphene nanoribbons. GRMs are often produced as highly non-ideal structures. Point defects, amorphous pockets, wrinkles, mismatching crystalline grains are found at the microscale, while stacking and inter-sheet interactions play critical role for the overall physical properties at the macroscale. Besides electrical transport, also heat transport requires a deep understanding of the physics and structure of complex GRM-based composite materials, and the details of inter-sheet interactions. For GRMs to have a real impact, one thus needs a deeper understanding of charge and heat transport in large scale models of thin conductive layers of GRMs composed of large number of overlapping sheets, or three-dimensional percolating layers present in bulk composites.

Multiscale experimental, theoretical and computational tools should be developed to study the charge and heath transport of systems composed by large numbers of interacting GRM nanosheets, and of the interfaces present in such systems. Projects should investigate the charge transport properties and/or the thermal conductivity of GRM-based composites, through the development of a full hierarchy of computational and theoretical models, for example ranging from two-dimensional continuum elasticity to atomistic modelling of charge and heat currents in very large size systems. The structural morphologies of studied materials and transport results should be cross-validated with experimental data of relevance for applications.

7. Ecotoxicology of GRMs

The study of the interactions of GRMs and living organisms must be extended to a wider array of materials and to the toxic substances frequently present in polluted environments, whose action might be promoted or inhibited by GRMs. The aim is to promote safety-by-design, meaning that potentially toxic properties could be engineered out in order to have new, improved, non-toxic materials, still retaining their desirable properties. Because ecotoxicology has to provide the regulatory assessment tools related to the future GRMs in the environment, it is necessary to design new protocols relevant to natural exposure conditions. Understanding the global mechanisms of interaction and effects of GRMs under natural conditions could be achieved by designing experimental trophic chains and bio environments using representative organisms and cell models in aquatic and terrestrial setting.

Areas of special interest are:

1) Characterization of materials properties and interplay with pollutants in connection to potential GRMs ecotoxicity. A combination of well-characterized, "custom-designed" materials (i.e. materials with systematic variation in properties, such as lateral dimensions or number of layers) needs to be investigated in comparison to others that are relevant from an industrial and commercial point of view, and released in use conditions or simulated use conditions, together with different arrays of heavy metals and organic contaminants. The effects need to be assessed on ecologically relevant organisms (e.g. soil organisms, nitrogen fixing bacteria and cyanobacteria, mycorrhizal fungi, or autophototrophs), aquatic model organisms and different relevant unicellular models.

2) Physico-chemical and biological biodegradation processes and sedimentation of GRMs in soil and water ecosystems. The numerous physico-chemical interactions between these materials and humic colloids, e.g. humic and fulvic acids, need to be studied spectroscopically in order to describe the potential impact of the environmental matrices (“eco”-corona) on the biodegradation and sedimentation processes.

8. Nanofluidics using GRMs

GRMs show great potential for many applications (including separation of gases, heat exchanges, water filtration, energy storage, biomedical applications, and various sensors) where understanding of the nanofluidic properties of GRM laminates plays a crucial role. Further research is needed to use GRMs to develop structures or laminates with a significant performance improvement over current technologies, and to exploit the new opportunities offered by GRMs.

Projects should outline a credible route towards higher technology readiness levels and, ultimately, new industrial products. They should combine experimental and theoretical efforts, based on the expertise in GRM fabrication, characterisation and modelling of their relevant structural and nanofluidic properties.

9. Novel device concepts based on GRMs for quantum communication

The rapid technological advances in quantum communication have triggered increased interest for commercial applications. An important roadblock is the limited performance of single photon detectors and controllable sources of single photons or entangled photon pairs. GRMs offer new ways to control single photon emission, for example from localized emitters such as quantum dots embedded in the material.

There is a strong need to gain better control and understanding of the exciton localization and the ability to tailor the localization in terms of position, emission properties, ability of electrical control, etc. Ideally the emission wavelength should be expanded from visible to shortwave-infrared, up to 1.5 μm, covering the telecommunication window. It is important to integrate the emitters with cavities in order to enhance the emission efficiency, and to enable efficient coupling with integrated photonic systems. In addition, controllable emission of entangled photon pairs is required. For a single-photon detection platform, there is a need to employ GRMs for single photon detection with high quantum efficiency. One promising approach is the implementation of GRM-based

superconducting bolometers. The sensitive wavelength range should extend up to and preferably beyond 5 μm. Benchmarking of the devices with existing technologies is essential.

10. Beyond CMOS switches and new computing paradigms based on GRMs

The geometric scaling of silicon transistors is approaching fundamental limits and solutions in the beyond CMOS area are required. GRMs offer several different possibilities to realize beyond CMOS switches and devices enabling novel computing paradigms.

Proposals should focus on the experimental demonstration of proof-of-concept devices based on GRMs for beyond CMOS switches or devices enabling novel computing paradigms. If applicable, the implementation of these devices into new computing architectures may additionally be addressed. Specific devices within the scope of this call topic include, but are not limited to: (Vertical) tunnelling transistors, ballistic switches, devices based on GRM heterostructures, devices utilizing the spin degree of freedom, quantum devices or similar. Projects may include also theoretical work in order to provide an outline on the ultimate performance of the devices, to develop models for the devices or to reduce the parameter space for further improvement.

Graphene – Applied research and innovation

1. In-situ and ex-situ quality control of GRMs

Fast and reliable characterization of GRMs is an important step for production quality control and industrialization of material synthesis. Therefore it is essential to develop techniques, in-situ and ex-situ, to monitor the quality of these materials and provide feedback for process control or material grading.

Areas of special interest are: (i) in-situ techniques that are able to detect in real-time (a) different oxidation states of the catalyst; (b) identify monolayer growth and area coverage; (c) number of layers and (d) estimation of the grain size; (ii) Ex-situ techniques that can quickly provide information on the film morphology, thickness, composition, surface and electrical properties are also required.

Demonstrators should target the characterization of at least one property of mono- or multilayer GRM over a large set of experimental samples.

2. Controlling doping in high quality, large-area graphene

Doping is an essential process to engineer the conductivity and work function of graphene. Besides electrostatic doping, other techniques such as chemical doping need further exploration. The two major approaches involving chemical doping of graphene include substitutional and adsorbate-induced doping. Substitutional doping involves replacement of carbon atoms in a graphene layer by other atoms, such as nitrogen and boron. It is difficult to control, and it significantly disrupts the graphene lattice, thus deteriorating the charge carrier mobility. Adsorbate-induced doping, on the other hand, exploits the 'surface-only' nature of graphene to modulate the charge carrier concentration via physisorption of molecules. This type of doping takes place via charge transfer between dopant and graphene. While the controllability is more favourable compared to substitutional doping, the weak nature of the physisorbed interaction limits the robustness, hence feasibility, of this routine.

Alternatively, chemical modification could provide a means that is controllable, as well as being chemically and thermally robust. Chemical functionalization can form sp^3 defects at the points of covalent attachment. Covalent attachment of molecules to graphene is also a known method of inducing doping. Thus, covalent functionalization provides a platform in which to tackle simultaneously the issue of band gap tuning and charge carrier doping. The high degree of surface coverage control over the extent of modification and homogeneity make covalent functionalization an attractive protocol. However, a major drawback to chemically modifying graphene is that the unique electronic structure (sp^2 based) can be destroyed. In general, due to the use of highly reactive species, required because graphene has a relatively low chemical reactivity due to the delocalization of the π electrons over the entire two-dimensional network, the chemical modification of graphene cannot be spatially ordered and the covalent attachment occurs randomly. This results in a significant reduction of the charge carrier mobility, for which a solution must be found. Other problems such as scalability, combination with the graphene transfer, robustness and reproducibility arise at when fabricating and patterning graphene components into integrated circuits, especially in ambient

conditions. Current state-of-the-art methods do not offer viable graphene components to compete with the present materials in use, hence alternative strategies are demanded.

The target is to devise an efficient strategy for large area doping of graphene, while preserving key properties such as mobility and scattering time. This needs to be combined with large area transfer processes. All approaches must result in a material that is CMOS compatible, in terms of metal and other impurities, as for CMOS fab rules.

3. GRMs for smart textiles

Current advanced (or smart) textile technology relies on a heterogeneous platform of multilayers printed or coated in sequence onto fibres or directly deposited on the final fabric. Current conducting fibres for smart textiles mainly use thin Cu or Al wires bundled with cotton or coated with polymers, and the main components are textile-integrated (into/onto the textile surface). The future in this field will lead to having the components being textile-based (the textile itself being the functional component). The full realisation of advanced textiles could benefit from a new platform exploiting fully flexible, tuneable and processable materials to give new functionalities (e.g. light emission, photovoltaic activities, sensing, energy storage, heating or mechanical actuators). GRMs can provide the high conductivity, high flexibility and chemical tuneability needed for this task.

The goal is to develop new GRM-based smart textiles, using the unique properties of GRMs, to have structural, chemical, optical or electronic functionalities that cannot be obtained with other types of materials. Addressing the issues of durability of the target systems upon standard textile washing and enhanced biocompatibility in contact with human skin will represent an added value. Encapsulation techniques (although not preferable) might also be suitable as a solution.

4. Functional coatings using GRMs

Due to their layered structure, GRMs are ideal candidates for coating and thin film applications, and with new production technologies emerging, graphene is now available in useful quantities to address its implementation in various areas. Additionally, the field of functional LMs is not limited to pristine graphene but also includes doped derivatives, transition metal dichalcogenides (TMDs), polymers and others or nano-composites based on such materials.

Areas of interest are coating formulation, application and testing, addressing functionalities such as (but not limited to): electrical conductivity, gas barrier properties or gas separation, improved chemical resistance, heat dissipation, temperature stability, catalytic activity, electromagnetic interference shielding or self-monitoring.

Such functionalities can have many applications ranging from gas barrier coatings, separation membranes, anti-statics, radiation shielding or flame-retardance to more sophisticated devices like in-situ strain measurement sensors, catalytically active surfaces and electrodes or flexible electronics. Within this field a diversity of formulations and recipes can be addressed, for instance powder based dry coatings, paints, specialized inks for different printing technologies or direct deposition on the substrate.

5. GRMs for corrosion prevention and as lubricants

The planar nature of GRMs makes them promising for the protection of surfaces, including those of construction materials, aerospace metals, composites and machine components.

Areas of special interest are (i) coatings for improved chemical and water barrier properties, corrosion resistance or thermal performance; (ii) lubricant systems where GRMs lead to lower friction, reduced wear, reduced corrosion and higher efficiency of heat transfer. In the context of coatings, a scalable deposition methodology must be developed (e.g. direct growth, spray coating, dip coating).

For both coating and lubricants applications it is expected that new formulation techniques may have to be developed. The addition of GRMs to the coatings and lubricants should show improved performance in both short-term and accelerated tests conducted in service relevant-conditions, such as hot salt spray chambers.

6. GRMs for thermal management and thermoelectrics

The ability to tailor the electron density of states and thereby influence the Seebeck coefficient in GRMs makes them attractive candidates for thermal management. This is particularly applicable to GRM-based heterostructures, and to grainy materials with controlled grains size, shape and distribution. While the former could lead to sufficient electronic level difference to tune electron transfer and electron contribution to the thermal conductivity, an important research questions is to what degree this affects the nature of the interfaces and the concomitant interface thermal resistance. The latter, if studied with a statistical approach to take into account the variations in the real GRM grain structure and estimate their contribution to the interface thermal resistance within certain bounds, will provide a means to have a degree of predictive insight as to what to expect in terms of thermoelectric parameters and performance of such materials.

Proposals should address novel experimental methods on near-field and far-field radiation and thermal measurements, and advanced configurations arising from phonon engineering for optimization of thermal management in GRM-based hybrids. The reliability and reproducibility of the experimental methods and material structures should be emphasized, as well as its integration and large scale production perspectives.

7. Biorecognition of specific disease markers using GRMs

The identification and accurate measurement of disease biomarkers at the level of individual patient in response to specific therapies is instrumental to the development of personalized medical treatments. Toward this goal, new devices capable of high sensitivity, parallel measurements of multiple disease biomarkers (either circulating in the bloodstream or found in phenotypically characterized (live) cell subpopulations), are strongly required. In this context, graphene-based opto-electrical platforms (e.g. fluorescence quenching, impedance related electrochemical measurements and paper/plastic-based platforms) are ideal candidates as cost-effective, highly sensitive devices for

the analysis of protein and/or DNA biomarkers in small sample volumes. Disease biomarkers detection platforms might result from synergies between various GRMs, nanoparticles, specific biofunctionalization protocols and sensing technologies.

To allow further industrialization, production of high quality functionalized graphene, (reduced) graphene oxides and/or graphene quantum dots, with thickness control and high quantum yield, should be demonstrated through easily scalable processes and overall with appropriate functional groups, compatible with physiological media and able to maximize the interaction with the disease biomarkers.

8. Highly selective gas sensors based on GRMs

The major challenges in the emerging gas sensing concepts are concentrated on selectivity. Highly sensitive GRM-based gas sensors analysing e.g. the charge carrier response to the adsorbed gases have inherent limitations in the selectivity, similar to the more conventional material systems such as functionalised oxides and their matrices. The only viable alternative for the next phase selective gas sensors is in the direct measurement of the spectral fingerprints of the gases.

Areas or special interest are: GRM based spectroscopic systems for the measurement of the characteristic vibrational spectra of gaseous substances at far-IR / THz region and/or dissociation spectra in the UV region; potentially (non-dispersive) IR/THz gas sensors or waveguide-based sensors; potentially employing bolometric or thermoelectric effects in GRMs.

Systems should be operating at ambient or room temperature and the stability with respect to humidity and thermal fluctuations should be controllable. The spectral features under analysis should be narrow and distinguishable enough to allow selective detection irrespective to the presence of other gases and this, as well as the benefit of GRM in relation to more conventional material solutions, should be rigorously justified in the proposal.

9. GRM-based bioelectronic technologies

The call aims at projects exploring GRM-based bioelectronic technologies and devices for in-vitro and in-vivo applications.

Projects addressing the topic of in-vitro cell interfaces should aim at developing novel technologies based on GRMs for studying in-vitro cell or tissue related processes (growth, electrical and chemical signalling, etc.) or at exploiting these technologies for sensing (cell-based drug screening, etc.). Beyond demonstration of novel technology concepts (electrical, optical, mechanical, etc.) taking advantage of GRM characteristics as well as their combination with other materials, the projects should aim at integrating the technologies into prototype platforms, including engineering of functionalities such as microfluidics and electronics.

Projects addressing the topic of bioelectronic devices for in-vivo applications should aim at developing GRM-based flexible devices that, via nerve/tissue stimulation or recordings (central or peripheral nervous systems), can be used to restore or maintain healthy conditions or to study cognitive functions or neural disorders. In particular, the call targets technologies for control of

artificial limbs or devices, neuromodulation, and rehabilitation (spinal cord injury, stroke, pain, speech disorders, etc.), as well as applications involving organs different than the brain (cardiovascular, such as pacemakers, etc.). The developed technologies must be designed and evaluated together with clinical organizations (leading the therapeutic assessment) as well as industrial partners (leading the commercial exploitation) and tested on relevant preclinical models for studying functionality, efficiency, safety and mechanisms of action.

HBP – Basic and applied research

Projects should contribute to the aims of the HBP and address ambitious research questions in the field of brain research including medical research, brain inspired technologies, robotics & computing and/or contribute to technological development. The proposed activities should be based on the latest scientific knowledge, and include innovative concepts that bring the field closer to the solution of a concrete and important problem in an interdisciplinary research approach. Objectives should be realistic and measurable, and reproducibility should be ensured. Proposed activities should demonstrate their potential to shape the evolving HBP ICT platforms (Subprojects 5-10), e.g. showcasing the value that these platforms can add to the neuroscience community, and/or foster their development. Ideally they cut across existing HBP Subprojects, including neuroscientific and platform Subprojects and/or the 'Ethics and Society' Subproject.

1. Human brain intracranial data and their relationship to other aspects of brain organisation

Human intracranial data are optimal to bridge levels of observations and understanding between animal electrophysiology and human non-invasive recordings (fMRI, EEG, MEG). It would be extremely valuable to provide intracranial data collected during cognitive tasks, e.g. multi-unit recordings, to integrate them into the Human Brain Atlas, and to analyse them, for example with respect to other aspects of brain organisation (structural, functional), ideally in collaboration with experts in other recordings scales (monkey or non-invasive human recordings). There is an added value for the Human Brain Atlas and for modelling and simulation.

2. Comparing morphology and physiology of cortical cell types in human and non-human primates

Simulating human brain neuronal circuitry based on data-driven models is one of the major goals of HBP. The simulation of the somatosensory cortical column of rodents provides a roadmap for data-driven modelling and simulation of human circuitries. However, early results on neuronal morphologies and physiologies revealed that several properties of human neuronal circuits in the cortex are strikingly different from rodent cortical circuits. To understand whether these differences are specific to human neocortex or whether they extend also to non-human primates, research is needed on the morphology and physiology of neuronal circuits in the non-human primate neocortex subserving similar functions in both species.

3. Comparative aspects of brain function and connectivity

Studies on homologies of the human brain and the brains of other species are central for understanding how far data from animal models can be transferred to human brain research. It is proposed to study neuronal activity/connectivity across species for the same task and experimental set-up. This would concern preferably comparisons between mouse, monkey, and human brains.

For example, fMRI can be used to compare brain activations obtained during cognitive tasks in different species, and to establish quantitative, functional connectivity matrices across homologous areas and networks in multiple species under varying states and task conditions. Such in-vivo connectomes are needed to build and simulate multimodal computational architectures of the cortex incorporating ex-vivo histological and receptor-density data in the same models.

