**Horizon 2020**

**Work programme 2016 – 2017**

*Excellent Science*

*Future and Emerging Technologies*

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## Introduction

**Future and Emerging Technologies activities help to create in Europe a fertile ground for responsible and dynamic multi-disciplinary collaborations on future and emerging technologies and for kick-starting new European research and innovation eco-systems around them. These will be the seeds for future industrial leadership and for tackling society's grand challenges in new ways.**

FET focuses on research beyond what is known, accepted or widely adopted and supports novel and visionary thinking to open promising paths towards **radically new technological possibilities**. In particular, FET funds **interdisciplinary collaborations** that seek genuine cross-fertilisation and deep synergies between the broadest range of advanced sciences (including the life sciences, social sciences and humanities) and cutting-edge engineering disciplines.

FET has three main lines of activity:

**FET Open** supports the early-stages of the science and technology research and innovation around new ideas towards radically new future technologies. It also funds coordination and support activities for such high-risk forward looking research to prosper in Europe.[[1]](#footnote-2)

**FET Proactive** addresses promising directions for research on future technologies in order to build up a European critical mass of knowledge and excellence around them.

**FET Flagships** are science-driven, large-scale, multidisciplinary research initiatives oriented towards a unifying goal, aiming at transformational impacts with substantial benefits for European competitiveness and for society.

In this workprogramme, particular attention is paid to tapping into the **innovation** potential from the respective FET action lines. For example, actions to stimulate the exploitation of early results from FET research are foreseen. In order to create a wider and more diverse support base from which to take these innovations forward, the participation of new actors and of young and high-potential researchers and high-tech innovators is encouraged. Along the same line, FET encourages wide non-discriminatory participation and outreach and pays attention to diversity issues such as gender, age and culture, aware that this can also offer new perspectives, pose new questions and open new areas of investigations.

Silo-breaking research collaborations in FET will improve readiness across Europe to take up **new research and innovation practices** that make leading-edge research more open, creative and closer to society, for example through 'open science', the use of advanced modelling, simulation and open collaboration platforms and of participatory methods. A variety of creativity-enhancing and artistic practices can be linked into research and innovation approaches, for instance for exploring technological visions, for testing unexpected technical solutions, developing novel uses of technology or for exploring their social acceptance.

FET research is well placed for **global collaborations** that can raise the level of excellence and accelerate the impact from global alliances. Thus, participation of excellent non EU partners in FET activities, whenever necessary, is welcome.

The projects funded under this area will participate will participate in the **Pilot on Open Research Data** in Horizon 2020 in line with the Commission's Open Access to research data policy for facilitating access, re-use and preservation of research data. Projects have the possibility to opt out of the Pilot. The use of a Data Management Plan is required for projects participating in the Open Research Data Pilot. It details what data the project will generate, whether and how it will be exploited or made accessible for verification and re-use, and how it will be curated and preserved. Further guidance on the Open Research Data Pilot is available on the Participant Portal.

## Call FET-Open - novel ideas for radically new technologies

This call aims to support the early stages of joint science and technology research for radically new future technological possibilities. The call is entirely non-prescriptive with regards to the nature or purpose of the technologies that are envisaged and thus targets mainly the unexpected. A bottom-up selection process will build up a diverse portfolio of projects. In order to identify and seize opportunities of long-term benefit for citizens, the economy and society, the early detection of promising new areas, developments and trends, wherever they come from, will be essential. The FET-Open call also seeks for coordination and support activities to turn Europe into the best place in the world for responsible collaborative research and innovation on future and emerging technologies that will make a difference for society in the decades to come.

Proposals are invited against the following topics:

### FETOPEN 1 – 2016/2017: FET-Open Research and Innovation Actions

Specific challenge: The successful exploration of new foundations for radically new future technologies requires supporting a large set of early stage, high risk visionary science and technology projects to investigate new ideas. Here agile, risk-friendly and highly interdisciplinary research approaches are needed with collaborations that are open to all sciences and disciplines and that dissolve the traditional boundaries between them. The renewal of ideas is complemented by the renewal of actors taking these new ideas forward. Therefore, this topic encourages the driving role of new high-potential actors in research and innovation, such as excellent young researchers and high-tech SMEs that may become the scientific and industrial leaders of the future.

