

*The HBP Calls for Expression of Interest for SGA3
“Rodent microcircuits”*

Guide for Applicants



Human Brain Project



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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 programme¹. The HBP is developing the European Brain ReseArch INfrastructureS (EBRAINS), an innovative ICT² 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 CEOI

This Call for Expression of interest (CEOI) is for WP1 of SGA3. WP1 will increase the capacity of the research community to model human brain activity at an unprecedented level of sophistication, leading to the generation of new neuroscientific insights and relevance for social sciences and humanities. These ambitions will be realised by building a theoretically-grounded computational framework fully embedded in EBRAINS, which will enable the self-consistent organisation of multiscale neuroscience data and models in a common reference space, linking data to model parameters, and establish workflows to simulate and validate multiscale neural activity of human brain networks. This approach will address the major impediments to human neuroscience progress through modelling, including variation in data quality and availability, lack of computational resources, and the difficult translation between mathematical models, theory, and data.

Although WP1 aims at humans, an essential complement is provided by modelling of the mouse brain. First of all, mouse models can leverage on a wealth of molecular / cellular information not commonly available for humans and can be validated through standardised and repeatable experimental tests. Secondly, some of the human data may be missing and will be complemented by getting inspiration from mouse microcircuit data and models and validating the process against *in silico* surrogates, thereby leveraging unique HBP experience. The present CEOI provides an essential test-bench to generate a point neuron model of the rodent brain reconnecting fundamental microcircuits (especially the cerebellum and hippocampus with cerebral cortex) ready to be adapted and embedded into The Virtual Brain, robotic controllers and neuromorphic hardware.

2.1 Challenge

The generation of a full-brain rodent model is recognised to be of fundamental importance for understanding brain dynamics and for a set of advanced technological applications. This project complements the human brain models developed in WP1 and needs to provide a proof of principle for the multiscale brain modelling approach and for its transferability to humans. The models of selected brain regions need to start from a high level of maturity that would ensure their effective integration into the whole-brain scaffold.

The CEOI is addressed to organisations interested in reconstructing a full-brain model of rodents for closed-loop simulation of large-scale circuit dynamics. Given that most data and Atlases are available for mice, these provide the most significant background for the call.

¹ <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/fet-flagships>

² ICT, Information and Communication Technology

The project has to demonstrate a clear potential for real-world applications (e.g. in software, atlas of brain data, robotics and neuromorphic computing) and has to generate workflows for functional simulations to be applied to the investigation of brain dynamics e.g. in The Virtual Brain environment, in robotic control systems and in neuromorphic computing systems. It should address brain architectures involved in motor and cognitive control.

Under this CEol, HBP Partners responsible for the development of whole-brain rodent models and specific microcircuits are expected to group up with potential new Partners to submit proposals for a challenging project addressing high-level Use Cases to further **advance the development of the HBP science and research infrastructure**. The suggested approach must leverage on previous HBP achievements in terms of science, tools and simulation platforms and fully exploit them to *yield disruptive results* while demonstrating a *very high quality of science*. Potential new partners could include Scientists, Developers and Engineers and are expected to have a strong track record in the development of microcircuit models of the rodent brain and in their experimental validation and application to biological questions in large neuroscience or life science projects or equivalent. The proposal must be compatible with the requirements of the CEol.

2.2 Details

The selected proposal will address the following points:

- Generate a model of the rodent brain at the microcircuit and point neuron level. The component microcircuit models need to be connected into a multi-regional large-scale network (e.g. cerebellum and hippocampus to cortex).
- Derive point neurons and microcircuits from data-driven detailed multicompartamental models through simplification and validation pipelines allowing to maintain the salient biological features and propagate them at higher scales.
- The models should be appropriately configured to be integrated into *The Virtual Brain* of the mouse (<https://www.thevirtualbrain.org/tvb/zwei/home>), in which they should be capable in running in *co-simulations*. It is therefore recommendable that the models are integrated into a whole-brain scaffold using an appropriate Mouse Brain Atlas for reference.
- Run benchmarks demonstrating the effectiveness of co-simulations in different network configurations of mixed scales.
- Perform fundamental simulations demonstrating the effectiveness of the model for generating brain dynamics.
- Make critical, substantial contributions to the construction of the *HBP common brain reference framework* (WP1) and include specification of the data and/or tools, which will then be distributed through *EBRAINS* to the scientific community.
- Generate workflows for functional simulations to be applied to the investigation of brain dynamics in The Virtual Brain environment, in robotic control systems and in neuromorphic computing systems.

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 it 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 partners³ or consortium applies for the CEol. 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 partners⁴ are eligible for funding under this CEol. 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 unit⁵ of an existing HBP partner, not receiving any HBP funding, is eligible to participate in the CEol 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 with a close collaboration with already integrated 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 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.

Equal opportunities).

The European Commission (EC) eligibility and financial rules apply⁶. 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 CEol for EU funding for the HBP SGA3 period. Project duration should be 30 months maximum (01.10.2020 - 31.03.2023) depending on the date of 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 WP1. The selected partner organisations will

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

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.

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 900,000.

The requested budget must not exceed EUR 900,000 per proposal.

The total Call budget includes a voucher of EUR 90,000 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 450,000 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](#)).

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 lead 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).

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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 has 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 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%
<ul style="list-style-type: none"> • 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%
<ul style="list-style-type: none"> • Contribution to the design and development of the HBP research infrastructure • Coordination with the HBP WP1 • Contribution to HBP mouse-human neurosciences and to theory development 	Score: ?/10 (Threshold: 8/10)
3. Implementation	Weight: 20%
<ul style="list-style-type: none"> • 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%
<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • 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.