In addition, comparative fMRI experiments in monkeys and human patients that have to undergo surgical resection of epileptic foci may be performed with the goal to identify potentially functionally homologous regions in the temporal pole. Based on the fMRI maps, equivalent portions of monkey cortex can be dissected as in the patients. Both brain samples could then be prepared for slice recordings to perform a detailed physiological and morphological characterization of cells in both samples. This would allow a direct comparison of neurons in human and monkey association cortex which are likely contributing to similar perceptual or cognitive processes.

4. Cross-species multi-scale data constraints for visuo-motor integration

Multi-scale object recognition and sensorimotor integration neural simulation models are being developed in the HBP based on both experimental data and conceptual models. The present research area targets contributions from additional multi-scale data from multiple simultaneous electrophysiological recording data from relevant brain areas in non-human primates (e.g. visual, parietal, subcortical, premotor, motor) performing the same or similar sensory-motor tasks. Additional high-resolution fMRI and EEG human data for other sensory-motor tasks could provide useful constraints for validating and generalising the simulation models.

5. The neural bases of spatial navigation and episodic memory

Spatial navigation represents a complex function of the vertebrate brain. It requires the brain to remember a sequence of locations and events stored in episodic memory to be able to navigate. Central to this information processing are circuits in the entorhinal cortex and hippocampus. Much is known regarding specific cell types, connectivity and transmitters. It is proposed to translate this extensive knowledge into an understanding of the circuits generating navigation, to identify the input sources and the output that forwards information to the motor centres.

6. Models of auditory processing

The auditory system is important for navigation and to sense the environment, but has not been considered in HBP so far. The present research area aims to develop data-driven models of auditory processing, from the level of the cochlea up to the auditory cortex (including brain stem and thalamic nuclei) with a focus on the “awake” auditory processing. The models should be implementable in neuromorphic hardware and ideally run in real-time, for being used in neuro-robotics applications, or sensori-motor navigation paradigms.

7. Representation of perceived or memorised information in multi-level systems

In various HBP projects both bottom-up and top-down approaches are pursued for understanding the linkage between low-level, e.g. single neurons and local microcircuits, and high-level systems, e.g. networks distributed across multiple areas, in relation to behaviour, perception and cognition. Novel, emerging techniques such as 2-photon calcium imaging or high-density silicon probe recordings now allow researchers to study the relations between these multiple levels in combination with behavioural paradigms. The present research area aims to investigate how these different levels are connected and organised to understand the neural representation of perceived or memorised information.

8. Modelling dendrites within active networks

Dendrites are important to understand how neurons integrate information but little is known about dendritic function in activated states of the brain. The goal of this research area is to design models of dendrites with unprecedented dynamical realism, directly constrained by experiments. The experiments should directly visualize (using voltage-sensitive probes) the activity of cortical dendrites, during “active” network states, either in vivo or in vitro. Models are then designed (or existing models improved) directly based on these data. The goal is to understand dendritic processing in vivo, ultimately in awake animals.

9. Testing predictive coding and attractor network models

The construction of world models by the brain has been conceived in terms of multiple theoretical models, such as Predictive Coding networks (where incoming sensory information is predicted based on prior experience), Attractor networks (recurrently connected dynamic networks) and Hierarchical models of feature detectors. This research theme should examine (i) whether model predictions can be verified or rejected by physiological and behavioural data; (ii) whether sensory and memory systems may realistically combine models within one overall architecture; (iii) what computational properties such joint models have.

10. Biological deep learning

Deep learning networks have turned out to be very efficacious in addressing complex problems such as playing games (e.g. Go), image classification and object recognition. The next challenge is to implement such networks in biological brains. The present research area aims to research whether less realistic properties of deep learning algorithms could be replaced by more biological properties, i.e. realistic bioelectric behaviour of neurons, and how the functionality of networks could be further augmented using knowledge about the brain.

11. Disease modelling and simulation

The Medical Informatics Platform aims to achieve biologically based classifications of brain diseases, and thus to take advantage of rich data available in hospitals. The objective of this area is to promote clinical proof-of-concept studies of the Medical informatics and the simulation platforms. Projects will have access to data and bioinformatics methods (machine learning, data intensive network analysis, pathways analysis in large volume of data) to gain new clinical insights, derive mechanisms of disease causation and mechanisms of action of known therapeutic agents. Possible research themes include mechanisms of disease causation, mechanisms of action of known therapeutic agents, screening of drug candidates, and developing theory-driven models of disease directly constrained by experimental data in human and animals from the biological signatures of disease and the disease classifications identified by researchers using the Medical Informatics Platform.

12. Innovative modelling for allosteric drug discovery

Innovative neuromedicine approaches require a detailed understanding of the molecular and systems-level organization of the human brain, the causes and mechanisms of diseases, their progression, and the response to treatments. Because of the high level of complexity of the nervous system and of intersubject variability in molecular brain organization, behaviour and disease, addressing these issues for any neuropathology appears a daunting task. Indeed, for most neurodegenerative diseases, such as Alzheimer's and Parkinson's, there is currently no cure in spite of the very large investments from academia and industries. The discovery of new drugs against brain diseases thus has high ethical priority for the on-going neuroscience research. HBP offers novel insights and computational methods to design and in silico select original classes of drugs.

Allosteric pharmacology, or the design of drugs targeting sites topographically different from the endogenous ligand binding site, is one of the most recent innovative approaches to drug discovery. Classical neuroactive drugs were designed on the basis of their similarity-isosteric competitivity with compounds of natural origin. The allosteric interaction paradigm, instead, offer alternative drug-discovery opportunities.

There is a need for novel molecular-simulation based research efforts to accelerate the discovery of new and more effective treatments, based on allosteric mechanisms, reducing the problem of side effects, whilst speeding up and drastically lowering the cost of drug discovery.

13. Integration of simulation tools, neuromorphic computing and robotics with brain and behavioural studies for developing next-generation brain-computer interfaces

Using expertise on brain organization, cognitive and theoretical neuroscience, as well as brain simulation and neurorobotics, the present research area proposes to develop next-generation interfaces for controlling brain states and neural population activity subserving neuroprosthetics, brain stimulation techniques, optogenetics (highly specific control of neural circuits by genetic manipulation and light, in animal models) and other forms of real-time feedback to brain systems.

14. Text mining of cellular, synaptic, connectomic or functional properties of the brain

Basic semantic data mining capabilities are available in the Neuroinformatics Platform of the HBP. This research area aims to develop HBP text mining tools (Sherlock, a UIMA based text mining engine) or adapt open source community toolkits and workflows in the text mining community to extract information relevant for HBP modelling and predictive work. Of particular interest in this effort are cellular, synaptic, connectomic, and functional properties of all scales of the health and diseased brain.

FLAG-ERA

Joint Transnational Call 2017

for research projects in synergy with the two FET Flagships

Graphene Flagship &

Human Brain Project

Call Announcement

Deadline: 14 March 2017, 17:00 CET

Documents and procedures:	http://www.flagera.eu
FLAG-ERA Joint Call Secretariat:	Fabien Guillot **+33 1 73 54 81 97** **fabien.guillot@agencerecherche.fr**
Indicative budget:	**€ 15.980.000**

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1. Introduction

The two FET Flagship initiatives, the Graphene Flagship and the Human Brain Project (HBP), are large-scale initiatives in the European Research Area addressing grand scientific and technological (S&T) challenges, based on a unifying vision, a core project serving this vision, and mechanisms to align efforts funded from various sources with this core project toward this unifying vision[1]. In this context, FLAG-ERA, the 'Flagship ERA-NET', gathers National and Regional Funding Organisations (NRFOs) in Europe and beyond with the goal of supporting, together with the European Commission (EC), the FET Flagship initiatives. One of its main aims is to allow researchers to complement the current Flagship projects and to collaborate towards the achievement of their vision through the use of existing or dedicated transnational, national and regional calls. In particular, FLAG-ERA aims at launching dedicated joint transnational calls (JTCs) allowing researchers from several countries to jointly contribute to the Flagship goals. After a first one launched two years ago (the JTC 2015), the present call is the second JTC in support of the two Flagships.

Such JTCs combine the features of conventional ERA-NET calls with specific features for the Flagships. First, the thematic scope of the call is based on inputs from the Flagship Core Projects, and corresponds to topics where synergies with them are expected. Second, proposals include information on the expected synergies in the framework of the proposed projects and selected projects are expected to become Flagship partnering projects. While a formal approval is not needed at submission stage, discussions prior to submission are encouraged to avoid any issue after selection. Proposals can include Flagship Core Project partners, but the evaluation and selection processes are independent of the Flagship Core Projects.

As a novelty in this call compared to the JTC 2015, in order to accompany the Graphene Flagship evolution toward higher technology readiness levels (TRL), a sub-call on applied research and innovation is organised in addition to one on basic research for the Graphene topic. For the HBP topic, a single sub-call covers basic and applied research. Each sub-call bears on different research areas and will be evaluated by different evaluation panels.

The NRFOs participating to this call are listed in the next section. The JTC will be conducted simultaneously by these NRFOs and coordinated centrally by the Joint Call Secretariat (JCS). The NRFO Contact Points (CPs) are provided in Annex II, and the contact information of the JCS is provided on the front page of the present Call Announcement. The descriptions of the scientific areas for this call are provided in Annex I. Only proposals falling into these areas will be considered.

[1] http://graphene-flagship.eu/project/partnering/Pages/Partnering-Mechanisms-under-Horizon-2020.aspx, https://www.humanbrainproject.eu/partnering-projects.

2. Participating NRFOs and indicative budgets

The table below provides the list of NRFOs participating to the call, indicative budgets and anticipated number of fundable research groups. Note that the list of participating NRFOs depends on the Flagship and, for the Graphene Flagship, on the sub-call ('basic research' or 'applied research and innovation').

Country		Funding organisation	Graphene (k€)		HBP (k€)	
			Basic research	Applied research and innovation	Basic and applied research	Anticipated nb of fundable research groups
BE	Belgium	FNRS	200	-	200	2
		FWO	500		500	2-4
BG	Bulgaria	BNSF	175	-	175	2-3
DE	Germany	DFG	2000	-	-	10-12
ES	Spain	MINECO-AEI	560		560	6-9
FR	France	ANR	1250		1250	8-10
GR	Greece	GSRT	500	200	-	7
HU	Hungary	NKFIH	250		250	4
IT	Italy	MIUR	-	100	100	2
LT	Lithuania	LMT	100		100	2
LV	Latvia	VIAA	200		200	2-3
NL	Netherlands	FOM	1000	-	-	3-4
PL	Poland	NCBR	-	500	-	2-3
RO	Romania	UEFISCDI	250		250	6-8
SE	Sweden	VR & VINNOVA	500	500	500	4-8
SI	Slovenia	MIZS	210		420	3
SK	Slovakia	SAS	240		240	4-5
TR	Turkey	TUBITAK	1000		1000	5-6
		Total:	10235		5745	

3. Timeline

The timeline below is indicative. The exact deadline for full proposals will be provided when notifying the accepted short proposals.

14 March 2017	Short proposal submission deadline
End May 2017	Notification of accepted short proposals
July 2017	Full proposal submission deadline
Oct 2017	Notification of accepted full proposals
Dec 2017 - March 2018	Project start (duration up to 3 years)

4. Eligibility

The FLAG-ERA joint transnational call is a hybrid funding instrument. Proposals are submitted by international consortia with partners in multiple countries, and the proposal evaluation and selection are international. Funding is then provided by participating funding organisations directly to the selected consortium partners.

Each partner is directed by a principal investigator (PI), who interacts with its respective NRFO. One partner acts as the coordinator for the consortium and is the single point of contact with the FLAG-ERA JCS.

It is both necessary that the consortium is eligible for FLAG-ERA, and that all partners are eligible to be funded by their respective NRFOs.

4.1. Eligibility of the consortium

Consortia must be international. They must involve at least 3 different partners from 3 different countries. It is possible to request funding in only 2 of these countries, provided that a partner from another country can secure its funding as a Flagship Core Project partner. In other words, the consortium must fulfil at least one of the following two options:

- At least 3 partners requesting funding from 3 different countries participating in the JTC, or
- At least 2 partners requesting funding from 2 different countries participating in the JTC plus a Flagship Core Project partner from a different country (possibly not participating in the call), not requesting funding in the framework of the JTC and securing its own funding.

Furthermore, the consortium coordinator must be a partner requesting funding (and be eligible for funding) from an organisation participating in the call.

Consortia must be balanced. The maximum requested funding allowed per country in a proposal is 60% of the total requested funding of the proposal, except if only partners from 2 countries apply for funding, in which case this figure is raised to 75%.

Research groups who are not eligible to receive funding by an organisation participating in the call but are willing to collaborate and contribute to the proposed project may be part of a consortium if they are able to secure their own funding. Third-party funding is not considered for the application of the above-mentioned balance rule.

4.2. Eligibility of partners

The eligibility criteria for partners are specific to their respective NRFO. In order not to jeopardize the whole consortium, each partner in the consortium should ensure that no doubts exist about the eligibility of their institution (university, academic institutions, industry), the eligibility of their PI (permanent staff, position secured for the duration of the project, etc.), and their eligible costs. It is important to note that some NRFOs require that eligibility of partners is checked with them prior to applying. It is the responsibility of the coordinator to ensure that all necessary checks have been done before submitting.

Details as well as contact points are provided in Annex II.

4.3.Duration

Projects may be funded for a period of up to three years and according to individual funding organisation regulations (see Annex II).

5. Application procedure

Before submitting, ensure the proposal is valid, and in particular that:

- the research is in line with the topics of the call,
- the consortium meets the eligibility criteria,
- each partner meets the eligibility criteria, and
- all partners who must contact their NRFO prior to submission have done so.

5.1.Submission of pre-proposals (1st step)

A joint pre-proposal document (maximum 10 pages, in English, in PDF format) shall be prepared by the consortium partners and submitted by the coordinator. Additionally, a Flagship partnership proposal shall also be prepared and submitted. These two documents shall follow the templates provided on the call web page. They shall be submitted in electronic format no later than the deadline provided on the front page of this call announcement, via the electronic submission system (http://submission.flagera.eu/).

It is recommended that a preliminary proposal be submitted several days before the deadline to guarantee against unforeseen issues. Submitted proposals can be updated until the deadline.

Partners whose funding organisation requires submitting forms alongside the consortium application must do so at this point.

The coordinator and all partners must be in a position to diligently answer e-mail queries after the submission. If a partner's PI is not available, he or she must be represented by a collaborator of the same organisation.

5.2.Submission of full proposals (2nd step)

If selected after the first step, applicants will be invited to submit a full proposal. At least 6 weeks will be granted for preparing the full proposal. The submission deadline will be given in the invitation to submit the full proposal. The procedure is similar to the submission of the short proposal, except for the following points:

- The maximum length of full proposals is 30 pages (cf. full proposal template).
- The full proposal is expected to be consistent with the pre-proposal. Any change to the plans described in the pre-proposal should be explained and justified. If the changes involve a change in consortium composition, it is strongly advised to contact the national contact points in the concerned countries as well as the Joint Call Secretariat prior to submission to check for any eligibility issue.

The Flagship partnership proposal can be updated at this stage.

6. Evaluation and selection

Proposals are assessed and ranked by independent international Scientific Evaluation Panels (SEPs). There are three different SEPs, one for each sub-call for the Graphene topic ('basic research' and 'applied research and innovation') and one for the HBP topic ('basic and applied research').

6.1. Evaluation criteria

The evaluation criteria are the following:

1. **Relevance** to the call (this criterion applies to the first step only)
   a. Relevance to the topic
   b. Level of potential synergies with the Flagship
   c. Complementarity to the Flagship Core Project
2. **Excellence:** Scientific and/or technological excellence with respect to the topics of the call
   a. Soundness of the concept, and quality of the objectives
   b. Progress beyond the state-of-the-art
   c. Quality and effectiveness of the methodology and the associated work plan
   d. Originality and novelty of ideas
3. **Implementation:** Quality and efficiency of the implementation and management
   a. Appropriateness of the management structure and procedures
   b. Quality and relevant experience of individual participants
   c. Quality and added value of the consortium (complementarity, balance, etc.)
   d. Appropriateness of allocation and justification of requested resources (staff, equipment…)
   e. Identification of risks and mitigation plan
4. **Impact:** Potential impact through the development, dissemination and exploitation of results
   a. Potential impact at the European and/or international level
   b. Societal and scientific importance
   c. Appropriateness of measures for the dissemination and/or exploitation of project results, and management of intellectual property

6.2. Evaluation and selection of pre-proposals

Proposals are evaluated by the SEPs. The assessment of each proposal is detailed in a consensus report, which is made available to the applicants.

On the basis of the ranking, the top ranked proposals, representing a cumulated amount of requested funding of about three times the total available budget for the call, are selected at this stage.

6.3.Evaluation and selection of full proposals

Proposals are assessed by the SEPs with the help of external reviewers. The assessment of each proposal is detailed in a consensus report, which is made available to the applicants.

On the basis of the ranking and of available funding, a board representing the participating funding organisations (Call Steering Committee, CSC) will prepare a list of projects recommended for funding.

7. Association to the Flagship

Projects recommended for funding are invited to proceed with the formal association to the Flagship, using the Flagship standard association procedure (cf. links provided in the introduction). Any issue at this stage is treated through classical project risk management.

8. Management of projects

8.1.Setting up the consortium

If the proposal is recommended for funding, each partner submits an administrative application to the chosen funding organisation to apply for their FLAG-ERA funding (grant or contract). The subsequent negotiation phase between the partners and the funding organisations follows their established procedures and, if successful, results in a grant agreement between the two parties.

All partners of a consortium should agree on a common start date, which is communicated to the FLAG-ERA JCS, and request funding in agreement with this common start date, to ensure that the collaborative research can be conducted as planned.

The administrative and financial management of funding is overseen by the respective funding organisations, according to their rules and guidelines.