Scope: This topic supports the early stages of research to establish a new technological possibility. Proposals are sought for **collaborative research with all of the following characteristics** ('FET gatekeepers'):

* **Long-term vision**: the research proposed must address a new and radical long-term vision of a science- and technology-enabled future that is far beyond the state of the art and not currently foreseen by technology roadmaps.
* **Breakthrough scientific and technological target**: research must target a scientifically ambitious and technologically concrete breakthrough, argued to be a crucial step towards achieving the long-term vision. The plausibility of the proposed breakthrough(s) to be attained within the life-time of the project must be argued in the proposal.
* **Novelty**: the research proposed for achieving the breakthrough must be based on cutting-edge knowledge, new ideas and concepts, rather than in the mere application or incremental refinement of existing ones.
* **Foundational**: the breakthroughs that are envisaged must be foundational in the sense that, if achieved, they would establish an essential basis for a new kind of technology and its future uses, not currently anticipated.
* **High-risk**: the inherently high risk of the research proposed will be reflected in a flexible but effective methodology for exploring alternative directions and options, supported by open and agile research and innovation practices.
* **Interdisciplinary**: the proposed collaborations are expected to go beyond 'waterfall' configurations in multi-disciplinary science- and technology research. Instead they should seek new solutions through genuine exchanges, mutual learning, cross-fertilisation and synergistic advances among distant disciplines in order to open unexplored areas of investigation and new directions for joint research.

Expected impact:

* Initiating or consolidating a baseline of feasibility or a radically new line of technology and its future uses by establishing the essential proofs-of-principle and their supporting scientific underpinnings.
* Strengthening European thought-leadership on visionary, new and emerging technologies, beyond academic excellence. This impact can be reinforced by involving also new high-potential actors such as young researchers and high-tech SMEs that may become the European scientific and technological leaders and innovators of the future.
* Impact is also sought in terms of the take up of new research and innovation practices for making leading-edge science and technology research more open, collaborative, creative and closer to society.

Type of instrument(s): Research and Innovation Actions. The Commission considers that proposals requesting a contribution from the EU of up to 4 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Budget per type of instrument: 84M€ in 2016 (1 deadline) and 168 M€ in 2017 (2 deadlines).

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### FETOPEN 2 – 2016: FET-Open Coordination and Support Actions

Specific challenge: The challenge is to make Europe the best place in the world for collaborative research and innovation on future and emerging technologies that will secure and renew the basis for future European competitiveness and growth, and that will make a difference for society in the decades to come.

Scope: Proposals shall address one of the following topics:

1. FET Communication [2016]: raising through targeted activities and events the visibility of FET and its potential impact towards various stakeholders well beyond the research communities. This may include collecting, aggregating and disseminating information from the entire range of FET projects and activities, and using an appropriate mix of channels and formats to engage with the target audiences, including policy makers and the public at large.
2. FET Exchange [2016]: actions for structuring and strengthening an emerging FET-relevant science and technology topic and the interdisciplinary communities around this topic. This may include research roadmapping, stimulating learning and exchange, expanding the range of disciplines (including the life sciences and humanities where relevant), involving new actors such as young researchers, entrepreneurs and high-tech SMEs, and broadening stakeholder engagement. One specific theme to be addressed is the area of alternative metrics (so-called "altmetrics") to assess research outputs and researchers.
3. FET Conference [2016]: supporting the organisation of the fourth European Future and Emerging Technologies Conference and Exhibition (see for example <http://www.fet11.eu/> ). The conference shall showcase progress and results from FET research, attract high-tech SMEs, investors and entrepreneurs that might take FET results forward, seed new ideas across disciplines, foster a dialogue between science, policy and society on future and emerging technologies, explore new ways of combining research and innovation and involve high-potential actors that will make the difference. Proposals should address pre-conference communication activities, the local organisation, participant assistance and post-conference follow-up. The event shall take place in early 2018.
4. FET Innovation Greenhouse [2016]: actions for establishing a Europe-wide capacity for innovation, exploitation and entrepreneurship stemming from the visionary, high-risk interdisciplinary science and technology research supported by FET. Greenhouse provides innovation support services to help bridging the gap between FET research and its application in industry and for society. The focus should be on enabling the earlier creative and learning stages of innovation from FET research, for which the classical path of business plans and investors is still premature, many options are still open and a more exploratory, risk-friendly and tailored support is needed. A wide technological scope, a strong specificity to FET and complementarity with existing greenhouse initiatives and innovation services are of prime importance. Support to the actions funded under the FET Innovation Launchpad (FETOPEN 4) and for networking and exchange among them are also welcome.

For each of the scope items a) and c) at most one proposal will be funded.

Expected impact:

* European thought-leadership on new and emerging technologies with a strong engagement of scientists, citizens, innovators and policy makers.
* Improved long-term innovation potential in Europe both from the abundance of novel ideas and the range of actors ready to take them forward.
* Improved understanding of the range of possible impact mechanisms for long-term science and technology research.
* Improved readiness across Europe to engage in silo-breaking research collaboration and to take up new research and innovation practices.

