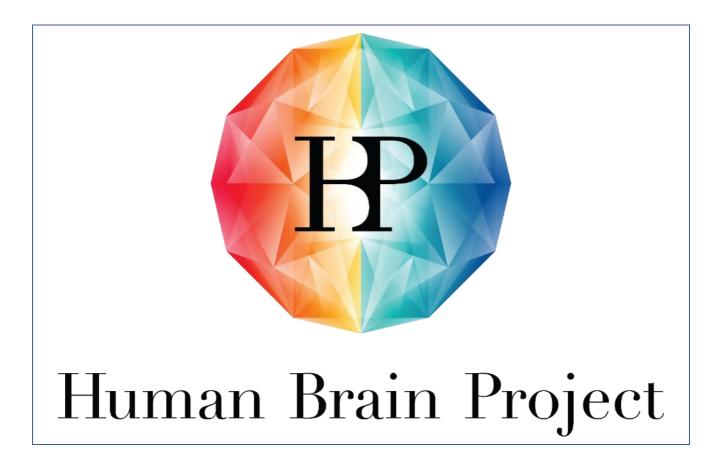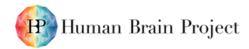# The HBP Calls for Expression of Interest for SGA3
"Data and models for studying the neural basis of cognition"

Guide for Applicants

Project Number:	785907	Project Title:	Human Brain Project SGA2

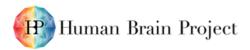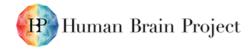| Document Title:	HBP CEoI for SGA3 – Data and models for studying the neural basis of cognition - Guide for Applicants
Document Filename:	HBP_SGA2_CEoI_cognition_Guide_for_Applicants
Dissemination Level:	PU = Public
Abstract:	Calls for Expression of Interest for SGA3, Guide for Applicants
Keywords:	working memory, action selection, planning, executive functions, semantic processing, semantic memory, behavioural sequencing, spatial navigation, spatial imagery, prefrontal cortex
Target Users/Readers:	Applicants, all interested
Call Publication Date:	24.10.2019
Pre-proposal Submission Deadline:	13.11. 2019 17:00 Brussels time
Proposal Submission Deadline:	11.12.2019 17:00 Brussels time
Proposal submission online platform	HBP Open Call Platform
Total Call Budget:	EUR 1,300,000. Maximum funding per proposal: EUR 1,300,000
More information:	info@opencalls.humanbrainproject.eu

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1.   The Human Brain Project

The Human Brain Project (HBP, https://www.humanbrainproject.eu/) is an ambitious 10-year scientific research and infrastructure initiative that is part of the EU Future and Emerging Technology (FET) Flagship programme[1]. The HBP is developing the European Brain ReseArch INfrastructureS (EBRAINS), an innovative ICT[2] infrastructure that will help neuroscientists and clinical researchers integrate data and knowledge about the brain across all levels of its spatial and temporal organisation. Using detailed digital representations, reconstructions, and simulations it aims to make available ICT tools to thousands of researchers to advance and accelerate our understanding of the functioning of the healthy and diseased human brain.

Computing the Brain is at the centre of the HBP's scientific strategy in SGA3, the third Specific Grant Agreement, and the HBP focuses on Neuroscience at the interface with Computing, to create an added value in this field. More information is available on the supplementary document HBP_SGA2_CEoI_for_SGA3_Proposal_Summary.

2.   Scope of the specific call

The CEoI is grounded in WP2 and is addressed at groups interested in gathering data which inform the neural basis of cognition and in data-driven modelling of cognitive processes.