At the latest three months after a project's start, a consortium agreement has to be signed by all partners and sent to the FLAG-ERA JCS. Some funding organisations may require that the consortium agreement is signed before the grant agreement can be finalised or before any payment.

8.2.Reporting and publications

The coordinators of funded projects have to submit a scientific report on each 12-month period of the project. The reports must be sent to the FLAG-ERA JCS within two months after the end of each period. In addition, the consortia must present the status of their projects at yearly events (expectedly three times for three-year projects). These events will be, as much as possible, coupled with Flagship events. The related costs are eligible and it is advised to include them in the project budget. Note that the participation in the Flagship might involve other meetings, and that the related costs are also eligible.

Some funding organisations require separate reports for individual project partners. This will be specified in their grant agreement.

Any publications resulting from FLAG-ERA funded projects must acknowledge FLAG-ERA, and an electronic copy must be sent to the FLAG-ERA JCS. Granting open access to publications and data is encouraged (related costs are eligible, in the framework of the respective funding organisation regulations).

ANNEX I – Topic descriptions

The FLAG-ERA JTC 2017 comprises two topics, one for each Flagship. The Graphene part of the call is sub-divided into two sub-calls, one for basic research and one for applied research and innovation. There are thus three sub-calls in total. Each sub-call covers a specific list of research areas listed below and described in the following pages. Relevant parts of the Flagship and contact points for each area are provided on the call web page.

Graphene JTC areas (Basic research)
1. Synthesis and characterization of Layered Materials (LMs) beyond graphene
2. Large scale production of heterostructures based on LMs
3. Vertical and lateral epitaxy of Graphene and Related Materials (GRMs) for optoelectronics
4. Functional ceramics incorporating GRMs
5. Inks for printing stable, GRM-based, semiconducting thin films
6. Modelling charge and heat transport in GRM-based composites
7. Ecotoxicology of GRMs
8. Nanofluidics using GRMs
9. Novel device concepts based on GRMs for quantum communication
10. Beyond CMOS switches and new computing paradigms based on GRMs
Graphene JTC areas (Applied research and innovation)
1. In-situ and ex-situ quality control of GRMs
2. Controlling doping in high quality large-area graphene
3. GRMs for smart textiles
4. Functional coatings using GRMs
5. GRMs for corrosion prevention and as lubricants
6. GRMs for thermal management and thermoelectrics
7. Biorecognition of specific disease markers using GRMs
8. Highly selective gas sensors based on GRMs
9. GRM-based bioelectronic technologies
HBP JTC areas (Basic and applied research)
1. Human brain intracranial data and their relationship to other aspects of brain organisation
2. Comparing morphology and physiology of cortical cell types in human and non-human primates
3. Comparative aspects of brain function and connectivity
4. Cross-species multi-scale data constraints for visuo-motor integration
5. The neural bases of spatial navigation and episodic memory
6. Models of auditory processing
7. Representation of perceived and memorised information in multi-level systems
8. Modelling dendrites within active networks
9. Testing predictive coding and attractor network models
10. Biological deep learning
11. Disease modelling and simulation
12. Innovative modelling for allosteric drug discovery
13. Integration of simulation tools, neuromorphic computing and robotics with brain and behavioural studies for developing next-generation brain-computer interfaces
14. Text mining of cellular, synaptic, connectomic or functional properties of the brain

Graphene – Basic research

1. Synthesis and characterization of LMs beyond graphene

Layered materials (LMs) are crystals where robust chemical bonding within the planes coexists with weak van der Waals coupling of those layers to the environment or in heterostructures, with properties suitable for electronics and optoelectronics applications. Further capability building is needed in:

- growth of atomically thin stable LMs (such as hBN, MoS_2, $MoSe_2$, $MoTe_2$, WSe_2, GaS, GaSe, GaTe, and InSe) using molecular beam epitaxy (MBE), chemical vapour deposition (CVD) and/or atomic layer deposition (ALD);
- finding chemical routes for repairing defects and damage in LMs produced by growth or exfoliation from bulk layered crystals;
- synthesis of novel semiconducting and metallic layered compounds that can be exfoliated into monolayers.

Proposals should foresee a balanced approach to materials fabrication and characterisation and plan for both growth/synthesis activities and suitable structural, optical, scanning microscopy, and/or electronic transport characterisation of the produced LMs. Projects are expected to gather teams with complementary expertise in growth and characterisation, with ready access to the necessary facilities. Developments should be benchmarked against the same materials already produced worldwide, showing that the material quality can advance electronic or optoelectronic devices beyond state of the art.

2. Large scale production of heterostructures based on LMs

The objective is to produce van der Waals heterostructures in a reliable, scalable and reproducible manner. The existence of a wide range of LMs gives the opportunity to create atomically thin pn-junctions, Schottky barriers, or tunnel junctions as these materials have strong intralayer bonding but only exhibit weak van der Waals interactions between adjacent layers. Applications are foreseen in functional electronics or high-end instrumentation development (e.g. detectors or sensors) in industrial sectors such as electronics and energy.

Materials may include mono-atomic layers (graphene, silicene, and phosphorene), compound mono-layers (BN, GaX) as well as other unit-cell thick materials such as transition metal dichalcogenides (TMDs). The scalable synthesis of heterostructures resulting from the formation of atomically sharp interfaces between strongly bonded oxides can also be considered. The approach may be wet-chemical assembly, including layer transfer or direct growth with chemical vapour, as well as physical vapour deposition, molecular beam epitaxy (MBE) or sputtering technologies. It should be explicitly shown that atomically thin interfaces are produced in the fabrication process. In order to assess the properties and functionalities of the heterostructures, characterization of the heterostructures is mandatory.

3. Vertical and lateral epitaxy of GRMs for optoelectronics

Graphene and related material (GRM) heterostructures offer a variety of novel functionalities determined by material choice and structure design, and give high performance due to atomically clean and sharp interfaces. Devices based on these heterostructures enable a wide range of applications such as light-emitting diodes, photovoltaic devices, and photodetectors. To further develop and use combinations of these structures, heteroepitaxial growth is needed for both vertically stacked heterostructures as well as in-plane connected GRM heterostructures.

The quality of the materials, as well as of the heterostructures, needs to be evaluated including the crystal orientation, relative orientation of the different materials and the sharpness of the interfaces. Also important is the evaluation of the interlayer coupling, in the context of the desired applications. The GRM range includes graphene, transition metal dichalcogenides (TMDs) and also GaX. The role of graphene is to be an efficient electrical contact for semi-conducting LMs. Devices fabricated based on the grown structures and demonstration of their functionality for opto-electronic applications, such as photodetectors, modulators, transceivers, light emitting diodes, single photon emitters are required. This includes an evaluation of the performance of the devices, such as efficiency and speed.

4. Functional ceramics incorporating GRMs

The use of GRMs as nano-additives in composites is one of the most mature research areas for these promising materials, with GRM-polymer composites already on the market. GRM-ceramic composites have received comparatively little attention, even if the use of ceramics as coating tiles, refractory material or bio-implants is a major industrial field. Effective development of GRM-ceramic composites is challenging due to the poor processability of both materials and the high temperatures involved in ceramic production.

The goal is to develop new GRM-ceramic composites, using the unique properties of GRMs to have structural, chemical, optical or electronic functionalities that cannot be obtained with other types of additives. Fundamental research is required, as example to better understand and control the (opto)electronic properties of GRM-ceramic interfaces. A clear vision of how the new functionalities developed shall solve existing problems, or allow new technological applications of ceramics, is needed.

5. Inks for printing stable GRM-based semiconducting thin films

Printing and solution processing are established approaches for low cost and high volume manufacturing, but the availability of printable materials exhibiting stable semiconducting properties and high enough charge carrier mobility (>40cm^2/Vs) for practical electronic applications is limited. Solution-based GRMs with semiconducting properties are very promising for the realization of large scale printed electronic applications.

The main challenges that need to be addressed include: manufacturing of semiconducting GRM powders and dispersions in bulk volumes; formulation of semiconducting GRMs into inks with a stable rheology without compromising the electrical properties of the materials; GRM inks formulation in friendly solvents; printability of the produced inks into stable semiconducting thin

films on standard substrates. In addition, the following key processes should be developed: substrate conditioning for optimal printing; post-processing of the printed structures to optimize the electrical performance and/or stability; contacting of the semiconducting thin film. The functionalization of the semiconductor material or thin film for specific properties would also enable further applications such as sensing. Devices utilizing printed semiconducting GRMs should be demonstrated with a mobility > 40cm^2/Vs and an ON/OFF ratio > 10^5, and the performance of the inks should be benchmarked against state-of-the-art materials, using the charge carrier mobility and the devices stability as key performance indicators.

6. Modelling charge and heat transport in GRM-based composites

Charge transport in graphene has been intensively studied. However, most studies focus on charge transport in defect-free graphene, or graphene nanoribbons. GRMs are often produced as highly non-ideal structures. Point defects, amorphous pockets, wrinkles, mismatching crystalline grains are found at the microscale, while stacking and inter-sheet interactions play critical role for the overall physical properties at the macroscale. Besides electrical transport, also heat transport requires a deep understanding of the physics and structure of complex GRM-based composite materials, and the details of inter-sheet interactions. For GRMs to have a real impact, one thus needs a deeper understanding of charge and heat transport in large scale models of thin conductive layers of GRMs composed of large number of overlapping sheets, or three-dimensional percolating layers present in bulk composites.

Multiscale experimental, theoretical and computational tools should be developed to study the charge and heath transport of systems composed by large numbers of interacting GRM nanosheets, and of the interfaces present in such systems. Projects should investigate the charge transport properties and/or the thermal conductivity of GRM-based composites, through the development of a full hierarchy of computational and theoretical models, for example ranging from two-dimensional continuum elasticity to atomistic modelling of charge and heat currents in very large size systems. The structural morphologies of studied materials and transport results should be cross-validated with experimental data of relevance for applications.

7. Ecotoxicology of GRMs

The study of the interactions of GRMs and living organisms must be extended to a wider array of materials and to the toxic substances frequently present in polluted environments, whose action might be promoted or inhibited by GRMs. The aim is to promote safety-by-design, meaning that potentially toxic properties could be engineered out in order to have new, improved, non-toxic materials, still retaining their desirable properties. Because ecotoxicology has to provide the regulatory assessment tools related to the future GRMs in the environment, it is necessary to design new protocols relevant to natural exposure conditions. Understanding the global mechanisms of interaction and effects of GRMs under natural conditions could be achieved by designing experimental trophic chains and bio environments using representative organisms and cell models in aquatic and terrestrial setting.

Areas of special interest are:

1) Characterization of materials properties and interplay with pollutants in connection to potential GRMs ecotoxicity. A combination of well-characterized, "custom-designed" materials (i.e. materials with systematic variation in properties, such as lateral dimensions or number of layers) needs to be investigated in comparison to others that are relevant from an industrial and commercial point of view, and released in use conditions or simulated use conditions, together with different arrays of heavy metals and organic contaminants. The effects need to be assessed on ecologically relevant organisms (e.g. soil organisms, nitrogen fixing bacteria and cyanobacteria, mycorrhizal fungi, or autophototrophs), aquatic model organisms and different relevant unicellular models.

2) Physico-chemical and biological biodegradation processes and sedimentation of GRMs in soil and water ecosystems. The numerous physico-chemical interactions between these materials and humic colloids, e.g. humic and fulvic acids, need to be studied spectroscopically in order to describe the potential impact of the environmental matrices (“eco”-corona) on the biodegradation and sedimentation processes.

8. Nanofluidics using GRMs

GRMs show great potential for many applications (including separation of gases, heat exchanges, water filtration, energy storage, biomedical applications, and various sensors) where understanding of the nanofluidic properties of GRM laminates plays a crucial role. Further research is needed to use GRMs to develop structures or laminates with a significant performance improvement over current technologies, and to exploit the new opportunities offered by GRMs.

Projects should outline a credible route towards higher technology readiness levels and, ultimately, new industrial products. They should combine experimental and theoretical efforts, based on the expertise in GRM fabrication, characterisation and modelling of their relevant structural and nanofluidic properties.

9. Novel device concepts based on GRMs for quantum communication

The rapid technological advances in quantum communication have triggered increased interest for commercial applications. An important roadblock is the limited performance of single photon detectors and controllable sources of single photons or entangled photon pairs. GRMs offer new ways to control single photon emission, for example from localized emitters such as quantum dots embedded in the material.

There is a strong need to gain better control and understanding of the exciton localization and the ability to tailor the localization in terms of position, emission properties, ability of electrical control, etc. Ideally the emission wavelength should be expanded from visible to shortwave-infrared, up to 1.5 μm, covering the telecommunication window. It is important to integrate the emitters with cavities in order to enhance the emission efficiency, and to enable efficient coupling with integrated photonic systems. In addition, controllable emission of entangled photon pairs is required. For a single-photon detection platform, there is a need to employ GRMs for single photon detection with high quantum efficiency. One promising approach is the implementation of GRM-based

superconducting bolometers. The sensitive wavelength range should extend up to and preferably beyond 5 μm. Benchmarking of the devices with existing technologies is essential.

10. Beyond CMOS switches and new computing paradigms based on GRMs

The geometric scaling of silicon transistors is approaching fundamental limits and solutions in the beyond CMOS area are required. GRMs offer several different possibilities to realize beyond CMOS switches and devices enabling novel computing paradigms.

Proposals should focus on the experimental demonstration of proof-of-concept devices based on GRMs for beyond CMOS switches or devices enabling novel computing paradigms. If applicable, the implementation of these devices into new computing architectures may additionally be addressed. Specific devices within the scope of this call topic include, but are not limited to: (Vertical) tunnelling transistors, ballistic switches, devices based on GRM heterostructures, devices utilizing the spin degree of freedom, quantum devices or similar. Projects may include also theoretical work in order to provide an outline on the ultimate performance of the devices, to develop models for the devices or to reduce the parameter space for further improvement.

Graphene – Applied research and innovation

1. In-situ and ex-situ quality control of GRMs

Fast and reliable characterization of GRMs is an important step for production quality control and industrialization of material synthesis. Therefore it is essential to develop techniques, in-situ and ex-situ, to monitor the quality of these materials and provide feedback for process control or material grading.

Areas of special interest are: (i) in-situ techniques that are able to detect in real-time (a) different oxidation states of the catalyst; (b) identify monolayer growth and area coverage; (c) number of layers and (d) estimation of the grain size; (ii) Ex-situ techniques that can quickly provide information on the film morphology, thickness, composition, surface and electrical properties are also required.

Demonstrators should target the characterization of at least one property of mono- or multilayer GRM over a large set of experimental samples.

2. Controlling doping in high quality, large-area graphene

Doping is an essential process to engineer the conductivity and work function of graphene. Besides electrostatic doping, other techniques such as chemical doping need further exploration. The two major approaches involving chemical doping of graphene include substitutional and adsorbate-induced doping. Substitutional doping involves replacement of carbon atoms in a graphene layer by other atoms, such as nitrogen and boron. It is difficult to control, and it significantly disrupts the graphene lattice, thus deteriorating the charge carrier mobility. Adsorbate-induced doping, on the other hand, exploits the 'surface-only' nature of graphene to modulate the charge carrier concentration via physisorption of molecules. This type of doping takes place via charge transfer between dopant and graphene. While the controllability is more favourable compared to substitutional doping, the weak nature of the physisorbed interaction limits the robustness, hence feasibility, of this routine.

Alternatively, chemical modification could provide a means that is controllable, as well as being chemically and thermally robust. Chemical functionalization can form sp^3 defects at the points of covalent attachment. Covalent attachment of molecules to graphene is also a known method of inducing doping. Thus, covalent functionalization provides a platform in which to tackle simultaneously the issue of band gap tuning and charge carrier doping. The high degree of surface coverage control over the extent of modification and homogeneity make covalent functionalization an attractive protocol. However, a major drawback to chemically modifying graphene is that the unique electronic structure (sp^2 based) can be destroyed. In general, due to the use of highly reactive species, required because graphene has a relatively low chemical reactivity due to the delocalization of the π electrons over the entire two-dimensional network, the chemical modification of graphene cannot be spatially ordered and the covalent attachment occurs randomly. This results in a significant reduction of the charge carrier mobility, for which a solution must be found. Other problems such as scalability, combination with the graphene transfer, robustness and reproducibility arise at when fabricating and patterning graphene components into integrated circuits, especially in ambient

conditions. Current state-of-the-art methods do not offer viable graphene components to compete with the present materials in use, hence alternative strategies are demanded.

The target is to devise an efficient strategy for large area doping of graphene, while preserving key properties such as mobility and scattering time. This needs to be combined with large area transfer processes. All approaches must result in a material that is CMOS compatible, in terms of metal and other impurities, as for CMOS fab rules.

3. GRMs for smart textiles

Current advanced (or smart) textile technology relies on a heterogeneous platform of multilayers printed or coated in sequence onto fibres or directly deposited on the final fabric. Current conducting fibres for smart textiles mainly use thin Cu or Al wires bundled with cotton or coated with polymers, and the main components are textile-integrated (into/onto the textile surface). The future in this field will lead to having the components being textile-based (the textile itself being the functional component). The full realisation of advanced textiles could benefit from a new platform exploiting fully flexible, tuneable and processable materials to give new functionalities (e.g. light emission, photovoltaic activities, sensing, energy storage, heating or mechanical actuators). GRMs can provide the high conductivity, high flexibility and chemical tuneability needed for this task.

The goal is to develop new GRM-based smart textiles, using the unique properties of GRMs, to have structural, chemical, optical or electronic functionalities that cannot be obtained with other types of materials. Addressing the issues of durability of the target systems upon standard textile washing and enhanced biocompatibility in contact with human skin will represent an added value. Encapsulation techniques (although not preferable) might also be suitable as a solution.