Type of instrument(s): Coordination and Support Actions. The Commission considers that proposals requesting a contribution from the EU of between EUR 0,3 and 0,5 million for scope items a), b) and d), and up to EUR 1 million for the scope item c), would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Budget per instrument: 3Meuro (2016)

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### FETOPEN 3 – 2017: FET-Open Coordination and Support Actions

Specific challenge: The challenge is to make Europe the best place in the world for collaborative research and innovation on future and emerging technologies that will renew the basis for future European competitiveness and growth, and that will make a difference for society in the decades to come.

Scope: Proposals shall address one of the following topics:

1. FET Futures [2017]: identifying strategy options, challenges and opportunities to stimulate and organise interdisciplinary research and innovation towards new and visionary technologies of any kind. Actions should rely on evidence from FET activities (e.g., portfolio, constituency, results) and from other sources (including other funding bodies or private initiatives worldwide, like those using prize schemes or challenges). They should aim at open and dynamic stakeholder participation using advanced methods and on-line tools/social networks.
2. FET Exchange [2017]: actions for structuring and strengthening an emerging FET-relevant science and technology topic and the interdisciplinary communities around this topic. This may include research roadmapping, stimulating learning and exchange, expanding the range of disciplines (including the life sciences and humanities where relevant), involving new actors such as young researchers, entrepreneurs and high-tech SMEs, and broadening stakeholder engagement. One specific theme to be addressed is the area of alternative metrics (so-called "altmetrics") to assess research outputs and researchers.

For scope item a) at most one proposal will be funded.

Expected impact:

* Strengthened European thought-leadership on new and emerging technologies with a strong engagement of scientists, citizens, innovators and policy makers.
* Improved long-term innovation potential in Europe both from the abundance of novel ideas and the range of actors ready to take them forward.
* Improved understanding of the range of possible impact mechanisms for long-term science and technology research.
* Improved readiness across Europe to engage in silo-breaking research collaboration and to take up new research and innovation practices.

Type of instrument(s): Coordination and Support Actions. The Commission considers that proposals requesting a contribution from the EU of between EUR 0,3 and 0,5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Budget per instrument: 1,5MEuro (2017)

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### FETOPEN 4 – 2016/2017: FET Innovation Launchpad

Specific challenge: FET projects often generate new and sometimes unexpected opportunities for commercial or societal application. This topic aims at funding further innovation related work (i.e. activities which were not scheduled to be funded by the original project) to verify and substantiate the innovation potential of ideas arising from FET funded projects and to support the next steps in turning them into a genuine social or economic innovation.

Scope: short and focused individual or collaborative actions to take out of the lab a promising result or proof-of-concept that originated from a FET-funded project and to get it on the way to social or economic innovation through new entrepreneurship or otherwise. The action will support the transformation of that specific research result into a credible offering for economic or social impact, by exploring the feasibility of an exploitation path and by coordinating and supporting the assembling of the right knowledge, skills and resources and thus serves as a launch pad for exploitation.

This call topic is focused on the early innovation stages from results of an ongoing or recently finished project[[2]](#footnote-3) funded through FET under FP7 or H2020. The complementarity and precise link with the relevant FET project is to be explicitly addressed in the proposal by clearly stating the nature and origin of the results to be taken up, and by adding a confirmation of any necessary agreements with owners or right holders of those results to move towards their exploitation. This call topic does not fund additional research, nor does it fund activities that are/were already foreseen in the relevant FET project. Activities to be funded should be fit-for-purpose (e.g., tailored to the level of maturity of the result to be taken up) and can include, among others, the definition of a commercialisation process to be followed, market and competitiveness analysis, technology assessement, consolidation of intellectual property rights and strategy, scenario and business case development, developing contacts and support relevant activities with for instance, industrial transfer partners, potential licence-takers, investors, societal organisations or potential end users.

By focusing on the very early stage of the innovation path where an SME or other suitable entrepreneurial context may not yet exist, the scope of this call complements innovation through existing SMEs that could be funded under specific schemes for innovation, such as the SME scheme.

Expected Impact

* Increased innovation potential from FET projects by picking up expected as well as non-anticipated innovation opportunities.
* Creation of concrete and closer-to-market high-potential innovations from FET projects.
* Stimulating, supporting and rewarding an open and proactive mind-set towards exploitation beyond the European research world.
* Seeding future growth and the creation of jobs from FET research.