Scientific Work Packages WP2 and WP3 will jointly develop models for cognitive functions during SGA3, which will act as a unified backbone to which other modules for additional cognitive functions can be added. Some of these modules will not be supplied by the HBP core Consortium. The applications that will be prioritised will be those that present a better opportunity for co-development of the EBRAINS infrastructure (e.g. neuroinformatics; brain simulation; high-performance computing; neurorobotics; neuromorphic computing).
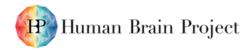
> *Background and Ambition:*
>
> The scientific Work Package investigating Networks underlying brain cognition and consciousness (WP2) aims to decode cognition, based on the general multiscale approach of the HBP. Neural mechanisms of cognition will be studied from the microscale of synapses up to the levels of multi-area neuronal networks shaping behaviour and conscious experience. In particular, WP2 aims to understand how the brain represents stimuli in their spatiotemporal context, and how consciousness arises therefrom. Answering these questions will not only contribute to fundamental neuroscience, but is also a prerequisite for building a neural architecture (in collaboration with WP3) that can realise adaptive, flexible and intelligent behaviour. To detect changes in the environment, it is essential to recognise and classify stimuli as a function of context, maintain them in memory, and use this information to guide appropriate action.
>
> The cognitive models of WP2 are composed of a set of hierarchically organised cortical and subcortical areas that are also represented in the connectome studies of WP1. They should fulfil several minimal requirements in terms of functionalities (e.g. object selectivity, contextual sensitivity, feature grouping) and should comply with neural constraints (e.g. plausibility of the neural architecture, ability to mimic neural response properties and global brain state transitions). To this end, WP2 will enrich the structural connectome (WP1) with data-based single-cell, spiking and local field potential models comprising several cortical and subcortical areas involved in cognitive tasks like multisensory object learning, perception and object-directed motor actions. Given WP2's strong reliance on the tools provided by the HBP Joint Platform, it will provide crucial guidance for co-developing the EBRAINS Research Infrastructure in the SGA3 phase, via use cases that constrain EBRAINS by requiring solutions for neuroscience demands on the infrastructure. Finally, WP2 will develop an advanced philosophical and ethical framework for the experimental

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[1] https://ec.europa.eu/programmes/horizon2020/en/h2020-section/fet-flagships
[2] ICT, Information and Communication Technology

and computational explorations of cognition and consciousness. This empirically-based conceptual framework will include methods and criteria to analyse broadly relevant issues on the relationships between the emergence of complex network functions and consciousness as well as between human and artificial intelligence.

2.1   Challenge

This Call targets both acquisition and analysis of experimental data and multiscale modelling, which is required to result in the integration of models into the overall backbone modelling structure in SGA3. The call is intended for (i) adding new modules mediating specific cognitive functions (see below), and (ii) collecting data, including multi-area and multiscale data from humans, nonhuman primates and/or rodents gathered during the execution of cognitive and behavioural tasks. These techniques comprise, for instance, high-resolution functional magnetic resonance imaging, transcranial magnetic stimulation, high-density recordings, cellular *in vivo* imaging, cell-type specific interventions such as by optogenetics, voltage-sensitive dye imaging, ultrasound and receptor-specific interventions (e.g. Dreadds).

2.2   Details

The focus of this Call is on cognitive and systems neuroscience studies that are complementary to ongoing work in the core consortium, specifically on:

1) prefrontal cortex-dependent capacities such as working memory, action selection, planning and related executive functions;

2) semantic processing and semantic memory, associated with temporal lobe structures, or

3) behavioral sequencing, spatial navigation and spatial imagery.

3.   Expected contributions and impact

Applicants are expected to provide a detailed description of the implementation of work plans within the defined timeframe (30 months from 01.10.2020 to 31.03.2023), as well as plans on how to integrate such work into the HBP. In addition, all proposals are expected to briefly describe the long-term vision of the proposed research theme (i.e. in a timeframe of 5 years), as well as how they will contribute to the overall HBP vision and objectives.

Any duplication with existing HBP activities must be avoided.
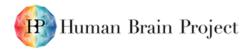
4.   Activities, eligibility and funding

It is highly recommended that a group of partners[3] or consortium applies for the CEoI. The consortium should be represented by a project coordinator with the principal investigator (PI) acting as the main contact person.

Either HBP partners or non-HBP partners[4] are eligible for funding under this CEoI. At least 60% of the proposal budget must be assigned to non-HBP partners, while the HBP partners should not account for more than 40% of the allocation. Please note, a new unit[5] of an existing HBP partner, not receiving any HBP funding, is eligible to participate in the CEoI and can apply for 60% of the allocated budget. The same rule applies to the HBP partners not receiving any SGA3 HBP funding. This rule allows (but does not force) new units to directly start in close collaboration with already integrated

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[3] Partner = a university or organisation, not an individual
[4] Non-HBP partners are not part of the HBP Consortium, thus not receiving any HBP funding
[5] Unit refers to a laboratory or department of a university or organisation

units. All proposals will be subject to the same evaluation criteria, whether it includes HBP partners or not (see Proposal evaluation).