4. Functional coatings using GRMs

Due to their layered structure, GRMs are ideal candidates for coating and thin film applications, and with new production technologies emerging, graphene is now available in useful quantities to address its implementation in various areas. Additionally, the field of functional LMs is not limited to pristine graphene but also includes doped derivatives, transition metal dichalcogenides (TMDs), polymers and others or nano-composites based on such materials.

Areas of interest are coating formulation, application and testing, addressing functionalities such as (but not limited to): electrical conductivity, gas barrier properties or gas separation, improved chemical resistance, heat dissipation, temperature stability, catalytic activity, electromagnetic interference shielding or self-monitoring.

Such functionalities can have many applications ranging from gas barrier coatings, separation membranes, anti-statics, radiation shielding or flame-retardance to more sophisticated devices like in-situ strain measurement sensors, catalytically active surfaces and electrodes or flexible electronics. Within this field a diversity of formulations and recipes can be addressed, for instance powder based dry coatings, paints, specialized inks for different printing technologies or direct deposition on the substrate.

5. GRMs for corrosion prevention and as lubricants

The planar nature of GRMs makes them promising for the protection of surfaces, including those of construction materials, aerospace metals, composites and machine components.

Areas of special interest are (i) coatings for improved chemical and water barrier properties, corrosion resistance or thermal performance; (ii) lubricant systems where GRMs lead to lower friction, reduced wear, reduced corrosion and higher efficiency of heat transfer. In the context of coatings, a scalable deposition methodology must be developed (e.g. direct growth, spray coating, dip coating).

For both coating and lubricants applications it is expected that new formulation techniques may have to be developed. The addition of GRMs to the coatings and lubricants should show improved performance in both short-term and accelerated tests conducted in service relevant-conditions, such as hot salt spray chambers.

6. GRMs for thermal management and thermoelectrics

The ability to tailor the electron density of states and thereby influence the Seebeck coefficient in GRMs makes them attractive candidates for thermal management. This is particularly applicable to GRM-based heterostructures, and to grainy materials with controlled grains size, shape and distribution. While the former could lead to sufficient electronic level difference to tune electron transfer and electron contribution to the thermal conductivity, an important research questions is to what degree this affects the nature of the interfaces and the concomitant interface thermal resistance. The latter, if studied with a statistical approach to take into account the variations in the real GRM grain structure and estimate their contribution to the interface thermal resistance within certain bounds, will provide a means to have a degree of predictive insight as to what to expect in terms of thermoelectric parameters and performance of such materials.

Proposals should address novel experimental methods on near-field and far-field radiation and thermal measurements, and advanced configurations arising from phonon engineering for optimization of thermal management in GRM-based hybrids. The reliability and reproducibility of the experimental methods and material structures should be emphasized, as well as its integration and large scale production perspectives.

7. Biorecognition of specific disease markers using GRMs

The identification and accurate measurement of disease biomarkers at the level of individual patient in response to specific therapies is instrumental to the development of personalized medical treatments. Toward this goal, new devices capable of high sensitivity, parallel measurements of multiple disease biomarkers (either circulating in the bloodstream or found in phenotypically characterized (live) cell subpopulations), are strongly required. In this context, graphene-based opto-electrical platforms (e.g. fluorescence quenching, impedance related electrochemical measurements and paper/plastic-based platforms) are ideal candidates as cost-effective, highly sensitive devices for

the analysis of protein and/or DNA biomarkers in small sample volumes. Disease biomarkers detection platforms might result from synergies between various GRMs, nanoparticles, specific biofunctionalization protocols and sensing technologies.

To allow further industrialization, production of high quality functionalized graphene, (reduced) graphene oxides and/or graphene quantum dots, with thickness control and high quantum yield, should be demonstrated through easily scalable processes and overall with appropriate functional groups, compatible with physiological media and able to maximize the interaction with the disease biomarkers.

8. Highly selective gas sensors based on GRMs

The major challenges in the emerging gas sensing concepts are concentrated on selectivity. Highly sensitive GRM-based gas sensors analysing e.g. the charge carrier response to the adsorbed gases have inherent limitations in the selectivity, similar to the more conventional material systems such as functionalised oxides and their matrices. The only viable alternative for the next phase selective gas sensors is in the direct measurement of the spectral fingerprints of the gases.

Areas or special interest are: GRM based spectroscopic systems for the measurement of the characteristic vibrational spectra of gaseous substances at far-IR / THz region and/or dissociation spectra in the UV region; potentially (non-dispersive) IR/THz gas sensors or waveguide-based sensors; potentially employing bolometric or thermoelectric effects in GRMs.

Systems should be operating at ambient or room temperature and the stability with respect to humidity and thermal fluctuations should be controllable. The spectral features under analysis should be narrow and distinguishable enough to allow selective detection irrespective to the presence of other gases and this, as well as the benefit of GRM in relation to more conventional material solutions, should be rigorously justified in the proposal.

9. GRM-based bioelectronic technologies

The call aims at projects exploring GRM-based bioelectronic technologies and devices for in-vitro and in-vivo applications.

Projects addressing the topic of in-vitro cell interfaces should aim at developing novel technologies based on GRMs for studying in-vitro cell or tissue related processes (growth, electrical and chemical signalling, etc.) or at exploiting these technologies for sensing (cell-based drug screening, etc.). Beyond demonstration of novel technology concepts (electrical, optical, mechanical, etc.) taking advantage of GRM characteristics as well as their combination with other materials, the projects should aim at integrating the technologies into prototype platforms, including engineering of functionalities such as microfluidics and electronics.

Projects addressing the topic of bioelectronic devices for in-vivo applications should aim at developing GRM-based flexible devices that, via nerve/tissue stimulation or recordings (central or peripheral nervous systems), can be used to restore or maintain healthy conditions or to study cognitive functions or neural disorders. In particular, the call targets technologies for control of

artificial limbs or devices, neuromodulation, and rehabilitation (spinal cord injury, stroke, pain, speech disorders, etc.), as well as applications involving organs different than the brain (cardiovascular, such as pacemakers, etc.). The developed technologies must be designed and evaluated together with clinical organizations (leading the therapeutic assessment) as well as industrial partners (leading the commercial exploitation) and tested on relevant preclinical models for studying functionality, efficiency, safety and mechanisms of action.

HBP – Basic and applied research

Projects should contribute to the aims of the HBP and address ambitious research questions in the field of brain research including medical research, brain inspired technologies, robotics & computing and/or contribute to technological development. The proposed activities should be based on the latest scientific knowledge, and include innovative concepts that bring the field closer to the solution of a concrete and important problem in an interdisciplinary research approach. Objectives should be realistic and measurable, and reproducibility should be ensured. Proposed activities should demonstrate their potential to shape the evolving HBP ICT platforms (Subprojects 5-10), e.g. showcasing the value that these platforms can add to the neuroscience community, and/or foster their development. Ideally they cut across existing HBP Subprojects, including neuroscientific and platform Subprojects and/or the 'Ethics and Society' Subproject.

1. Human brain intracranial data and their relationship to other aspects of brain organisation

Human intracranial data are optimal to bridge levels of observations and understanding between animal electrophysiology and human non-invasive recordings (fMRI, EEG, MEG). It would be extremely valuable to provide intracranial data collected during cognitive tasks, e.g. multi-unit recordings, to integrate them into the Human Brain Atlas, and to analyse them, for example with respect to other aspects of brain organisation (structural, functional), ideally in collaboration with experts in other recordings scales (monkey or non-invasive human recordings). There is an added value for the Human Brain Atlas and for modelling and simulation.

2. Comparing morphology and physiology of cortical cell types in human and non-human primates

Simulating human brain neuronal circuitry based on data-driven models is one of the major goals of HBP. The simulation of the somatosensory cortical column of rodents provides a roadmap for data-driven modelling and simulation of human circuitries. However, early results on neuronal morphologies and physiologies revealed that several properties of human neuronal circuits in the cortex are strikingly different from rodent cortical circuits. To understand whether these differences are specific to human neocortex or whether they extend also to non-human primates, research is needed on the morphology and physiology of neuronal circuits in the non-human primate neocortex subserving similar functions in both species.

3. Comparative aspects of brain function and connectivity

Studies on homologies of the human brain and the brains of other species are central for understanding how far data from animal models can be transferred to human brain research. It is proposed to study neuronal activity/connectivity across species for the same task and experimental set-up. This would concern preferably comparisons between mouse, monkey, and human brains.

For example, fMRI can be used to compare brain activations obtained during cognitive tasks in different species, and to establish quantitative, functional connectivity matrices across homologous areas and networks in multiple species under varying states and task conditions. Such in-vivo connectomes are needed to build and simulate multimodal computational architectures of the cortex incorporating ex-vivo histological and receptor-density data in the same models.

In addition, comparative fMRI experiments in monkeys and human patients that have to undergo surgical resection of epileptic foci may be performed with the goal to identify potentially functionally homologous regions in the temporal pole. Based on the fMRI maps, equivalent portions of monkey cortex can be dissected as in the patients. Both brain samples could then be prepared for slice recordings to perform a detailed physiological and morphological characterization of a number of cells in both samples. This would allow a direct comparison of neurons in human and monkey association cortex which are likely contributing to similar perceptual or cognitive processes.

4. Cross-species multi-scale data constraints for visuo-motor integration

Multi-scale object recognition and sensorimotor integration neural simulation models are being developed in the HBP based on both experimental data and conceptual models. The present research area targets contributions from additional multi-scale data from multiple simultaneous electrophysiological recording data from relevant brain areas in non-human primates (e.g. visual, parietal, subcortical, premotor, motor) performing the same or similar sensory-motor tasks. Additional high-resolution fMRI and EEG human data for other sensory-motor tasks could provide useful constraints for validating and generalising the simulation models.

5. The neural bases of spatial navigation and episodic memory

Spatial navigation represents a complex function of the vertebrate brain. It requires the brain to remember a sequence of locations and events stored in episodic memory to be able to navigate. Central to this information processing are circuits in the entorhinal cortex and hippocampus. Much is known regarding specific cell types, connectivity and transmitters. It is proposed to translate this extensive knowledge into an understanding of the circuits generating navigation, to identify the input sources and the output that forwards information to the motor centres.

6. Models of auditory processing

The auditory system is important for navigation and to sense the environment, but has not been considered in HBP so far. The present research area aims to develop data-driven models of auditory processing, from the level of the cochlea up to the auditory cortex (including brain stem and thalamic nuclei) with a focus on the “awake” auditory processing. The models should be implementable in neuromorphic hardware and ideally run in real-time, for being used in neuro-robotics applications, or sensori-motor navigation paradigms.

7. Representation of perceived or memorised information in multi-level systems

In various HBP projects both bottom-up and top-down approaches are pursued for understanding the linkage between low-level, e.g. single neurons and local microcircuits, and high-level systems, e.g. networks distributed across multiple areas, in relation to behaviour, perception and cognition. Novel, emerging techniques such as 2-photon calcium imaging or high-density silicon probe recordings now allow researchers to study the relations between these multiple levels in combination with behavioural paradigms. The present research area aims to investigate how these different levels are connected and organised to understand the neural representation of perceived or memorised information.

8. Modelling dendrites within active networks

Dendrites are important to understand how neurons integrate information but little is known about dendritic function in activated states of the brain. The goal of this research area is to design models of dendrites with unprecedented dynamical realism, directly constrained by experiments. The experiments should directly visualize (using voltage-sensitive probes) the activity of cortical dendrites, during “active” network states, either in vivo or in vitro. Models are then designed (or existing models improved) directly based on these data. The goal is to understand dendritic processing in vivo, ultimately in awake animals.

9. Testing predictive coding and attractor network models

The construction of world models by the brain has been conceived in terms of multiple theoretical models, such as Predictive Coding networks (where incoming sensory information is predicted based on prior experience), Attractor networks (recurrently connected dynamic networks) and Hierarchical models of feature detectors. This research theme should examine (i) whether model predictions can be verified or rejected by physiological and behavioural data; (ii) whether sensory and memory systems may realistically combine models within one overall architecture; (iii) what computational properties such joint models have.

10. Biological deep learning

Deep learning networks have turned out to be very efficacious in addressing complex problems such as playing games (e.g. Go), image classification and object recognition. The next challenge is to implement such networks in biological brains. The present research area aims to research whether less realistic properties of deep learning algorithms could be replaced by more biological properties, i.e. realistic bioelectric behaviour of neurons, and how the functionality of networks could be further augmented using knowledge about the brain.

11. Disease modelling and simulation

The Medical Informatics Platform aims to achieve biologically based classifications of brain diseases, and thus to take advantage of rich data available in hospitals. The objective of this area is to promote clinical proof-of-concept studies of the Medical informatics and the simulation platforms. Projects will have access to data and bioinformatics methods (machine learning, data intensive network analysis, pathways analysis in large volume of data) to gain new clinical insights, derive mechanisms of disease causation and mechanisms of action of known therapeutic agents. Possible research themes include mechanisms of disease causation, mechanisms of action of known therapeutic agents, screening of drug candidates, and developing theory-driven models of disease directly constrained by experimental data in human and animals from the biological signatures of disease and the disease classifications identified by researchers using the Medical Informatics Platform.

12. Innovative modelling for allosteric drug discovery

Innovative neuromedicine approaches require a detailed understanding of the molecular and systems-level organization of the human brain, the causes and mechanisms of diseases, their progression, and the response to treatments. Because of the high level of complexity of the nervous system and of intersubject variability in molecular brain organization, behaviour and disease, addressing these issues for any neuropathology appears a daunting task. Indeed, for most neurodegenerative diseases, such as Alzheimer's and Parkinson's, there is currently no cure in spite of the very large investments from academia and industries. The discovery of new drugs against brain diseases thus has high ethical priority for the on-going neuroscience research. HBP offers novel insights and computational methods to design and in silico select original classes of drugs.

Allosteric pharmacology, or the design of drugs targeting sites topographically different from the endogenous ligand binding site, is one of the most recent innovative approaches to drug discovery. Classical neuroactive drugs were designed on the basis of their similarity-isosteric competitivity with compounds of natural origin. The allosteric interaction paradigm, instead, offer alternative drug-discovery opportunities.

There is a need for novel molecular-simulation based research efforts to accelerate the discovery of new and more effective treatments, based on allosteric mechanisms, reducing the problem of side effects, whilst speeding up and drastically lowering the cost of drug discovery.

13. Integration of simulation tools, neuromorphic computing and robotics with brain and behavioural studies for developing next-generation brain-computer interfaces

Using expertise on brain organization, cognitive and theoretical neuroscience, as well as brain simulation and neurorobotics, the present research area proposes to develop next-generation interfaces for controlling brain states and neural population activity subserving neuroprosthetics, brain stimulation techniques, optogenetics (highly specific control of neural circuits by genetic manipulation and light, in animal models) and other forms of real-time feedback to brain systems.

14. Text mining of cellular, synaptic, connectomic or functional properties of the brain

Basic semantic data mining capabilities are available in the Neuroinformatics Platform of the HBP. This research area aims to develop HBP text mining tools (Sherlock, a UIMA based text mining engine) or adapt open source community toolkits and workflows in the text mining community to extract information relevant for HBP modelling and predictive work. Of particular interest in this effort are cellular, synaptic, connectomic, and functional properties of all scales of the health and diseased brain.

ANNEX II – National Requirements

BE – Belgium – FNRS

Country/Region	Belgium, French-speaking Community
Funding organisation	Fund for Scientific Research (FNRS)
National contact person	Florence Quist – florence.quist@frs-fnrs.be; +32 2 504 9351 Joël Groeneveld – joel.groeneveld@frs-fnrs.be; +32 2 504 9270
Funding commitment	€ 200.000 per Flagship (€ 400.000 in total)
Anticipated number of fundable research groups	2 (in total)
Eligibility of project duration	The maximum amount of requested funding per project is € 200.000 for a total period of three years.
Maximum funding per awarded project	The maximum amount of requested funding per project is € 200.000.
Eligibility of a partner as a beneficiary institution	The applicant must be affiliated to a research institution from the Fédération Wallonie-Bruxelles. The applicant should also: • be a permanent researcher of F.R.S. - FNRS (Chercheur qualifié, Maître de recherches ou Directeur de recherches), • or hold a tenure track position (or an assimilated position including pending tenure track) within a research institution from the Fédération Wallonie-Bruxelles, • or be a permanent research staff member in the 'Ecole Royale Militaire', • or be a permanent research staff member of a federal scientific institution in which case he can act as a co-promotor only. The applicant should not have reached retirement at the starting date of the project. If the applicant reaches the age of retirement in the course of the project, he should precisely describe in the proposal how the handover will be managed. FNRS funds only basic research carried out in a research institution from the "Fédération Wallonie-Bruxelles" and will not fund industrial partners nor any activity related to the private sector.
Eligibility of costs, types and their caps	The following costs are eligible: **Personnel:** • Scientifique doctorant € 37.200/year • Scientifique non postdoctoral € 63.300/year • Scientifique postdoctoral € 73.800/year • Technicien € 53.7600 (full time/year) - € 27.200 (half time/year) • Chercheur temporaire postdoctoral € 47.600/year The categories « scientifique doctorant » and « chercheur temporaire postdoctoral » can only be full-time positions. The three other positions can either be filled full-time or part-time. The usual duration of ERA-NET research programmes is three years. However, when the project involves a PhD student, the principal investigator can apply for an additional one year funding in order to complete the four years PhD programme. This request should be submitted to FNRS six months before the end of the project, together with the written agreement from the "Comité d'accompagnement".