Instrument(s): Coordination and Support Actions. The Commission considers that proposals for actions no longer than 18 months and requesting a contribution from the EU of up to 100KEuro would allow this specific challenge to be addressed appropriately.

Budget per instrument(s): 1,2 MEuro from 2016 budget, 1,8 MEuro from 2017 budget

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### *Conditions for this call (FETOPEN)*

Opening date:[[3]](#footnote-4) <XXX>
Deadline(s):[[4]](#footnote-5).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| FETOPEN 1 | 11/05/2016at 17.00.00 Brussels time |  | [17/01/2017at 17.00.00 Brussels time] | 28/09/2017at 17.00.00 Brussels time |  |
| FETOPEN 2 | 11/05/2016at 17.00.00 Brussels time |  |  |  |  |
| FETOPEN 3 |  |  | 17/01/2017at 17.00.00 Brussels time |  |  |
| FETOPEN 4 |  | 28/10/2016at 17.00.00 Brussels time |   |  | 27/10/2017at 17.00.00 Brussels time |

Overall indicative budget: EUR 88,2 million from the 2016 budget[[5]](#footnote-6), EUR 113,8 million from the 2017 budget[[6]](#footnote-7) and 57,5 million from the 2018 budget[[7]](#footnote-8)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2016EUR million  | 2017EUR million |  |  |
| FETOPEN 1 | 84 | *168* |  |  |
| FETOPEN 2 | 3 |  |  |  |
| FETOPEN 3 |  | *1,5* |  |  |
| FETOPEN 4 | 1,2 | *1.8* |  |  |

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following additions:

|  |  |
| --- | --- |
| FETOPEN 1 | Part B of the proposal shall only consist of the three following parts and shall strictly respect the corresponding size limitations: * A single A4 title page with acronym, title and abstract of the proposal.
* Maximum 15 A4 pages consisting of an S&T section (section 1), an Impact section (section 2) and an Implementation section (section 3).
* A section 4 (Members of the consortium) and section 5 (Ethical issues) to which no page limitation applies.
 |
| FETOPEN 2 | For each of the scope items a) and c) at most one proposal will be funded. |
| FETOPEN 3 | For scope item a) at most one proposal will be funded. |
| FETOPEN 4 | Proposals shall build on results from an ongoing FET-funded project, or from a completed FET-funded project with end date at most one year before the deadline of submission.Part B of the proposal shall only consist of the four following parts and shall strictly respect the corresponding size limitations: * A single A4 title page with acronym, title and abstract of the proposal.
* Maximum 7 A4 pages consisting of an S&T section (section 1), an Impact section (section 2) and an Implementation section (section 3).
* A section 4 (Members of the consortium) and section 5 (Ethical issues) to which no page limitation applies.
* Declaration by the coordinator of the necessary rights and ownership of results to be exploited, as described in the proposal. For applicants that are not the owner of the result to be taken up in the proposal: letter from the relevant beneficiary or beneficiaries of the previous FET project that own(s) the result, that confirms the existence of the necessary agreements with the coordinator of the current proposal, including on IPR.
 |

Evaluation criteria, scoring and threshold**:** Due to this specific nature of FET research, FET applies specific evaluation criteria for this call.