The HBP has committed itself to improve equal opportunities. As such, we explicitly encourage applications from women and groups of applicants who have considered gender equality aspects in their group of applicants (see Equal opportunities).

The European Commission (EC) eligibility and financial rules apply[6]. The new partner organisations must therefore be established in the EU Member States or Horizon 2020 associated countries.

One (1) proposal will be selected out of this CEoI for EU funding for the HBP SGA3 period. Project duration should be 30 months maximum (01.10.2020 – 31.03.2023), depending on the inclusion of the new partner in the Consortium, and has a fixed end date which is the end of SGA3, 3 years from the start which is planned for the 1st of April 2020 at the moment of writing of this document.

The selected project and their partners will become a new Task as part of the overall envisioned HBP Work Plan for SGA3. The project will be located in WP2. The selected partner organisations will be incorporated in the HBP Consortium. The new partners will be requested to sign the relevant agreements with the EC as well as the Consortium Agreement that regulates the relations between the Partners of the Consortium.

The agreements with the EC include a Framework Partnership Agreement (FPA) and a Specific Grant Agreement (SGA). The FPA Consortium Agreement applies to the Consortium during the entire Flagship period and is amended regularly for major changes. The addition of new Partners to the Consortium is subject to the approval of the required FPA Amendment by the HBP Stakeholder Board and the EC.

Success in this CEoI should not be considered as a commitment by the HBP or the EC to continue funding the Partners after the end of the SGA3 period. The continuation of this activity will be subject to the same review as all other HBP activities.

Note: while preparations for the coming phase (HBP SGA3) are going ahead to allow a timely start of new partners, the final approval of the selected projects will be subject to the HBP being successful in applying for funding of the next phase (currently under preparation). Applicants will receive the final confirmation of project funding only, once the HBP SGA3 Proposal has been accepted for funding by the EC.

4.1   Budget of the proposal

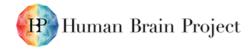The total Call budget is EUR 1,300,000.

The requested budget must not exceed EUR 1,300,000 per proposal.

The total Call budget includes a voucher of EUR 130,000 to fund technical support for integration of project results in EBRAINs, which will be performed by the HBP High Level Support Team (HLST).

Co-funding of approximately EUR 585,000 is requested. Proposals with lower contributions are not *a priori* excluded, but must be justified.

It is expected that the new partners have the operational capacity to carry out the activities related to the main objectives of this CEoI. Nevertheless, subcontracting is allowed for activities not crucial to the HBP work (see Financial Rules - H2020-amga).

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[6] The countries eligible to apply are all the EU Member States and the H2020 Associated Countries. For eligibility of other countries, see http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/international-cooperation_en.htm.

5. Pre-proposal submission

The pre-proposal **must** be submitted via the HBP open call platform. A member of the relevant WP will respond to the applicants within 1 week. The response will be limited to clarifying whether the proposal fits into the scope of the call and how the proposal could be improved.

Note: it is **mandatory** to submit a pre-proposal and it has no influence on the evaluation of the full proposal.

6. Proposal submission

The proposal is submitted via the HBP open call platform. The applicants are required to register a profile, enter the proposal information and partner data, and submit the proposal document as a PDF and the requested budget.

The applicants can edit the proposal before the deadline (e.g. submit revised versions); only the last version will be considered for evaluation.

Shortly after the submission of the proposal, an acknowledgement of receipt will be sent to the e-mail address of the proposal's main contact person, named in the submitted proposal. Sending of an acknowledgement of receipt does not imply that a proposal has been accepted as eligible for evaluation.

For any given proposal, the proposal main contact person will act as the main point of contact between the proposal partners and the HBP.

It is the responsibility of the applicants to ensure timely submission; proposals submitted after the deadline will not be considered. Failure of the proposal to arrive in time for any reason, including communications delays, will automatically leads to rejection of the proposal. The time of receipt of the message as recorded by the submission system will be authoritative.