	Equipment (max. 50.000 EUR/project) **Running costs:** travel expenses; organisation of small scientific events in Belgium; consumables and the following support costs: ○ Conception d'ouvrage ○ Réalisation de dictionnaire ○ Achat de livre ○ Encodage ○ Location de licence de logiciel ○ Inscription à un congrès ○ Ordinateur ○ Scannage "Overhead" is not an eligible cost. If the project is selected for funding, these costs will be subject to a separate agreement between the institution of the beneficiary and the F.R.S.-FNRS. General rules and regulations of FNRS apply: www.frs-fnrs.be.
Submission of the pre-proposal at the national level	No
Submission of the full proposal at the national level	No
Submission of financial and scientific reports at the national level	Financial reporting: yearly by the finance department of the institution; scientific reporting: the joint FLAG-ERA reports replace the reporting for FNRS.
Information available at	http://www.ncp.fnrs.be/index.php/appels/era-nets
OTHER	Please note that FNRS does not allow multiple funding; the principal investigator should clearly state how the proposed project differs from other granted projects.

BE – Belgium – FWO

Country/Region	Belgium
Funding organisation	Fonds Wetenschappelijk Onderzoek – Vlaanderen (FWO)
National contact person	**Alain Deleener** Science policy advisor Strategic Research Programmes Tel: +32 2 550 15 95 E-mail: alain.deleener@fwo.be **Toon Monbaliu** Advisor Research Affairs Tel: +32 2 550 15 70 E-mail: eranet@fwo.be
Funding commitment	€ 500.000 per Flagship, 1 M€ in total
Anticipated number of fundable research groups	2-4
Eligibility of project duration	Up to 36 months
Maximum funding per awarded project	€ 500.000
Eligibility of a partner as a beneficiary institution	Funding criteria and regulations can be found at: http://www.fwo.be/en/fellowships-funding/research-projects/sbo-projects (see objective, features, profile and conditions, regulation and downloads). See also 'OTHER'.
Eligibility of costs, types and their caps	This call fits within the FWO Strategic Basic Research (SBO) Programme. Consequently the SBO-cost model applies: http://www.fwo.be/media/652551/Cost-model-SBO-and-TBM-2017.pdf
Submission of the pre-proposal at the national level	No
Submission of the full proposal at the national level	No
Submission of financial and scientific reports at the national level	Yes (incl. valorisation!)
Information available at	http://www.fwo.be/en/fellowships-funding/research-projects/sbo-projects
OTHER	**With regard to the conformity with the objectives of the SBO-programme (incl. valorisation/impact) applicants are strongly recommended to contact the contact points.**

BG – Bulgaria – BNSF

Country/Region	Bulgaria
Funding organisation	Bulgarian National Science Fund (BNSF)
National contact person	Violeta Milkova; +359 (0) 888788052; +359 (02) 444 4961; v.milkova@mon.bg
Funding commitment	BNSF budget is split between two sub-calls as follows: 1) Graphene / Basic research: 175 000 € 2) HBP / Basic research: 175 000 €
Anticipated number of fundable research groups	2-3
Eligibility of project duration	Up to 3 years
Maximum funding per awarded project	175 000 €
Eligibility of a partner as a beneficiary institution	Applicants eligible to participate in this project selection procedure are only the following entities: 1) Accredited universities as defined in Art.85 para.1, p. 7 of the Higher Education Act; 2) Research organizations as defined in Art. 47, para 1 of the Higher Education Act. Applicants under this procedure shall be directly responsible for the implementation of the activities under the project proposal and shall not act as intermediaries, but they shall carry out activities under the project proposal on their behalf and at their expense. Applicants to this procedure must be entities: - Carrying out fundamental research studies; and - Whose activities are entirely of a non-profit nature; or - Whose activities are of both for-profit and not-for-profit nature, but these activities are clearly distinguished and their organization allows tracking of revenue and expenditures connected with their implementation, including by keeping analytical accounting. In the event that an applicant is involved in both for-profit and not-for-profit activities, the funding, expenditures and revenues shall be taken into account separately for each type of activity and on the basis of consistently applied principles of accounting of expenditures being justifiable. **Research team** For each project proposal the applicant shall designate a team consisting of: 1) Coordinator of the research team; 2) Members of the research team - researchers, specialists, post-graduate students and university students; 3) Technical personnel in consideration of project specific activities. **Requirements to participants of the research team** 1) Coordinator of the research team is required to be a scientist holding

	an educational and scientific degree "Doctor" or "Doctor of Science" with the necessary scientific and management competence for a successful implementation of the project activities, verified by professional CV, publications, patent ownership (if applicable) in the respective research domain; 2) Persons acting as Coordinators of research project financed by BNSF competition for Scientific Research in Priority Areas in 2014 shall not be eligible to be Coordinators of research teams in this competition; 3) Other participants are: - Scientists and experts with achievements in the research area of the project proposal verified by enclosed professional CV and a list of scientific publications in the respective research domain or related ones. - PhD students, post-doctorates and young researchers, for whom professional CVs and lists of scientific publications should be attached, if any; - University students; - Technical personnel. 4) Project coordinator and members of the research team, who are holders of educational and scientific degree "Doctor" or "Doctor of Science" should be included in the BNSF database or should provide information to be included in the database; 5 Persons who unjustifiably have failed to submit their reports under previous BNSF contracts within the set deadlines as Coordinator of research projects after 2011, or act as Coordinators of projects which have received unsatisfactory mark in the last 3 years shall not be eligible as members of the research team under this procedure. For further information please refer to BNSF section of national rules for participation in ERA NET programs at: https://www.fni.bg/?q=node/578
Eligibility of costs, types and their caps	Eligible costs are specified in" National requirements and eligibility conditions" of Bulgarian National Science Fund available at: https://www.fni.bg/sites/default/files/competition/12_2016/ERA/ERA_NET_2016_2.pdf
Submission of the pre-proposal at the national level	Yes. Applicants need to fill in Application form for the administrative description of the project and deposit it at BNSF Registry Office.
Submission of the full proposal at the national level	Yes.
Submission of financial and scientific reports at the national level	Yes.
Information available at	https://www.fni.bg/?q=node/578
OTHER	For more information please contact NCP

DE – Germany – DFG

Country/Region	Germany
Funding organisation	German Research Foundation (DFG)
National contact person	Michael Mößle, +49 228 885 2351, Michael.Moessle@dfg.de Martin Winger, +49 228 885 2039, Martin.Winger@dfg.de
Funding commitment	€ 2.000.000 for the "Graphene – Basic Research" sub-call. The DFG does not participate in the "Graphene – Applied Research and Innovation" and "HBP – Basic and applied research" sub-calls.
Anticipated number of fundable research groups	10 -12 depending on average funding amounts
Eligibility of project duration	Maximum of 3 years
Maximum funding per awarded project	There are no predefined limits.
Eligibility of a partner as a beneficiary institution	The general DFG rules and conditions as defined in the DFG form 50.01 "Guidelines Research Grants Programme" (10/2011) apply. This document is available on the DFG website at: http://www.dfg.de/foerderung/programme/einzelfoerderung/sachbeihilfe/formulare_merkblaetter/index.jsp . As an exception, the Guidelines on the Duty to Cooperate (DFG guideline 55.01) shall not apply.
Eligibility of costs, types and their caps	Eligible cost categories (related to specific "Programme Modules") are specified in DFG forms 52.01 – 52.07, available on the DFG website at: http://www.dfg.de/foerderung/programme/einzelfoerderung/sachbeihilfe/formulare_merkblaetter/index.jsp (standard: "Basic Module", form 52.01).
Submission of the pre-proposal at the national level	No
Submission of the full proposal at the national level	Yes. A copy of the proposal has to be submitted via the DFG's ELAN system (http://www.dfg.de/en/research_funding/principles_dfg_funding/elan/index.html) at the same deadline. Please submit your proposal as a "Research Grant" ("Sachbeihilfe") and select the call "FLAG-ERA JTC 2017 Graphene".
Submission of financial and scientific reports at the national level	Financial and scientific reports needs to be submitted in accordance with the relevant rules as specified in the Guidelines for the Use of Funds and for Final Reports available on the DFG website at: http://www.dfg.de/foerderung/programme/einzelfoerderung/sachbeihilfe/formulare_merkblaetter/index.jsp
Information available at	http://www.dfg.de/en/research_funding/programmes/individual/research_grants/index.html (DFG-Website on Research Grants)
OTHER	In submitting a proposal for a research grant to the DFG, applicants agree to adhere to the rules of good scientific practice (http://www.dfg.de/en/research_funding/principles_dfg_funding/good_scientific_practice/). The DFG expects that the results of funded projects will be made available to the public.

ES – Spain – MINECO

Country/Region	Spain
Funding organisation	Ministerio de Economía y Competitividad - Agencia Estatal de Investigación (MINECO-AEI)
National contact person	Administrative and technical issues: Watse Castelein; +34 9160 38876; era-ict@mineco.es Scientific issues: Dr. Carles Cané (Graphene); era-ict@mineco.es Dr. Juan J. Garrido (HBP); era-ict@mineco.es Representative: Severino Falcón; severino.falcon@mineco.es
Funding commitment	1.120.000 € (total)
Anticipated number of fundable research groups	6-9
Eligibility of project duration	Up to 3 years
Maximum funding per awarded project	The following funding limits are considered eligibility criteria. Proposals not respecting these limits could be declared non eligible. • Maximum per legal entity and proposal eligible for MINECO-AEI should not exceed 35.000 € per year (up to 105.000 € for three year project). If two or more legal entities participate in the same proposal the MINECO-AEI part should not exceed 46.000 € per year. • For experimental groups, the above limits are increased: Up to 50.000 € per year for one Spanish partner (up to 150.000 € for three year project). Up to 65.000 € per year for the whole Spanish part in case more than one Spanish partner participates in the same proposal. • If the transnational proposal is led by a PI eligible for MINECO-AEI a maximum of 8.000 € per year in addition. Research or Academic Centres formed by an agreement between different legal entities will be considered as a unique entity, and thus the maximum funding should not exceed the limits per proposal established above (for example mixed Centres). The final funding will take into account the transnational evaluation of the collaborative proposal, the scientific quality of the Spanish group, the added value of the international collaboration, the participation of the industrial sector, and the financial resources available. Spanish PIs have to remain unchanged between the pre-proposal stage, the full proposal stage, and the National APCIN call.
Eligibility of a partner as a beneficiary institution	Non-profit research organizations according to the APCIN call Although enterprises won't be funded through the APCIN Call, the Spanish industrial sector is much welcome to participate in the transnational consortia using their own funds. Final rules on eligibility will be described at the APCIN2017 call, to be published here.
Eligibility of costs, types and their caps	- Personnel costs for temporary contracts (fellowships are not eligible). - Current costs, small scientific equipment, disposable materials,

	travelling expenses and other costs that can be justified as necessary to carry out the proposed activities. - Indirect costs (overheads) or clinical assays (proofs of concept, proofs of principle) are not eligible for funding in the APCIN call.
Submission of the pre-proposal at the national level	No
Submission of the full proposal at the national level	*Programa Estatal de Investigación, Desarrollo e Innovación Orientada a los Retos de la Sociedad,* Plan Estatal de Investigación Científica Técnica y de Innovación 2013-2016. The instrument for funding the Spanish groups will be the Spanish Call on International Joint Programming Actions (*Acciones de Programación Conjunta Internacional*), which will be launched in 2017 (APCIN 2017) or the equivalent. Only as a reference, the beneficiaries are advised to read the call APCIN 2016. The Spanish legal entities granted are obliged by the regulations established in this APCIN call and by the funding limits specified below. The projects granted by the MINECO-AEI must be aligned with the main objectives described in the Programa Estatal.
Submission of financial and scientific reports at the national level	See previous point.
Information available at	www.mineco.es
OTHER	***Additional eligibility criteria*** Mandatory: Spanish Principal investigators must be eligible according to the APCIN 2017 call and must have experience as investigators in projects funded by the *Plan Nacional I+D+I 2008-2011*, the *Plan Estatal I+D+I 2013-2016*, ERC Grants, or European Framework Programmes. Not allowed: - Principal Investigators are not allowed to apply for funding in more than one proposal in the APCIN 2017 call or its equivalent. This must be taken into account when participating in different ERA-NETs or other international initiatives. - Principal Investigators have to remain unchanged between the pre-proposal stage, the full proposal stage, and the National APCIN 2017 call or its equivalent. - Important: Principal Investigators who obtained funding in the APCIN 2016 call are not allowed to apply neither in APCIN 2017 or its equivalent nor in this FLAG-ERA JTC 2017 call. ***Mandatory acknowledgement*** Any publication or dissemination activity resulting from the granted projects must acknowledge MINECO-AEI funding even after the end of the project: "Project (reference nº XX) funded by MINECO-AEI through APCIN 2017".

FR – France – ANR

Country/Region	France
Funding organisation	Agence Nationale de la Recherche (ANR)
National contact person	Fabien Guillot, fabien.guillot@anr.fr, +33 173 54 81 97 Edouard Geoffrois, edouard.geoffrois@anr.fr, +33 1 73 54 81 49
Funding commitment	2 500 k€ in total
Anticipated number of fundable research groups	8-10
Eligibility of project duration	No additional constraint in addition to the transnational level (3 years maximum)
Maximum funding per awarded project	No predefined maximum. Requested funding should be justified with respect to the project work plan.
Eligibility of a partner as a beneficiary institution	The general rules of ANR apply (cf. link below). In particular, both public research institutions and enterprises can apply.
Eligibility of costs, types and their caps	The general rules of ANR apply (cf. link below). Personnel, consumables, subcontracts (within 50% of the eligible costs for the partner), equipment and travel costs are eligible. Funding rates are 100% of additional costs for public research institutions, 45% of total costs for SMEs, and 30% of total costs for large companies.
Submission of the pre-proposal at the national level	No
Submission of the full proposal at the national level	No
Submission of financial and scientific reports at the national level	Financial reporting at the national level is needed, using the usual ANR procedures. The FLAG-ERA level reporting takes the place of the scientific reporting for ANR.
Information available at	http://www.agence-nationale-recherche.fr/AAPProjetsOuverts
OTHER	Applicants from France must read the specific appendix available at the above-mentioned link.

GR – Greece – GSRT

Country/Region	Greece
Funding organisation	General Secretariat for Research & Technology (GSRT)
National contact person	Konstantina Kotsari, k.kotsari@gsrt.gr Vasso Karavaggeli, vkar@gsrt.gr
Funding commitment	700 k€ in total
Anticipated number of fundable research groups	~7projects
Eligibility of project duration	36 months (3 years)
Maximum funding per awarded project	Upper limit of the total public funding will be 100.000 € per project. The maximum state aid intensity will be calculated according to the provisions of the European state aid rules and regulations in force (type of research activity, size of the participating enterprise, collaborative research).
Eligibility of a partner as a beneficiary institution	All legal entities (public and private sector)
Eligibility of costs, types and their caps	The **eligible costs** of research and innovation projects shall be allocated to a specific category of research such us personnel costs, costs of instruments and equipment to the extent and for the period used for the project, costs of contractual research, knowledge and patents bought or licensed from outside sources at arm's length conditions, as well as costs of consultancy and equivalent services used exclusively for the project, additional overheads and other operating expenses, including costs of materials, supplies and similar products, incurred directly as a result of the project. **The aid intensity for each beneficiary** : (a) 100 % of the eligible costs for fundamental research; (b) 50 % of the eligible costs for industrial research; (c) 25 % of the eligible costs for experimental development. **The aid intensities for industrial research and experimental development** may be increased up to a maximum aid intensity of 80 % of the eligible costs as follows: (a) by 10 percentage points for medium-sized enterprises and by 20 percentage points for small enterprises; (b) by 15 percentage points if one of the following conditions is fulfilled: (i) the project involves effective collaboration: — between undertakings among which at least one is an SME, or is carried out in at least two Member States, or in a Member State and in a Contracting Party of the EEA Agreement, and no single undertaking bears more than 70 % of the eligible costs, or — between an undertaking and one or more research and knowledge-dissemination organisations, where the latter bear at least 10 % of the eligible costs and have the right to publish their own research results;

	(ii) the results of the project are widely disseminated through conferences, publication, open access repositories, or free or open source software. **Innovation aid for SMEs** 1. The eligible costs shall be the following: (a) costs for obtaining, validating and defending patents and other intangible assets; (b) costs for secondment of highly qualified personnel from a research and knowledge-dissemination organization or a large enterprise, working on research, development and innovation activities in a newly created function within the beneficiary and not replacing other personnel; (c) costs for innovation advisory and support services; 2. The aid intensity shall not exceed 50 % of the eligible costs. 3. In the particular case of aid for innovation advisory and support services the aid intensity can be increased up to 100 % of the eligible costs provided that the total amount of aid for innovation advisory and support services does not exceed EUR 100.000 per undertaking within any three year period. **Aid for process and organisational innovation** 1. Aid to large undertakings shall only be compatible if they effectively collaborate with SMEs in the aided activity and the collaborating SMEs incur at least 30 % of the total eligible costs. 2. The eligible costs shall be the following: (a) personnel costs; (b) costs of instruments, equipment to the extent and for the period used for the project. Where such instruments and equipment are not used for their full life for the project, only the depreciation costs corresponding to the life of the project, as calculated on the basis of generally accepted accounting principles are considered as eligible; (c) costs of contractual research, knowledge and patents bought or licensed from outside sources at arm's length conditions; (d) additional overheads and other operating costs, including costs of materials, supplies and similar products, incurred directly as a result of the project. 3. The aid intensity shall not exceed 15 % of the eligible costs for large undertakings and 50 % of the eligible costs for SMEs. **Further information regarding the categorization of aid intensity is available at the national guide published at GSRT website.** *Eligible costs as Indirect costs:* Up to 5% of the total budget.

Submission of the pre-proposal at the national level	No
Submission of the full proposal at the national level	No
Submission of financial and scientific reports at the national level	Financial reporting at the national level is needed, using the GSRT procedures based on **National Research and Innovation Strategy for Smart Specialization 2014-2020**.
Information available at	http://www.gsrt.gr
OTHER	For more information please contact the NCP.