Thresholds are set for each criterion, as indicated in the table below. A proposal failing to achieve any of these threshold scores will not be funded.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Excellence | Impact | Quality and efficiency of the implementation |
| FETOPEN 1 | Compliance with FET-gatekeeepers:* Clarity and novelty of long-term vision, and ambition and concreteness of the targeted breakthrough towards that vision.
* Novelty, non-incrementality and plausibility of the proposed research for achieving the targeted breakthrough and its foundational character.
* Appropriateness of the research methodology and its suitability to address high scientific and technological risks.
* Range and added value from interdisciplinarity, including measures for exchange, cross-fertilisation and synergy.
 | * Importance of the new technological outcome with regards to its transformational impact on technology and/or society.
* Impact on future European scientific and industrial leadership, notably from involvement of new and high potential actors.
* Quality of methods and measures for achieving impact beyond the research world and for establishing European though leadership, as perceived by industry and society.
 | * Soundness of the workplan and clarity of intermediate targets.
* Relevance of expertise in the consortium.
* Appropriate allocation and justification of resources (person-months, equipment, budget).
 |
| **Threshold: 4/5** **Weight: 60%**  | **Threshold: 3.5/5****Weight: 20%** | **Threshold: 3/5****Weight: 20%** |
| FETOPEN 2FETOPEN 3 | * Clarity of objectives.
* Contribution to the co-ordination and/or support of high-risk and high-impact research, for new or emerging areas or horizontally.
* Appropriateness of the coordination and/or support activities.
 | * Transformational impact on the communities and/or practices for high-risk and high-impact research.
* Appropriateness of measures for spreading excellence, use of results, and dissemination of knowledge, including engagement with stakeholders.
 | * Quality of workplan and management.
* Relevance of expertise in the consortium.
* Appropriate allocation and justification of resources (person-months equipment, budget).
 |
| **Threshold: 3/5****Weight: 40%** | **Threshold: 3/5****Weight: 40%** | **Threshold: 3/5****Weight: 20%** |
| FETOPEN 4 | * Clarity and quality of the innovation idea and its link with the previous or ongoing FET project indicated in the proposal.
* Concreteness of objectives and their pertinence for moving the output of FET research through the initial steps of a process leading to a commercial or social innovation.
* Suitability and necessity of the proposed activities to reach the stated objectives, including their complementarity to actions already foreseen or expected from the previous or ongoing FET project.
 | * Added innovation potential with respect to the FET project from which this innovation originates.
* Extent of economic and/or societal benefits resulting from this innovation as identified in the proposal.
* Suitability of measures for taking the innovation beyond the research world, including through engagement with prospective exploitation partners, other stakeholders, users or society.
 | * Quality of workplan and management.
* Relevance of expertise in the consortium.
* Appropriate allocation and justification of resources (person-months, budget).
 |
| **Threshold: 3/5****Weight: 40%** | **Threshold: 3/5****Weight: 40%** | **Threshold: 3/5****Weight: 20%** |

Evaluation procedure:

At consensus stage, the consensus score for each evaluation criteria will be the median of the corresponding scores attributed by the individual evaluators and consensus report will comprise a collation of the comments from individual reports, or extracts from them. Final scores and any additional comments are decided by the final panel review.

The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide associated with this call.

A single stage submission procedure will be followed.

- Indicative timetable for evaluation and grant agreement

|  |  |  |
| --- | --- | --- |
|  | Information on the outcome of the evaluation  | Indicative date for the signing of grant agreements |
| FETOPEN 1FETOPEN 2FETOPEN 3FETOPEN 4 | Maximum 5 months from the final date for submission | Maximum 8 months from the final date for submission |

Consortium agreements: In line with the Rules for Participation and the Model Grant *Agreement, participants in Research and Innovation Actions or in Innovation Actions are* required to conclude a consortium agreement prior to grant agreement.

## Call FET Proactive – boosting emerging technologies

Proposals are invited against the following topics:

### FETPROACT 1 – 2016: FET-Proactive: emerging themes and communities

Specific Challenge: to mature a number of novel areas and themes by working towards structuring emerging communities and supporting the design and development of transformative research themes. The main benefits of this structuring yet explorative approach are emerging novel areas that are not yet ready for inclusion in industry research roadmaps, and building up and structuring of new interdisciplinary research communities around them. It makes the step from collaborations between a small number of researchers, to larger collaborations addressing various aspects of a novel research theme to jointly explore possibilities for, and long-term implications of future technologies that matter.

Scope: proposals shall address research and innovation activities, aimed at jointly exploring directions and options to establish a solid baseline of knowledge and skills, and to foster the emergence of a broader innovation ecosystem for a new technology in one of the following areas and more specific themes:

**Area 1: Future technologies for societal change**

1. Being human in a technological world: critical interdisciplinary explorations of potentially game-changing impacts of future technologies on humanity, in plausible as well as in extreme scenarios. This can include individual, gender, organisational, economical, cultural and societal impacts, for instance from changes to self- or social perception, to our narratives, or to human development (e.g., cognitive, physical) or evolution. Visions being addressed should be radically forward looking and relatively unexplored, such as hyperconnectivity, human augmentation, hybridisation of nature, life extension, extra-sensorial perception or real/virtual blending. The work should provide fresh perspectives that challenge current thinking, include ethical and social aspects, reflecting on the purposes, impacts and motivations for the research and innovation activity, the associated uncertainties, areas of ignorance, assumptions, questions and dilemmas; and by this crystalize through active stakeholder engagement concrete options for shaping a worthwhile and responsible future.
2. New science for a globalised world: tools and methods (mathematical, technological, social/organisational,…) for the collaborative study, projection and engineering of large scale open socio-technological and –ecological systems characterised by complexity and inherent uncertainty due to, among others, partial knowledge, ignorance and conflicting world-views by different actors. These tools and methods should include the study of informal opinion groups emerging on the Internet at a global level, and focusing on global topics such as Global Systems Science as a new integrative science approach, the emergence of global solutions as patchworks of local ones, non-rationality, the impact of open-data, the dynamics of social and cultural divides, of peace and conflict, and various incentives, drivers and enablers of change and innovation, including the arts.