Upon the call deadline, the proposals have to fulfil the admissibility and eligibility criteria in order to be retained for evaluation. In addition, the proposals have to strictly adhere to the template provided via the HBP open call platform, which defines sections and the overall length. Evaluators will be instructed not to consider extra material in the evaluation.

Note: a proposal submitted without the pre-proposal will be not considered eligible for the evaluation.

The HBP offers an email-based helpdesk system for applicants at info@opencalls.humanbrainproject.eu.
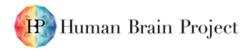
With the upload of the proposal template and the completion of the contact information, the applicants agree that contact names, affiliations and proposal titles of the winning proposals (only) will be announced on the HBP website.

7. Ethical issues

Research activities in Horizon 2020, and particularly in the HBP, must respect fundamental ethical principles, particularly those outlined in the Horizon2020_Ethics_Guidance.

If there are ethical issues specific to your proposal (please see the ethical issue table in the Horizon2020_Ethics_Guidance.pdf above), before and during the runtime of the research activities within the HBP, you must submit an HBP Ethical Issues and Approvals survey and include the documents that you need under national law (e.g. proof of approval by the competent authority).

The HBP Ethical Issues and Approvals survey should describe how the proposal meets the national legal and ethical requirements of the country or countries where the tasks raising ethical issues are to be carried out; and explain, in detail, how you address the issues in the ethical issues table, in

particular with regard to research objectives (dual use, etc.), methodology (protection of collected data, etc.) and potential impact of the research (dual use issues, benefit-sharing, misuse, etc.).

Applications, especially from non-European countries, must make sure to comply with the above Horizon2020 Ethics Guidelines and clarify ethical issues before the proposal submission.

Proposers must demonstrate that they are mindful of the fact that the citizens of Europe trust the public R&D endeavour to produce tangible results benefiting society by advancing health, economic growth, and quality of life across all communities.

The applicants are responsible for ethical compliance. They will work with the HBP contact persons, the respective HBP ethics rapporteur and ethics support team to ensure compliance with ethical and legal requirements. Their ethics compliance will be included in the HBP ethics compliance management processes.

8.   Equal opportunities

Gender equality concerns all parts of Horizon 2020 (see the Guidance on Gender Equality in H2020). HBP is committed itself to improve equal opportunities, especially to balance the proportion of male and female scientists in leadership positions, as well as among PhD students and post docs. HBP created the Gender Advisory Committee which provides advice and feedback on the Gender Action Plan of HBP on activities planned to improve equality in their respective areas of responsibility.

The HBP aims to demonstrate how diversity drives scientific excellence, innovation, and collaboration and aims to become a European best practice example for fostering equal opportunities across different institutions, member states, disciplinary cultures and intellectual environments.

The applicants are invited to outline in their proposal which measures will be undertaken to foster equal opportunities and how sex, gender or other diversity issues are addressed as part of their research. Equal opportunities represent an evaluation criterion (see Table 1).

9.   Proposal evaluation

All submitted proposals will be evaluated by acknowledged external experts from relevant research fields and by reviewers from the broader scientific community (all referred to as 'experts'). To avoid conflicts of interest, the experts are independent of the HBP Consortium and the applicants. The conflict of interest rules for this call are set out here.
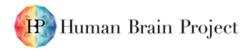
Experts will maintain strict confidentiality with respect to the entire evaluation process. Experts perform evaluations in their private capacity, not as representatives of their employer, their country or any other entity. Under no circumstance may an expert attempt to contact an applicant directly, either during the evaluation or afterwards. Experts cannot submit an Expression of Interest (EoI) proposal for the call they are reviewing.

The proposals evaluation will be performed in two steps.

In the **first step**, at least three external experts will review individually each proposal assigned. They evaluate each proposal considering the evaluation criteria in 9.1 – Table 1. The experts score each criterion (0 to 10, detailed in 9.1 – Table 2) , with explanatory comments.