HU – Hungary – NKFIH

Country/Region	Hungary
Funding organisation	Nemzeti Kutatási, Fejlesztési és Innovációs Hivatal (NKFI Hivatal) National Research, Development and Innovation Office (NRDI Office)
National contact person	Nemzeti Kutatási, Fejlesztési és Innovációs Hivatal Kéthly Anna tér 1, Budapest, H-1077, Hungary Edina.Nemeth@nkfih.gov.hu, +36-70-221-0387 National Contact Point for Horizon 2020 ICT & FET
Funding commitment	The total indicative national funding for this call is € 500.000, corresponding to an indicative funding of € 250.000 per Flagship. (The funds unused in one Flagship can be used in the other Flagship)
Anticipated number of fundable research groups	2 per flagship.
Eligibility of project duration	Up to 3 years
Maximum funding per awarded project	125.000 €
Eligibility of a partner as a beneficiary institution	Eligible applicants from Hungary are entities falling under any of the following GFO codes: • enterprise with legal entity (GFO code: 11X) • non-profit organisation with legal entity (GFO code: 5XX) • budgetary units and entities (eg. higher education institutions, municipalities;) (GFO code: 3XX) • enterprise with a registered office in the European Economic Area and a branch in Hungary (GFO: 226).
Eligibility of costs, types and their caps	All research-related costs in accordance with government decree 380/2014 (XII.31). In case a partner is subject to State Aid rules, funding intensity shall be set at a level that complies with the State Aid rules in force at the time of the funding decision (Commission Regulation No 651/2014 of 17 June 2014) (The Guide for Applicants for the NEMZ_16 national call are applicable)
Submission of the pre-proposal at the national level	Not required.
Submission of the full proposal at the national level	Following the international selection of the projects to be funded, a proposal should be formally submitted to NKFI Hivatal through its electronic proposal system (EPR). Proposers will receive guidance on the submission by NKFI Hivatal.
Submission of financial and scientific reports at the national level	Financial and scientific reports need to be submitted in accordance with the relevant rules prescribed in the international call and the national grant agreement (annually).
Information available at	http://www.nkfih.gov.hu
OTHER	-

IT – Italy – MIUR

Country/Region	Italy
Funding organisation	Ministry for Education, University and Research (MIUR)
National contact person	Giorgio Carpino, tel. +39 06 5849 7147, e-mail: giorgio.carpino@miur.it Aldo Covello, tel. +39 06 5849 6465, e-mail: aldo.covello@miur.it
Funding commitment	Indicatively, MIUR budget is split between the two sub-calls as follows: 1) Graphene / Basic research: 0 € 2) Graphene / Applied research and innovation: 100.000 € as grant 3) HBP / Basic and applied research: 100.000 € as grant All activities classifiable as Basic Research (HBP sub-call), Industrial research and Experimental development (Graphene sub-call and HBP sub-call) are eligible for funding. Furthermore, Basic research and Industrial research activities must be predominant with respect to Experimental development activities.
Anticipated number of fundable research groups	A maximum of two Italian participants per project proposal is admitted. A Principal Investigator can participate (either as coordinator or as partner) in only one project proposal.
Eligibility of project duration	Min. project duration: 24 months Max. project duration: 36 months
Maximum funding per awarded project	A maximum grant of 100.000 € can be awarded to each project proposal, even if it includes more than one Italian participant.
Eligibility of a partner as a beneficiary institution	Eligible participants must have a stable organization in Italy. *1) Type/nature of participants* The following entities are eligible for funding, providing that they have stable organization in Italy: - Enterprises and private research bodies (which meets the requirements of research organization under EU Reg. no. 651/2014 of the Commission - June 17, 2014) - Universities, public research institutions, research organizations (public and private) in accordance with Reg. EU n. 651/2014 of the Commission - June 17, 2014). *2) Legal/administrative/financial conditions:* The participant must not be defaulting with regard to other funding received by MIUR. The participant must not have requested/got any other funding for the same research activities. The participant must respect the Italian law against "mafia". *3) Financial conditions* For any private entity, the following financial criteria, calculated using the data reported in the last approved balance sheet, must be fulfilled:

<table>
<tr><td></td><td>a) CN > (CP – I)/2
Where:
CN = net assets (Capitale netto)
CP = sum of the costs of all the projects for which public funding has been requested by the participant during the year
I = sum of the contributions received, approved or requested for the same projects
b) OF/F < 8%
Where:
OF = financial charges (Oneri finanziari)
F = turnover (Fatturato)</td></tr>
<tr><td>Eligibility of costs, types and their caps</td><td>All costs incurred during the lifetime of the project under the following categories are eligible: Personnel, Equipment, Subcontracting, Consumables, and Overheads.
<table>
<tr><td colspan="2" rowspan="3">Applicant typology
Activity typology</td><td colspan="4">Funding Rates</td></tr>
<tr><td colspan="3">Enterprises and private research bodies (which meets the requirements of research organization under EU Reg. no. 651/2014 of the Commission - June 17, 2014)</td><td rowspan="2">Universities, public research institutions, research organizations (public and private) in accordance with Reg. EU n. 651/2014 of the Commission - June 17, 2014)</td></tr>
<tr><td>Small Enterprises</td><td>Medium Enterprises</td><td>Big Enterprises</td></tr>
<tr><td>Basic Research</td><td>grant</td><td>40%</td><td>30%</td><td>20%</td><td>70%</td></tr>
<tr><td>Industrial Research</td><td>grant</td><td>40%</td><td>30%</td><td>20%</td><td>50%</td></tr>
<tr><td>Experimental Research</td><td>grant</td><td>30%</td><td>20%</td><td>10%</td><td>25%</td></tr>
</table>
On request of applicants a pre-payment may be done, equal to:
- 80% of the total contribution for public entities;
- 50% of the total contribution for private entities.
The remaining part of contribute will be paid in instalments after each financial and progress reporting period.</td></tr>
<tr><td>Submission of the pre-proposal at the national level</td><td>In addition to pre-proposals and full proposals that shall be submitted at European level, Italian participants must provide MIUR with a set of additional National documents published on MIUR website (http://www.ricercainternazionale.miur.it/era/eranet-cofund-(h2020)/flag-era-ii.aspx). These national additional documents must be sent to MIUR by the same deadline of the preproposal phase submission established in the international joint call.
Any participant who does not send its national documents by the deadline of the FLAGERA call will be considered not eligible for funding.</td></tr>
<tr><td>Submission of the full proposal at the national level</td><td>MIUR will require to all Italian participants admitted to the second phase some additional documents describing in more detail the participant and its research activities within the project (capitolato tecnico).</td></tr>
</table>

Submission of financial and scientific reports at the national level	The admission for funding is subject to the adoption of the necessary accounting and administrative measures for the allocation of the resources. Funded participants will be requested to submit financial and scientific reports to MIUR.
Information available at	http://www.ricercainternazionale.miur.it
OTHER	It is recommended to contact the National Contact Persons already in early stage of project preparation.

LT – Lithuania – LMT

Country/Region	Lithuania
Funding organisation	Research council of Lithuania (LMT) www.lmt.lt
National contact person	Dr Saulius Marcinkonis, Tel: +370 5 261 8530, saulius.marcinkonis@lmt.lt Research Council of Lithuania, Gedimino pr. 3, Vilnius, Lithuania
Funding commitment	€ 100.000 per Flagship (€ 200.000 in total)
Anticipated number of fundable research groups	2 (in total)
Eligibility of project duration	Up to three years
Maximum funding per awarded project	The maximum amount of requested funding per project is € 100.000
Eligibility of a partner as a beneficiary institution	The general funding rules of LMT apply: Lithuanian higher education and research institution (which is listed in the Register of Ministry of Education and Science of Republic of Lithuania); SME (in collaboration with Lithuanian higher education and research institution); The applicant who intends to act as a project leader (PL) or principal investigator (PI) has to be a scientist (researcher holding at least a Ph.D. degree); A person, acting as a PL, PI or a core group member can participate only in one proposal in this Call. All proposals not fulfilling this requirement will be rejected. The workload of the core members of project team must be at least 20 hours multiplied by the duration of the project in months.
Eligibility of costs, types and their caps	Funding rates are 100% of eligible costs. Eligible direct costs: • Personnel • Subcontracting • Consumables • Travel and Subsistence • Equipment • Other Overheads: • Up to 30% of Personnel and Subcontracting costs.
Submission of the pre-proposal at the national level	No
Submission of the full proposal at the national level	No
Submission of financial and scientific reports at the national level	Financial and scientific (mid- term and final) reporting at the national level is needed, using the usual LMT procedures.
Information available at	http://www.lmt.lt/lt/mkf/era-net/flag.html
OTHER	For more information please contact the NCP

LV – Latvia – VIAA

Country/Region	Latvia
Funding organisation	Valsts izglitibas attistibas agentura
National contact person	Maija Bundule, maija.bundule@viaa.gov.lv, +371 67785423
Funding commitment	400 000 €
Anticipated number of fundable research groups	2 -3
Eligibility of project duration	Up to 3 years
Maximum funding per awarded project	Upper funding limit is 70 000 €/year per project participant.
Eligibility of a partner as a beneficiary institution	The following legal persons (as defined under the Latvian law) are eligible as a beneficiaries: - R&D institutions: research institutes, universities, higher education establishments, their institutes and research centres, etc. - Enterprises and companies.
Eligibility of costs, types and their caps	Direct costs: - Personnel costs, - Other direct costs such as consumables, equipment (only depreciation costs), materials, events, etc., - Subcontracts (up to 20% of total direct costs), - Travel costs. Indirect costs can reach a maximum of 20% of the total direct costs excluding subcontracts.
Submission of the pre-proposal at the national level	No
Submission of the full proposal at the national level	Full proposal should be submitted at the national level when applying for national funding for project which is recommended for implementation by FLAG-ERA II CSC.
Submission of financial and scientific reports at the national level	Financial and scientific (periodic and final) reporting at the national level will be needed in accordance with the terms of national contract.
Information available at	www.viaa.gov.lv
OTHER	The funding of RTD activities is provided pursuant in accordance with the Law on Research Activity (adopted on 14 April 2005 with amendments) and Regulation of the Council of Ministers of the Republic of Latvia No 259 on the procedure for providing support for participation in international cooperation programs for research and technology (adopted on 26 May 2015). National co-financing rate for state aid project shall be determined in accordance with the Commission's Regulation (EC) No 651/2014 of 26 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty (General block exemption Regulation).

NL – Netherlands – FOM

Country/Region	The Netherlands
Funding organisation	Stichting voor Fundamenteel Onderzoek der Materie (FOM) From January 1st 2017: Netherlands Organisation for Scientific Research (NWO)
National contact person	Marcel Hoek, +31 30 600 12 26, marcel.hoek@fom.nl / m.hoek@nwo.nl
Funding commitment	1 M€ for Graphene (basic research sub-call)
Anticipated number of fundable research groups	3-4
Eligibility of project duration	Maximum of 3 years
Maximum funding per awarded project	€ 330.000
Eligibility of a partner as a beneficiary institution	Professors and permanent scientific staff at the Dutch universities, or NWO institutes or at other research organisations that - at least in part - are funded by the Ministry of Education, Culture and Science may apply for funding and participate in a FLAG-ERA consortium as main applicant or as co-applicant. Individuals who – in the framework of a tenure-track position, a Vidi grant or a Vici grant – do not yet have a permanent appointment can also be (co-)applicant. However, their proposal must be accompanied by a declaration from the dean of the faculty or director of the institute which states that they have a prospect of a permanent position after the temporary appointment period. This declaration must be sent separately to the national contact person.
Eligibility of costs, types and their caps	One (or more) PhD students and/or Postdoctoral researcher(s) (up to a maximum of 3 years), non-scientific personnel (up to a maximum of 3 years), material costs, traveling costs, network and consortium costs. For all eligible applicants the VSNU standard tariffs for personnel costs apply (see http://www.nwo.nl/en/funding/funding+process+explained/salary+tables). Because projects in the ERA-NET run no longer than 36 months, NWO will only fund at maximum 36 months of a PhD student or other position. The applicants need to indicate and guarantee a separate funding source for the last part of the position (if applicable). They also need to indicate in their planning how the 4-year term of a PhD student is incorporated in the planning of the project. Any project results that are to be produced by the 4-year position need to be planned and delivered in the project period, including all relevant reports to the ERA-NET.
Submission of the pre-proposal at the national level	No.
Submission of the full proposal at the national level	Yes, but only for proposals which are selected for funding.

Submission of financial and scientific reports at the national level	Yes. Submission of financial & scientific reports at national level is required in accordance with the rules of NWO.
Information available at	www.fom.nl/flagera-II-en
OTHER	Applicants must consult the 'NWO Guide for Applicants' available at the link above for specific eligibility criteria and other details. Projects that are selected for funding are required to complete a financial form and submit it to NWO.

PL – Poland – NCBR

Country/Region	Poland
Funding organisation	National Centre for Research and Development (NCBR)
National contact person	Katarzyna Samsel, katarzyna.samsel@ncbr.gov.pl, +48 22 39 07 156
Funding commitment	€500.000 (Graphene – Applied research and innovation)
Anticipated number of fundable research groups	2-3
Eligibility of project duration	Max. 3 years
Maximum funding per awarded project	€250.000
Eligibility of a partner as a beneficiary institution	Enterprises, universities and R&D institutions only in cooperation with Polish enterprises
Eligibility of costs, types and their caps	Industrial research and experimental development Equipment, consumables, human resources, outsourcing, overheads
Submission of the pre-proposal at the national level	No
Submission of the full proposal at the national level	No. Only for proposals selected for funding will have to fill information at the national level.
Submission of financial and scientific reports at the national level	Yes. Submission of financial and annual scientific reports at national level is required according with the rules of NCBR
Information available at	http://www.ncbr.gov.pl/programy-miedzynarodowe/era-net-co-fund/
OTHER	-

RO – Romania – UEFISCDI

Country/Region	Romania
Funding organisation	Executive Agency for Higher Education, Research, Development & Innovation Funding (UEFISCDI)
National contact person	Domnica Cotet domnica.cotet@uefiscdi.ro
Funding commitment	500 k€ in total
Anticipated number of fundable research groups	6-8
Eligibility of project duration	36 months
Maximum funding per awarded project	250 k€ if the Romania is project coordinator; 200 k€ if the Romanian is project partner;
Eligibility of a partner as a beneficiary institution	All legal entities (public and private sector)
Eligibility of costs, types and their caps	The general rules of UEFISCDI apply (cf. link below). Staff costs, consumables, equipment, subcontracts (within 25% of the eligible costs for the partner), travel costs and indirect costs (20% from direct costs) are eligible. The aid intensity is applying in respect of type of organization and type of eligible activity (cf. link below).
Submission of the pre-proposal at the national level	No
Submission of the full proposal at the national level	If the project was selected for funding
Submission of financial and scientific reports at the national level	Reports are required at the national level, using the UEFISCDI procedures.
Information available at	http://uefiscdi.gov.ro/articole/4536/Pachet-de-informatii-ERANETERANET-Cofund.html
OTHER	The Romanian applicants must read carefully the information available at the link http://uefiscdi.gov.ro/articole/4536/Pachet-de-informatii-ERANETERANET-Cofund.html

SE – Sweden – VR & VINNOVA

Country/Region	Sweden
Funding organisation	The Swedish Research Council (VR) and the Swedish Governmental Innovation Agency (VINNOVA)
National contact person	**VR:** **Tomas Andersson, +46 8 546 441 73, tomas.andersson@vr.se & Camilla Grunditz, +46 8 546 441 55, camilla.grunditz@vr.se** **Vinnova:** **Johan Lindberg, +46 8 454 64 53, johan.lindberg@vinnova.se & Maria Öhman, +46 8 473 31 89, maria.ohman@vinnova.se**
Funding commitment	**VR** has committed in total SEK 2.5 million per year for Graphene – Basic research and HBP. **Vinnova** has committed in total SEK 2.5 million per year for Graphene – Applied research and innovation and Graphene - Basic research. The figures below are approximations according to our expectations: **Sub-call Graphene – Basic research:** €250 000 (approx. SEK 2.5 million per year for three years Funding organisations: VR + Vinnova **Sub-call Graphene – Applied research and innovation:** €125 000 (approx. SEK 1.25 million) per year for three years Funding organisation: Vinnova **Sub-call HBP:** €125 000 (approx. SEK 1.25 million) per year for three years Funding organisation: VR
Anticipated number of fundable research groups	4-8
Eligibility of project duration	3 years
Maximum funding per awarded project	Indicative SEK 0.5-1.5 million for the Swedish partner per year for three years
Eligibility of a partner as a beneficiary institution	**VR:** 1. VR funds Swedish partners within the two sub-calls **Graphene – Basic Research** and **HBP**. 2. VR funds basic research of the highest scientific quality, and promotes research collaboration and the exchange of experience. 3. Only legal persons are eligible as partners, natural persons are not allowed. 4. The investigators need to hold a PhD at the time of application. 5. The grants distributed by VR must be administrated by a Swedish university, higher education institution (HEI) or other public organisation that fulfils the Swedish Research Councils criteria for an administrating organisation. Eligible organisations are:

	http://www.vr.se/inenglish/researchfunding/applyforgrants/generalconditionsforgrantapplications/approvedadministratingorganisations.4.4b1cd22413cb479b80537a9.html 6. A researcher may only apply for funds from VR in one application in the FLAG-ERA JCT 2017 call. **Vinnova:** 1. Vinnova only funds partners within the two sub-calls **Graphene – Applied research and innovation** and **Graphene – Basic Research**. 2. Only **legal persons**, with an establishment or branch in Sweden, are eligible as partners, natural persons are not allowed. Within sub-call **Graphene – Applied research and innovation** all legal persons are eligible as partners (e.g. research organizations such as universities and R&D institutes, and private companies). Within sub-call **Graphene – Basic research** only private companies are eligible as Vinnova funded partners (for other organizations, see VR above). 3. When Vinnova fund private companies applying within **Graphene – Applied research and innovation** or **Graphene – Basic research**, the applicant must fulfil the following three conditions: • The participating company is a joint-stock (swe: aktiebolag) with an establishment or branch in Sweden, and with business along with a recognizable record of R&D and industrial/commercial activities in Sweden. Research institutes does not count as a private company in this terms • The participating company has a stable financial status and is able to cover its own expenses for the duration of the project. • The participating company is required to provide a credible proof for the positive impacts of the project outcome on the participant's growth and future assets.
Eligibility of costs, types and their caps	**VR:** The grant can be used to cover any type of project-related costs, for example salaries (including your own salary, corresponding to your level of activity in the project), travel (including visits to, and stays at, research facilities), publication costs, minor equipment and depreciations, etc. The grant may not be used for scholarships. If the project involves a doctoral student, project funding may not be used to pay salary for the time the doctoral student is teaching. The minimum amount for which you may apply is SEK 400 000 per year, including indirect costs. **Vinnova:** 1. Vinnova's contribution is granted in accordance with the Governmental ordinance 2015:208 regarding state aid to research, development and innovation (Förordning 2015:208 om statligt stöd till forskning och utveckling samt innovation).