**Area 2: Biotech for better life**

1. Intra- and inter-cell bio-nano-chem technologies: new approaches to enable and exploit the engineering of processes within biological cells, as well as their interactions with purposes such as sensing, signalling, imaging, regulating, curing or for mimicking or re-engineering the in- and inter-cell physics and processes. This can include natural cells, optimised, therapeutic and compound, synthetic ones or combinations of these. Where needed, multiscale mathematical modelling and computational simulation of in-cell physical and chemical processes can be included. Exploration of the paradigm-changing potential of these technologies, for instance in the bio-medical field, is encouraged.
2. Bio-electronic medicines and therapies: using adaptive nerve or brain stimulation for precise regulatory control of organs or other biological processes inside the human body, in order to restore or maintain healthy conditions. This includes bio-electronic medicines, drug-free therapies, adaptive drug release, closed-loop BCI or more invasive stimulation, all within a setting of personalised medicine and the tight integration of diagnostic and therapeutic capabilities (theranostics). Aspects of ethics, social science, humanities and responsible research should be taken into account.
3. Cognitive neuro-technologies: Integrated interdisciplinary approaches combining theory and novel technology-based experiments for understanding the circuits and pathways of higher-level cognitive functions (such as navigation, goal-oriented behaviour, motivation and reward, memory, knowledge and belief formation, reasoning and decision making, emotion, interaction, communication), the related principles of neural coding and operation within and between brain regions and the role of the physical and social/cultural environment in bringing them about. Proposals should focus on non-validated, leading-edge methodologies and technologies specifically relevant to cognitive neuroscience. Applications could include adaptive human interfaces, specific brain interfaces and neuro-prosthetics to restore or support cognitive functions or to address unmet therapeutic needs, exploiting the better understanding of brain activity, neuronal encoding and the genesis and organisation of higher-level cognitive processes.

**Area 3: Disruptive information technologies**

1. New computing paradigms and their technologies: new foundations for computing, including bio-, nature- and socio-inspired ones that can encompass also aspects of communication, interaction, mimickry or differentiation (adaptation, learning, evolution), as well as non-technological aspects like organisational or physical/virtual architectural ones, and tailored to future and emerging challenges and requirements in highly interdisciplinary settings and for new kinds of mathematical and computational approaches in science.
2. Quantum engineering: reproducible, economical and scaleable approaches, architectures and techniques for designing and realising devices and systems that exploit quantum phenomena, such as superposition and entanglement, for achieving new or radically improved functionalities (for instance in sensing, precision measurement, transduction, secure communication, control, simulation and computation) and demonstrated in the context and boundary conditions of a specific application area (for example in the biological, medical, materials, process, energy or standards domain).
3. Hybrid opto-electro-mechanical devices at the nano-scale: new working principles and their first-time validation in nano-, molecular- or atomic-scale devices based on the interaction and mutual control of multiple physical degrees of freedom to achieve new or radically improved functionalities and application scenarios under plausible operating conditions. The interacting degrees of freedom are those involved in e.g. nano-optics, nano-scale electromagnetism, nano-mechanics and phonons and fluctuations.

**Area 4: New technologies for energy and functional materials**

1. Ecosystem engineering:[[8]](#footnote-9) new models, materials, processes and devices for extreme energy and resource efficiency into cicular ecosystems (energy, raw materials, waste, water,…). New approaches and technologies for extremely efficient energy generation (e.g., artificial photosynthesis), transfer, conversion, high-density storage and consumption. Replacement of toxic/pollutant substances by ecofriendly materials should be considered. First time validation and assessment of these results in the context of integrated circular economy solutions or other quasi self-sufficient environments.
2. Complex bottom-up construction: self-organisation, assembly and adaptation of materials and physical devices/systems with complex functionality (including for instance energy storage and conversion), composition and/or spanning a range of scales (nano, meso) and with superior properties on each of them. Energy and resource/material availability, ecofriendlyness and efficiency are to be taken into account. ). Where needed, multiscale mathematical modelling and computational simulation of materials and related processes can be included.

When appropriate, this allows for proposals to provide financial support to third parties in line with the conditions set out in Part K of the General Annexes, for example to access specific expertise, or to further build up and structure the interdisciplinary research and innovation ecosystems around the topic addressed by the proposal.