In the **second step**, the experts discuss and compare all the proposals during the panel meeting. They establish the final ranking of the proposals, providing a list of proposals being above and below threshold. A proposal is considered as eligible for funding if all thresholds are met or exceeded, however, the highest ranked proposal will be selected for funding. If all proposals fall below threshold, no selection will be made and the CEoI might be reopened.

The experts will be advised by an invited group of HBP members of the Directorate (DIR) and WP leaders, who will clarify the procedure and need of the HBP prior to the evaluation, and offer their opinion on the relevance of the proposals to the HBP during the panel meeting.

The ranked list of the proposals will be presented to the HBP Science and Infrastructure Board (SIB) and the DIR for endorsement. The selected proposal will be funded and integrated into the envisaged HBP SGA3 Work Plan.

To ensure transparency, the results of the evaluations will be made available to the EC.

After completion of the call, applicants will receive the evaluation summary report for their proposal. Any request for redress can only be based on procedural grounds and must be submitted by the proposal coordinator within 30 days from the receipt of the official letter.

Note: the addition of new Partners to the Consortium is subject to the approval of the required FPA and SGA amendments by the HBP Stakeholder Board and the EC. Following this process, the partner(s) will be welcomed into the HBP consortium.

9.1   Proposal evaluation criteria and scores

The evaluation criteria for this CEoI are provided in Table 1.The criteria reflect the expected impact of project funded under this HBP CEoI.

The evaluation scores are provided in Table 2.

10. Additional information

You can find more information on the HBP here.

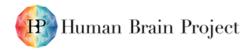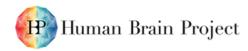A list of Frequently Asked Questions (FAQ) is available here.

Table 1: Proposal evaluation criteria

1. Scientific excellence	Weight: 40%
• Credibility and soundness of the proposed research theme and degree of conformity to provided specifications • Extent to which proposed work is ambitious, has innovation potential, and is beyond the state of the art (e.g. ground-breaking objectives of the long-term vision of the proposal, novel concepts and approaches and their potential to become a seminal work, etc.) • Quality and effectiveness of the detailed research plan (including appropriateness of tasks and experiments, milestones, and indicators to monitor progress) • Enhancing innovation capacity and generation and integration of new knowledge	*Score: ?/10* *(Threshold: 8/10)*
2. Impact	**Weight: 30%**
• Contribution to the design and development of the HBP research infrastructure • Coordination with the HBP WP2 • Contribution to HBP human neurosciences and to theory development	*Score: ?/10* *(Threshold: 8/10)*
3. Implementation	**Weight: 20%**
• Suitability of planned costs • Co-funding provided by the Partners (in-kind, cash or combination) • Appropriateness of proposed work plan • Quality of the Organisations and of the group of applicants as a whole (including complementarity, balance, involvement of key actors, prior history, relevant experience of the individual partners)	*Score: ?/10* *(Threshold: 8/10)*
4. Equal opportunities	**Weight: 10%**
• For teams, is the diversity aspect (gender, age, career stage, other factors) taken into consideration/ are there any measures in place? If there is a gender imbalance, are measures planned to improve gender equality? • In research activities, when human beings are involved as subjects or end-users, gender differences or other diversity factors may exist. In these cases, is the gender dimension and relevance of scientific questions on gender or other diversity factors (e.g. age) in the research content addressed as an integral part of the proposal?	*Score: ?/10* *(Threshold: 8/10)*
Remarks	
• Ethical implications and compliance with applicable international, EU and national law • Ensure that the study proposed will not promote indications that raise ethical issues	*No Score*
OVERALL SCORE	*Score: ?/10* *(Threshold: 8/10)*

Table 2: Proposal evaluation scores

0	The proposal fails to address the criterion	The proposal fails to address the criterion under examination or cannot be judged due to missing or incomplete information.
1-2	Poor	The criterion is addressed in an inadequate manner, or there are serious inherent weaknesses.
3-4	Fair	While the proposal broadly addresses the criterion, there are significant weaknesses.
5-6	Good	The proposal addresses the criterion well, although improvements would be necessary.
7-8	Very good	The proposal addresses the criterion very well, although certain improvements are still possible.
9-10	Excellent	The proposal successfully addresses all relevant aspects of the criterion in question. Any shortcomings are minor.