<table>
<tr><td></td><td>
Vinnova’s general terms and conditions for granting projects can be found at: http://www.vinnova.se/PageFiles/30198/Allmanna_villkor_2016.pdf

2. Vinnova's grant is a contribution to the project's eligible costs, as stated in Vinnova’s general terms and conditions for granting projects. In order for a cost to be eligible, it shall be actual and auditable, be incurred by a partner, be established in accordance with the partners usual and generally accepted accounting principles, be recorded, be used for the sole purpose of achieving the objectives of the project, and have been incurred during the project period.

For a more detailed description of eligible costs, see http://vinnova.se/upload/dokument/ansok_rapportera/Guide_till_Vinnovas_villkor_om_stodberattigande_kostnader_2016-04-11.pdf

3. When Vinnova funds partners with economic activity, the maximum funding level of the total eligible costs will depend on the type of research activity:
<table>
<tr><td>Type of research activity</td><td>Large Enterprise</td><td>Medium Enterprise**</td><td>Small Enterprise**</td></tr>
<tr><td>Industrial Research*</td><td>50 %</td><td>60 %</td><td>70 %</td></tr>
<tr><td>Experimental development*</td><td>25 %</td><td>35 %</td><td>45 %</td></tr>
</table>
*For definitions, see Chapter 1, article 2, No 85 and 86 (p.25) in the Commission regulation (EU) no 651/2014

** For definitions of small- and medium size enterprises, see http://ec.europa.eu/DocsRoom/documents/15582/attachments/1/translations

Additional funding can be granted if special conditions are met, see http://vinnova.se/upload/dokument/ansok_rapportera/Tabell_stodnivaer_statligt_stod.pdf
</td></tr>
<tr><td>Submission of the pre-proposal at the national level</td><td>No</td></tr>
<tr><td>Submission of the full proposal at the national level</td><td>Yes, the full proposals selected for funding must be resubmitted at national level if funded. Funded projects will be invited by the responsible funding organisation (VR or Vinnova) to resubmit the proposal.</td></tr>
<tr><td>Submission of financial and scientific reports at the national level</td><td>For Vinnova, financial and scientific reports must be submitted at national level every sixth month during the project.

For VR, financial reports will be annual whereas scientific reports will be due at the end of the project.</td></tr>
<tr><td>Information available at</td><td>VR:
www.vr.se

Vinnova:
http://www.vinnova.se/sv/Ansoka-och-rapportera/Utlysningar/Utlysningar-i-samverkan/FET-Flagship-ERA-NET-FLAG-ERA--Grafen/</td></tr>
<tr><td>OTHER</td><td>-</td></tr>
</table>

SI – Slovenia – MIZS

Country/Region	Slovenia
Funding organisation	Ministry of Education Science and Sport
National contact person	Andrej Ograjensek, andrej.ograjensek@gov.si, Tel: +386 1 478 4634
Funding commitment	630.000 € in total
Anticipated number of fundable research groups	Up to 3 projects
Eligibility of project duration	3 years
Maximum funding per awarded project	210.000 €
Eligibility of a partner as a beneficiary institution	**Eligibility of a partner as a beneficiary institution:** research organizations as defined in the national *Research and Development Act (Zakon o raziskovalni in razvojni dejavnosti - ZRRD, Uradni list RS, št. 22/06 – uradno prečiščeno besedilo, 61/06-ZDru-1, 112/07, 9/11 in 57/12-ZPOP-1A*. All participating institutions have to be registered in the Slovenian Research Agency register of research institutions (Informacijski sistem o raziskovalni dejavnosti v Sloveniji - Sicris). **Eligibility of principal investigator and other research team members:** The project activities of the Slovenian partner have to be under the supervision of the primary investigator/primary researcher who fulfils the requirements for project leader as defined in Art. 29 of the national *Decree on criteria and standards for allocating resources for the implementation of the research activity, financed from the budget of the Republic of Slovenia (Uredba o normativih in standardih za določanje sredstev za izvajanje raziskovalne dejavnosti, financirane iz Proračuna Republike Slovenije, Uradni list RS, št. 103/11, 56/12, 15/14 in 103/15*, from now on: *Decree on criteria and standards*). The criteria are further determined in the *Rules on Determining the Fulfilment of Conditions for a Research Project Leader (Pravilnik o kriterijih za ugotavljanje izpolnjevanja pogojev za vodjo raziskovalnega projekta, Uradni list RS št. 41/09 in 72/11)*. All participating researchers have to be registered in the Slovenian Research Agency register of researchers (Sicris) and must have available research hours.
Eligibility of costs, types and their caps	MIZS will fund all eligible costs of Slovenian researchers participating in successful transnational projects, recommended for funding in accordance with the *Decree on criteria and standards*. Eligible costs are defined based on the FTE value according to the Slovenian Research Agency's research project categorization (A, B, C or D based on the research conducted). Eligible costs must be directly related to the research conducted and should include personnel (according to article 16,18, 22 and 23 of the Decree), material (including travel, consumables and services) and equipment (amortization) costs as elements of the FTE. Indirect costs are eligible. The value is calculated based on the FTE value of category A, B,C,

	or D research projects, under the condition that costs under each of the specific FTE elements are appropriately decreased (by a max. of 20% for indirect costs).
Submission of the pre-proposal at the national level	No
Submission of the full proposal at the national level	No
Submission of financial and scientific reports at the national level	Financial reports are submitted yearly at national level and final financial and scientific reports at the end of the project according to internal procedures.
Information available at	www.mizs.gov.si
OTHER	**Period of eligibility of public expenditures**: as of budgetary year 2018 until the end of the budgetary year 2021. **Period of eligibility of expenditures on the project**: from the starting date of the transnational project stipulated in the consortium agreement for a period of 36 months, with a prescribed additional 30 day period for the payment of invoices related to the project costs. The exact duration of the project will be defined in the contract between MIZS and the selected Slovenian partner, after the consortium agreement between the selected consortium partners enters into force. **National funding**: max. 630.000 € (**Graphene:** 210.000 € ; **HBP:** 420.000 €) with a possibility of additional EC funding depending on EC contribution (in the form of top up funding) **Total requested funding per project**: for all Slovenian partners within one consortium must not exceed 70.000 € per year (210.000 € for the total project duration of 36 months). **Funding:** a) 100 % for research organization (such as universities, public and private research institutes) who's financed activity is non-economic in accordance with the provisions of Community Framework for State Aid for Research and Development and Innovation (OJ EU C 198, 27. 6. 2014). Wide dissemination of research results on a non-exclusive and non-discriminatory basis is required. b) For research organizations, under the provision of Companies Act (Zakon o gospodarskih družbah, Uradni list RS, št. 65/09 - uradno prečiščeno besedilo, 33/11, 91/11, 100/11 - skl. US, 32/12, 57/12, 44/13 - odl. US, 82/13 in 55/15): 80% for small enterprises, 75% for medium sized enterprises and 65% for large enterprises. **National contracting negotiations** will commence after the projects are selected for funding on the level of the transnational call. National documentation with a statement regarding the agreed starting date of the transnational project signed by the transnational project coordinator will be a prerequisite for signing the contract on national level.

SK – Slovakia – SAS

Country/Region	Slovakia
Funding organisation	Slovak Academy of Sciences (SAS)
National contact person	Jan Barancik, barancik@up.upsav.sk, +421 2 57 51 01 37 Zuzana Panisova, panisova@up.upsav.sk, +421 2 57 51 02 45
Funding commitment	€ 480 000 in total
Anticipated number of fundable research groups	4-5
Eligibility of project duration	3 years
Maximum funding per awarded project	120.000 €
Eligibility of a partner as a beneficiary institution	**Only research Institutes of the Slovak Academy of Sciences (up to 100%).** Applicants from other Slovak R&D centres (universities and/or other organisations) have to cover the project costs from their own sources (Letter of Commitment). In addition to this, the teams outside of SAS can be consortium members but not the coordinator of the consortium.
Eligibility of costs, types and their caps	Direct costs (DC): ▪ Personnel (max. 15% of DC) ▪ Consumables ▪ Equipment (max. 40% of DC) ▪ Travel costs Indirect costs (IC - overheads): max. 20 % of DC. Total eligible costs = DC + IC Training costs shall not be defined as a separate category, but included in other costs items. Financial rules on awarding SAS grants for research projects in frame of ERA.Net Programme for research institutes of SAS http://www.sav.sk/index.php?lang=sk&charset=&doc=services-news&source_no=25&news_no=5570
Submission of the pre-proposal at the national level	NO
Submission of the full proposal at the national level	Submission of the proposal at the national level will be required for proposals recommended for funding, once the international evaluation has been performed and endorsed by the CSC. The Slovak project partner will be invited by SAS to submit the proposal (using Form MVTS). The Presidium of SAS makes the final decision for funding of selected projects.
Submission of financial and scientific reports at the national level	Financial reports are submitted yearly at national level and final financial and scientific reports at the end of the project according to internal procedures. Scientific reports including the achieved result on yearly basis
Information available at	www.sav.sk
OTHER	-

TR – Turkey – TUBITAK

Country/Region	Turkey
Funding organisation	The Scientific and Technological Research Council of Turkey (TUBITAK)
National contact person	Ezgi Bener Email: ncpict@tubitak.gov.tr; Tel: 00903122989411; Web: www.h2020.org.tr
Funding commitment	€2 Million in national funding (€1M for Human Brain and €1M for Graphene)
Anticipated number of fundable research groups	5 – 6 projects
Eligibility of project duration	36 Months
Maximum funding per awarded project	360.000TRL (≃ € 110.000) for direct costs + limits provided by the national guidelines for overhead and other costs (see eligibility of costs below)
Eligibility of a partner as a beneficiary institution	The Research Projects in the context of this call will be assessed and supported by TÜBİTAK, considering the rules of "1001- Scientific and Technological Research Projects Funding Program". The organisations which are eligible for funding by TÜBİTAK, the eligibility criteria for cooperation and the national rules on eligible costs are given in the national guidelines under: http://tubitak.gov.tr/en/funds/academy/national-support-programmes/content-1001-scientific-and-technological-research-projects-funding-program Legal permission and ethical committee approval letters must be completed before full proposal stage, if necessary. Project application form in Turkish should be sent to TUBİTAK. Projects that aim routine/case study will be eliminated in pre proposal stage.
Eligibility of costs, types and their caps	the eligibility criteria for cooperation and the national rules on eligible costs, types and their caps are given in the national guidelines under: http://tubitak.gov.tr/en/funds/academy/national-support-programmes/content-1001-scientific-and-technological-research-projects-funding-program
Submission of the pre-proposal at the national level	Yes. Proposals in the pre-proposal stage must also resubmit their national application via online into the national electronic submission system.
Submission of the full proposal at the national level	Yes. Proposals in the full proposal stage must also resubmit their national application via online into the national electronic submission system.
Submission of financial and scientific reports at the national level	Yes, Scientific and financial reporting according to national criteria
Information available at	Call announcement is to be published on www.h2020.org.tr
OTHER	It is highly recommended to contact the NCP during the preparation of the Project.

FLAG–ERA JTC 2017 Pre-Proposal

Project Acronym

Project Full Title

Sub-call: ☐ Graphene – Basic Research ☐ Graphene – Applied research and innovation ☐ HBP – Basic and applied research

Main area within sub-call (*1, 2, 3…*) | |

Secondary area(s) (*If several, separate with commas*) | |

Duration | months

Partners and participants involved in the realisation of the project

Partner Number	Country	Institution/ Department	Name of the Principal Investigator (PI)[1]	Name of the co-Investigators[2]	Other participants[3]
1 *Coordinator*					
2					
3					
4					
5					
6					

Use as many lines as needed

[1] *The Principal Investigator (PI) is the point of contact of the partner for the corresponding National or Regional Funding Organisation.*

[2] *A co-investigator is a known scientist and/or group leader making a substantial contribution to the project.*

[3] *If the name is for the moment unknown, specify the level of expertise sought (PhD, post-doc, engineer, professor…)*

Summary of the project[4] *(max. 3000 characters):*

Project detailed informations :

Ensure to update the pagination of the following table of contents

General recommendation:

1. *The document must not exceed a maximum of 10 pages, all included. Any page beyond this limit will be disregarded. The minimum font size allowed is 11 points with single spaced lines. The page size is A4, and all margins (top, bottom, left, right) should be at least 15 mm (not including any footers or headers). Indications provided in italics can be deleted.*
2. *Please complete all sections. For the evaluation criteria, please refer to the call announcement. Your proposal should include all details required. Keep in mind that a separate document is used to describe the Flagship partnership information.*

[4] *Be precise and concise. This summary will be used to select suitable reviewers for the proposal.*

1 Section 1: Relevance to the call

(~ ½ page)
Explain how the proposal addresses the specific scope of the topic. Be specific about the relevant areas in the topic description.

2 Section 2: S/T Quality

2.1 General objectives of the project

(~ ½ page)
Describe the context, scientific question(s) addressed and general objectives of the project.

2.2 State of the art

(~ ½ page)
Describe the state of the art in the domain addressed by the project. Quantitative information must be provided.

2.3 Approach and research method

(~ ½-1 page)
Describe the approach and research method followed. Provide information about experimental protocols and metrics to be used, showing that results will be reproducible.

2.4 Expected progress beyond state of the art

(~ ½-1 page)
Describe the targeted outcomes. They should be clear, measurable, realistic and achievable within the duration of the project. Provide quantitative information when possible.

3 Section 3: Implementation

3.1 Work plan and work packages

(~ 1 page)
Describe the general work plan and foreseen work packages.

3.2 Management and risk assessment

(~ ½ page)
Describe the organisational structure, the management structure and the decision-making. Describe the assessment on the feasibility, and the possible risks and/or bottlenecks.

3.3 Consortium

(~ ½ page)
Describe expertise and role in the project for each partner.

3.4 Financial plan

(~ ½ page)
The overview and financial plan for each project partner is described directly in the Evaluation and Submission System (ESS) by the coordinator. Justify here these resources to be committed including: Personnel, Consumables, Equipment, Travel, Subcontracting, Provisions, Licensing fees, other.

4 Section 4: Impact

4.1 Expected impacts

(~ ½-1 page)
Describe the scientific impact of the proposed project, providing only information that applies to the proposal and its objectives. Wherever possible, use quantified indicators and targets. Describe how your project will contribute to the expected impacts set out in the work programme of the Flagship.

4.2 Dissemination and exploitation of results

(~ ½-1 page)
Describe the plan for disseminating and exploiting the project results.

5 Ethical issues

Describe any foreseeable ethical issue that may arise during the course of the research project. Describe all mitigation strategies employed to reduce ethical risk, and justify the research methodology with respect to ethical issues.

6 References

FLAG-ERA JTC 2017
Graphene Flagship Partnership Proposal

For any proposal submitted to the FLAG-ERA JTC 2017 on the Graphene topic, the present form must also be filled in by the coordinator and submitted on the FLAG-ERA submission web site (submission.flagera.eu). It should not exceed 3 pages. Any page beyond this limit will be disregarded. The present explanations can be removed.

For projects recommended for funding, the applicants will be invited to proceed with the association with the Graphene Flagship using an extended form similar to the one available on their web site (cf. section on Partnering Projects) and designed to easily reuse the information provided in the present form.

Project identification	
Title	
Acronym	
Project coordinator	
First and last name	
Email	
Affiliation (Organisation/ Institute, Laboratory, Department, etc.)	
Country	

Interactions with the Flagship Core Project
Expected added value for the project to join the Graphene Flagship as a Partnering Project
Contribution to the Graphene Flagship objectives, complementarity with the Graphene Flagship Core Project
Foreseen interactions and organisation to facilitate alignment and information flow between the project and the Graphene Flagship Core Project

Graphene Flagship Core Project Work Package(s) with which interactions are foreseen

FLAG-ERA JTC 2017
Human Brain Project (HBP) Flagship Partnership Proposal

For any proposal submitted to the FLAG-ERA JTC 2017 on the HBP topic, the present form must also be filled in by the coordinator and submitted on the FLAG-ERA submission web site (submission.flagera.eu). It should not exceed 4 pages. Any page beyond this limit will be disregarded. The present explanations can be removed.

For projects recommended for funding, the applicants will be invited to proceed with the association with the HBP using the procedure and forms available on their web site (cf. section on Partnering Projects), and reusing information provided in the present form and in the main FLAG-ERA proposal.