Expected Impact:

* Establish a solid baseline of knowledge and skills for a future technology in the theme addressed.
* Goal oriented community structuring and true interdisciplinary collaboration.
* Emergence of an innovation ecosystem around a future technology in the theme addressed from outreach to and partnership with high potential actors in research and innovation.

Type of instrument(s): Research and Innovation Actions. The Commission considers that proposals with duration up to 5 years and requesting a contribution from the EU of between EUR 4 and 10 million would allow this specific challenge to be addressed appropriately.

Budget per type of instrument: 80MEuro from 2016 budget, with a maximum of 20MEuro for each of the areas 1 and 4, and a maximum of 30Meuro for each of the areas 2 and 3.

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### FETPROACT 2 – 2016: FET ERANET Cofund CHIST-ERA

Specific Challenge: to support the maturation of novel research topics and structuration of the corresponding communities in the FET domain, in complementarity and synergy with the FET actions directly funded by the Commission, and while fostering cross-fertilisation and synergies between the supported topics and communities. This reflects that the participating funding organisations share the objectives of the FET programme and would amplify its funding and activities through this ERA-NET. The overarching goal is to enhance the construction of the European Research Area in the FET domain, by sharing a common vision of the various efforts in Europe in this domain and fostering cooperation towards the coordinated development of these technologies.

Scope:

* Share information on existing research programmes, strategic research agendas and technological roadmaps, among research funding organisations and with the relevant other stakeholders;
* Jointly identify emerging topics where transnational cooperation and support to community structuration is most needed, in complementarity with the FET programme;
* Launch a transnational call for proposals on selected topics, with EU co-funding, possibly followed by further calls for proposals without EU co-funding;
* Develop strategic agendas for these topics and accompany the structuration of the related communities though workshops and support to transversal activities.

Proposers are encouraged to implement other joint activities related to the coordination of public research and innovation programmes, such as transnational networking, meetings and technology transfer activities.

Expected Impact

* Amplification of the support to FET topics at the national level;
* Faster emergence of technologies through enhanced coordination;
* Identification and emergence of candidate FET Proactive and FET Flagship topics and communities;
* Enhanced complementarities and synergies in Europe in the FET domain.

Instrument(s): ERANET Cofund

Budget per type of instrument(s): EUR 5 million from 2016 budget

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### FETPROACT 3 – 2017: FET ERANET Cofund in Quantum Technologies

Specific Challenge: research on quantum technologies in Europe is currently funded through several targeted initiatives at European, national and regional level. The aim is to foster synergy between these initiatives in the area of quantum technologies in order to create collaborations among the best groups in Europe and fostering broader partnerships around them to spread excellence and to broaden the European footprint of this emerging technology area.

Scope: Proposals should coordinate national and regional programmes for research in the area of quantum technologies by implementing a call jointly funded by the participating states with EU cofunding resulting in grants to third parties. This call shall address the following topics:

* New principles, experiments, technologies, devices and systems that exploit quantum phenomena like entanglement and superposition to achieve new of radically enhanced functionalities.
* Demonstration and critical assessment of these advancements in comparison to classical or other quantum-based technological options.
* Exploration of advanced quantum enabled applications in areas of scientific, industrial or societal interest, linked to a critical assessment of feasibility beyond the technical (e.g., in terms of innovation potential, acceptability and industrial/societal take-up).

Proposers are encouraged to implement other joint activities related to the coordination of public research and innovation programmes in quantum technologies, such as transnational networking, training, technology transfer and additional joint calls without EU co-funding.

Expected Impact

* Closer coordination and greater mobilisation and pooling of resources between regional, national and EU research programmes in the area of quantum technologies.
* Increased transnational collaboration on quantum technologies, especially on topics that are complementary to the EU workprogrammes in this area.
* Spreading of excellence on quantum technologies across Europe.
* Establishment and alignment of national and regional research and innovation plans and initiatives in the area of quantum technologies.
* Identification of promising directions for future research programming through a comprehensive overview on multiple lines of development across Europe.
* Increased awareness of national and regional research and innovation interests, synergies and complementarities in the area of quantum technologies and their applications.