Project identification	
Title	
Acronym	
Project coordinator	
First and last name	
Email	
Affiliation (Organisation/ Institute, Laboratory, Department, etc.)	
Country	
Ethics Rapporteur Note: Activities conducted in a PP need to comply with the Ethics Compliance and other Ethics Management processes of the HBP as described on the Ethics Management website. This includes the nomination of an Ethics Rapporteur, responding to the ethics compliance survey and, where applicable, the submission of any ethics approvals and related documents.	
First and last name	
Email	
Affiliation (Organisation/ Institute, Laboratory, Department, etc.)	
Country	

Interactions with the Flagship Core Project
Expected added value for the project to join the HBP Flagship as a Partnering Project
Contribution to the HBP Flagship objectives, complementarity with the HBP Flagship Core

Project
Foreseen interactions and organisation to facilitate alignment and information flow between the Partnering Project and the HBP Flagship Core Project
HBP Flagship Core Project Subproject(s) with which interactions are foreseen

FLAG–ERA JTC 2017 Full Proposal[1]

Project Acronym

Project Full Title

Sub-call: ☐ Graphene – Basic Research ☐ Graphene – Applied research and innovation ☐ HBP – Basic and applied research

Main area within sub-call (*1, 2, 3…*)

Secondary area(s) (*If several, separate with commas*)

Duration _____ months

Partners and participants involved in the realisation of the project

Partner Number	Country	Institution/ Department	Name of the Principal Investigator (PI)[2]	Name of the co-Investigators[3]	Other participants[4]
1 *Coordinator*					
2					
3					
4					
5					
6					

Use as many lines as needed

[1] *Note that the submission must also include, as a separate document, a Flagship Partnering Project Application. This is an extended version of the Flagship Partnership Proposal submitted with the pre-proposal, which includes further information about the project partners. For proposals recommended for funding, applicants will be able to reuse this document for the formal association with the Flagship.*

[2] *The Principal Investigator (PI) is the point of contact of the partner for the corresponding National or Regional Funding Organisation.*

[3] *A co-investigator is a known scientist and/or group leader making a substantial contribution to the project.*

[4] *If the name is for the moment unknown, specify the level of expertise sought (PhD, post-doc, engineer, professor…)*

Summary of the project[5] *(publishable abstract, max. 3000 characters):*

Project detailed informations :

Ensure to update the pagination of the following table of contents

[5] *Be precise and concise. This summary will be used to select suitable reviewers for the proposal.*

General recommendation:

1. *The document must not exceed a maximum of 30 pages, all included. Any page beyond this limit will be disregarded. The minimum font size allowed is 11 points with single spaced lines. The page size is A4, and all margins (top, bottom, left, right) should be at least 15 mm (not including any footers or headers). Indications provided in italics can be deleted.*
2. *Please complete all sections. For the evaluation criteria, please refer to the call announcement. Your proposal should include all details required. Keep in mind that a separate document is used to describe the Flagship partnership information.*

Changes with respect to the pre-proposal, if any:

By default, the full proposal is expected to be consistent with the pre-proposal. If this is the case, mention it in one sentence. If not, explain and justify the changes. If the changes involve changes in the consortium composition, highlight them in a separate paragraph.

1 Section 2: S/T Quality

1.1 General objectives of the project

(~ 1 page)
Describe the context, scientific question(s) addressed and general objectives of the project.

1.2 State of the art

(~ 1 page)
Describe the state of the art in the domain addressed by the project. Quantitative information must be provided.

1.3 Approach and research method

(~ 1-2 page)
Describe the approach and research method followed. Be specific and do not describe only general directions. Provide information about experimental protocols and metrics to be used, showing that results will be reproducible. Describe experience or preliminary results showing feasibility.

1.4 Expected progress beyond state of the art

(~ 1-2 page)
Describe the targeted outcomes. They should be clear, measurable, realistic and achievable within the duration of the project. Quantitative numbers for targeted progress should be included as much as possible. Estimate expected progress in terms of Technology Readiness Levels (TRL).

2 Section 3: Implementation

2.1 Work plan and work packages

2.1.1 Work plan

(~ 1 page)
Describe the general work plan. Provide a general overview of the work plan and a timing of the different work packages and their components (Gantt chart or similar) and a graphical presentation of the components showing how they inter-relate (Pert chart or similar).

2.1.2 Work Packages

Provide a description of each work package and a list of work packages (templates provided).

(*up to 1 page per WP*)

WP 1	**WP Title**						Start month	End month
Contribution of project partners								
Partner number[6]	1	2	3	4	5	6	7	8
Total effort per partner (Person*months)								
Aim of the WP *Description of the Objective of the WP and the interrelation with other WPs.*								
Tasks								
T1.1	**Task title (Start month – end month: Responsible partner; Involved partner)[7]** *Description of work and role of participant*							
T1.2	**Task title (Start month – end month: Responsible partner; Involved partner)[7]** *Description of work and role of participant*							

[6] **Bold** the partner number of the work package leader
[7] *For instance: T1.1 Development of something (M3-M6; Responsible: 3; Involved: 1, 4)*

	Add as many lines as needed

Deliverable	Month of delivery	Title of deliverable
D1.1		
D1.2		
		Add as many lines as needed

Use as many WP templates as needed

Work package overview: Total effort per WP and partner (Person-months)

project-partner	WP1	WP2	WP3	WP4	WP5	WP6	total
1							
2							
3							
4							
5							
6							
total							

Use as many lines and columns as needed

2.2 Management and risk assessment

(~ 2 page)
Describe the organisational structure, the management structure and the decision-making. Provide a list of milestones and a risk analysis (templates provided).

List of milestones[8]:

No of Milestone	Delivery month	WP involved	Title
M1			
M2			
M3			

Use as many lines as needed but try to limit the number of milestones

Risk analysis:

Risk description	Likelihood[9]	Impact[9]	Mitigation plan

[8] *A milestone is a major and visible achievement in the project. It should be SMART (Specific, Measurable, Attainable, Relevant, Time-bound).*
[9] *Rate as low, medium or high.*

2.3 Consortium

2.3.1 Description of the consortium

Describe expertise and role in the project for each partner using the appropriate template below (different templates are provided for the coordinator, other partners requesting funding, and possible partners not requesting funding). The information provided here will be used to judge the operational capacity.

(max. 1 page per partner)

Partner 1 Project Coordinator	**Organisation Full name / Department**
Expertise: *Expertise of the organisation related to the project objectives.* *For the principal investigators give a brief CV highlighting research experience and list the 5 most important publications of the last three years*	
Role in project:	

Use this template if this partner is requesting funding

Partner n	**Organisation Full name / Department**
Expertise: *Expertise of the organisation related to the project objectives.* *For the principal investigators give a brief CV highlighting research experience and list the 5 most important publications of the last three years*	
Role in project:	

Use as many partner templates as needed

Use this template if this partner is not requesting funding

Partner n	**Organisation Full name / Department**
Expertise: *Expertise of the organisation related to the project objectives.* *For the principal investigators give a brief CV highlighting research experience and list the 5 most important publications of the last three years*	
Role in project:	
Please explain how the partner is able to secure its own funding	

Use as many partner templates as needed

2.3.2 Added value of the collaboration, including multidisciplinarity and European dimension

(~ ½ page)
Describe the added value of the consortium as a whole (including complementarity, balance). Indicate the contribution of the project, at the European and/or international level, to the expected impacts.

2.3.3 Consortium agreement principles (partner's rights and duties, IPR management)

(~ ½ page)

2.3.4 Description of significant facilities and large equipment available to the consortium to perform the project

(~ ¼ page)

2.3.5 Link with ongoing projects

(~ ½ page)
For each partner indicate (if applicable) the ongoing projects linked to the proposal topic, and their funding sources.

2.4 Financial plan

(~ 1-2 page)
Provide a financial plan using the templates below (provide as many tables as partners). All amounts must be in euro (for countries with a different currency, amounts in this currency are provided directly to the relevant funding organisation and figures provided here are indicative). For personnel costs, provide information on the number of person-months (PM), qualification (e.g. post-doc, PhD student, technician…). Provide a justification of the need and/or amount whenever this is not obvious from the rest of the proposal. If needed for the sake of clarity, several items of the same type can appear on different lines. Additional justifications can also be provided in plain text below the tables. Note that some costs might not be eligible in some countries. Information about eligible costs are provided in the Call Announcement (cf. Annex on National Requirements). In case of doubt, you are advised to contact the relevant National Contact Point.

Partner 1 (Coordinator): [Enter PARTNER NAME, COUNTRY here]			
Type	Item description and justification	Total cost	Requested
Personnel			
Travel			
Consumables			
Equipment			
Subcontracting			
Others			
Overheads			
Total (as also entered in the online submission system):			

Partner 2: [enter PARTNER NAME, COUNTRY here]			
Type	Item description and justification	Total cost	Requested
Personnel			
Travel			
Consumables			
Equipment			
Subcontracting			
Others			
Overheads			
Total (as also entered in the online submission system):			

Partner 3: [enter PARTNER NAME, COUNTY here]			
Type	Item description and justification	Total cost	Requested
Personnel			
Travel			
Consumables			
Equipment			
Subcontracting			
Others			
Overheads			
Total (as also entered in the online submission system):			

3 Section 4: Impact

3.1 Expected impacts

(~ 1-2 page)
Describe the scientific impact of the proposed project, providing only information that applies to the proposal and its objectives. Wherever possible, use quantified indicators and targets. Describe how your project will contribute to the expected impacts set out in the work programme of the Flagship.

3.2 Dissemination and exploitation of results

(~ 1-2 page)
Provide a plan for disseminating and exploiting the project results.

4 Ethical issues

Describe any foreseeable ethical issue that may arise during the course of the research project. Describe all mitigation strategies employed to reduce ethical risk, and justify the research methodology with respect to ethical issues.

5 References

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Graphene Flagship Partnering Project Application

This form must be filled in and submitted for the 2nd step of the evaluation. Compared to the form used for the 1st step of the evaluation, additional sections with administrative information have been added. Coordinators of projects recommended for funding will be able to reuse this form as is in order to proceed with the association with the Graphene Flagship.
As a reminder, it is expected that this application is prepared in concertation with Flagship members if none is already part of the project.

Project identification	
Title	
Acronym	
Start date	
Duration *(in months)*	
Project coordinator	
First and last name	
Email	
Affiliation *(Organisation/ Institute, Laboratory, Department, etc.)*	
Country	
Project summary	

Interactions with the Flagship Core Project
Expected added value for the project to join the Graphene Flagship as a Partnering Project
Contribution to the Graphene Flagship objectives, complementarity with the Graphene Flagship Core Project
Foreseen interactions and organisation to facilitate alignment and information flow between the project and the Graphene Flagship Core Project
Graphene Flagship Core Project Work Package(s) with which interactions are foreseen

List of all institutions involved in the project. Please tick the appropriate box **A- Applies to become new Associated Member** **B- Core 1 Project partner with new/additional research group/institute** **C- Existing Core 1 Project partner and Principal Investigator** **D- Does not wish to become Associated Member** *Please **mark with "X"** only one option under A, B, C or D. Note that, if one institution is already partner of the Core Project (option B and C), then it cannot become a new Associated Member. Use additional fields as needed.*				
Approved PPs and AM are expected to be listed on the Graphene Flagship webpages (name of project and institutions), please indicate if you agree with this:	YES/NO			
Organisation Name				
Type of organisation *(Company/SME/Research Performing Organisation/University/Other-please specify)*				
Country				
Principal Investigator first and name				
Principal Investigator email				
Status within the Graphene Flagship	A	B	C	D

Organisation Name				
Type of organisation *(Company/SME/Research Performing Organisation/University/Other-please specify)*				
Country				
Principal Investigator first and last name				
Principal Investigator email				
Status within the Graphene Flagship	A	B	C	D
Organisation Name				
Type of organisation *(Company/SME/Research Performing Organisation/University/Other-please specify)*				
Country				
Principal Investigator first and last name and email				
Principal Investigator email				
Status within the Graphene Flagship	A	B	C	D
Organisation Name				
Type of organisation *(Company/SME/Research Performing Organisation/University/Other-please specify)*				
Country				
Contact person / Principal Investigator name and email				
Status within the Graphene Flagship	A	B	C	D
Organisation Name				
Type of organisation *(Company/SME/Research Performing Organisation/University/Other-please specify)*				
Country				
Principal Investigator first and last name				
Principal Investigator email				
Status within the Graphene Flagship	A	B	C	D
Organisation Name				
Type of organisation *(Company/SME/Research Performing Organisation/University/Other-please specify)*				

Country				
Principal Investigator first and last name				
Principal Investigator email				
Status within the Graphene Flagship	A	B	C	D
Organisation Name				
Type of organisation *(Company/SME/Research Performing Organisation/University/Other-please specify)*				
Country				
Principal Investigator first and last name				
Principal Investigator email				
Status within the Graphene Flagship	A	B	C	D

Funding information	
Funding source and amount	
Funding organisation	
Country / region	
Funding amount (in € and/or local currency)	
Funding source and amount	
Funding organisation	
Country / region	
Funding amount (in € and/or local currency)	
Funding source and amount	
Funding organisation	
Country / region	
Funding amount (in € and/or local currency)	
Funding source and amount	
Funding organisation	
Country / region	
Funding amount (in € and/or local currency)	

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Human Brain Project (HBP) Flagship Partnering Project Application

This form must be filled in and submitted for the 2nd step of the evaluation. Compared to the form used for the 1st step of the evaluation, additional sections with administrative information have been added. Coordinators of projects recommended for funding will be able to reuse this form as is in order to proceed with the association with the HBP. Note that organisations that are not yet member of the HBP Flagship will have to submit an additional document for becoming Associated Member, to be found on the HBP web site (section on Partnering Projects).
As a reminder, it is expected that this application is prepared in concertation with Flagship members if none is already part of the project.

Project identification	
Title	
Acronym	
Start date	
Duration *(in months)*	
Project coordinator	
First and last name	
Email	
Affiliation (Organisation/ Institute, Laboratory, Department, etc.)	
Country	
Ethics Rapporteur Note: Activities conducted in a PP need to comply with the Ethics Compliance and other Ethics Management processes of the HBP as described on the Ethics Management website. This includes the nomination of an Ethics Rapporteur, responding to the ethics compliance survey and, where applicable, the submission of any ethics approvals and related documents.	
First and last name	
Email	
Affiliation (Organisation/ Institute, Laboratory, Department, etc.)	
Country	
Project summary	

Interactions with the Flagship Core Project
Expected added value for the project to join the HBP Flagship as a Partnering Project
Contribution to the HBP Flagship objectives, complementarity with the HBP Flagship Core Project
Foreseen interactions and organisation to facilitate alignment and information flow between the Partnering Project and the HBP Flagship Core Project
HBP Flagship Core Project Subproject(s) with which interactions are foreseen

List of all institutions involved in the project. Please tick the appropriate box:

- **A- Applies to become new Associated Member**
- **B- Existing Core Project partner**
- **C- Existing Associated Member**

Please select only one option. Note that, if one institution is already partner of the Core Project or an Associated Member, then it cannot become a new Associated Member.

Organisation 1			
Name			
Acronym (if applicable)			
Type *(Large enterprise, SME, Private/Public Research Organisation, Other-please specify)*			
Country			
Status within the HBP Flagship	A	B	C
	X	**X**	**X**
Principal Investigator for the project			
Name			
Email			
Position/function			
Institute, laboratory, department, group, team			

Co-investigators			
Name/ email			
Name/ email			
Admin contact point (if applicable)			
Name			
Position			
Email			
Phone			

Organisation 2			
Name			
Acronym (if applicable)			
Type *(Large enterprise, SME, Private/Public Research Organisation, Other-please specify)*			
Country			
Status within the HBP Flagship	A	B	C
	X	**X**	**X**
Principal Investigator for the project			
Name			
Email			
Position/function			
Institute, laboratory, department, group, team			
Co-investigators			
Name/ email			
Name/ email			
Admin contact point (if applicable)			
Name			
Position			
Email			
Phone			

Organisation 3	
Name	
Acronym (if applicable)	
Type *(Large enterprise, SME, Private/Public*	

Research Organisation, Other-please specify)			
Country			
Status within the HBP Flagship	A	B	C
	X	**X**	**X**
Principal Investigator for the project			
Name			
Email			
Position/function			
Institute, laboratory, department, group, team			
Co-investigators			
Name/ email			
Name/ email			
Admin contact point (if applicable)			
Name			
Email			
Phone			

Organisation 4			
Name			
Acronym (if applicable)			
Type *(Large enterprise, SME, Private/Public Research Organisation, Other-please specify)*			
Country			
Status within the HBP Flagship	A	B	C
	X	**X**	**X**
Principal Investigator for the project			
Name			
Email			
Position/function			
Institute, laboratory, department, group, team			
Co-investigators			
Name/ email			
Name/ email			
Admin contact point (if applicable)			
Name			

Position	
Email	
Phone	

Organisation 5			
Name			
Acronym (if applicable)			
Type *(Large enterprise, SME, Private/Public Research Organisation, Other-please specify)*			
Country			
Status within the HBP Flagship	A	B	C
	X	**X**	**X**
Principal Investigator for the project			
Name			
Email			
Position/function			
Institute, laboratory, department, group, team			
Co-investigators			
Name/ email			
Name/ email			
Admin contact point (if applicable)			
Name			
Position			
Email			
Phone			

Funding information	
Funding source and amount	
Funding organisation	
Country / region	
Funding amount (in € and/or local currency)	
Funding source and amount	
Funding organisation	
Country / region	
Funding amount (in € and/or local currency)	

Funding source and amount	
Funding organisation	
Country / region	
Funding amount (in € and/or local currency)	
Funding source and amount	
Funding organisation	
Country / region	
Funding amount (in € and/or local currency)	