Instrument(s): ERANET Cofund

Budget per type of instrument(s): 10Meuro from 2017 budget

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### *Conditions for this call (FETPROACT)*

Opening date:[[9]](#footnote-10) <XXX>
Deadline(s)[[10]](#footnote-11):

|  |  |
| --- | --- |
| FETPROACT 1 | 31/03/2016 at 17.00.00 Brussels time |
| FETPROACT 2 | 31/03/2016 at 17.00.00 Brussels time |
| FETPROACT 3 | 31/01/2017 at 17.00.00 Brussels time |

Overall indicative budget: EUR 90 million from the 2016 budget[[11]](#footnote-12) and EUR 5 million from the 2017 budget

|  |  |  |
| --- | --- | --- |
|  | 2016EUR million  | 2017EUR million |
| FETPROACT 1 | 80 |  |
| FETPROACT 2 | 5 |  |
| FETPROACT 3 |  | 10 |

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following additions:

|  |  |
| --- | --- |
| FETPROACT 1 | Part B of the proposal shall only consist of the three following parts and shall strictly respect the corresponding size limitations: * A single A4 title page with acronym, title and abstract of the proposal.
* Maximum 30 A4 pages consisting of an S&T section (section 1), an Impact section (section 2) and an Implementation section (section 3).
* A section 4 (Members of the consortium) and section 5 (Ethical issues) to which no page limitation applies.
 |

Evaluation criteria, scoring and threshold**:** Due to this specific nature of FET research, FET applies specific evaluation criteria.

Thresholds are set for each criterion, as indicated in the table below. A proposal failing to achieve any of these threshold scores will not be funded.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Excellence | Impact | Quality and efficiency of the implementation |
| FETPROACT 1 | * Clarity of targeted breakthrough and its specific science and technology contributions towards a long-term vision.
* Novelty, level of ambition and foundational character.
* Range and added value from interdisciplinarity.
* Appropriatness of the research methods.
 | * Importance of the new technological outcome with regards to its transformational impact on technology and/or society.
* Quality of measures for achieving impact on science, technology and/or society.
* Impact from empowerment of new and high potential actors towards future technological leadership.
 | * Quality of the workplan and clarity of intermediate targets.
* Relevant expertise in the consortium.
* Appropriate allocation and justification of resources (person-months, equipment, budget).
 |
| **Threshold: 4/5** **Weight: 60%**  | **Threshold: 3.5/5****Weight: 20%** | **Threshold: 3/5****Weight: 20%** |

Evaluation procedure:

At consensus stage, the consensus score for each evaluation criteria will be the median of the corresponding scores attributed by the individual evaluators and consensus report will comprise a collation of the comments from individual reports, or extracts from them. Final scores and any additional comments are decided by the final panel review.

The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide associated with this call.

A single stage submission procedure will be followed.

- Indicative timetable for evaluation and grant agreement

|  |  |  |
| --- | --- | --- |
|  | Information on the outcome of the evaluation  | Indicative date for the signing of grant agreements |
| FETPROACT 1FETPROACT 2FETPROACT 3 | Maximum 5 months from the final date for submission | Maximum 8 months from the final date for submission |

Consortium agreements: In line with the Rules for Participation and the Model Grant *Agreement, participants in Research and Innovation Actions or in Innovation Actions are* required to conclude a consortium agreement prior to grant agreement.

## Call FET Proactive: High Performance Computing

The FET-Proactive call on HPC aims at the next steps for leveraging the existing European strengths for building the next generation of extreme performance computing and taking advantage of the new opportunities created from the transition from peta to exascale computing. The ultimate goal is to achieve world-class extreme scale computing capabilities in platforms, technologies and applications.

The call complements the other building blocks under the e-Infrastructures and LEIT-ICT parts of Horizon 2020 of the European HPC strategy. The implementation of this HPC strategy in Horizon 2020 combines three elements: (a) developing the next generation of HPC towards exascale; (b) providing access to the best supercomputing facilities and services; and (c) achieving excellence in HPC applications. The Public Private Partnership (PPP) with the European Technology Platform in HPC (ETP4HPC), which started on 1 January 2014, provides the framework for the implementation of elements (a) and (c) of the HPC strategy, based on the Strategy Research Agenda (SRA) of the ETP4HPC[[12]](#footnote-13).

Proposals are invited against the following topics.

### FETHPC 1 - 2016: Co-design of HPC systems and applications

Specific Challenge: Achieve world-class extreme scale, power-efficient and highly resilient HPC platforms through a strong co-design approach driven by ambitious applications and in close cooperation with the scientific disciplines and stakeholders concerned; achieve the full range of technological capabilities needed for delivering a broad spectrum of extreme scale HPC systems. The designs of these systems must respond to critical demands of energy efficiency, scale, resilience, programmability and support for various classes of applications including extreme-data applications.

Scope: proposals with innovative and ground-breaking approaches to system architectures targeting extreme scale, power-efficient and highly resilient platforms with emphasis on balanced compute and data access characteristics. Special attention should be given to extreme data processing requirements. Proposals should have a strong co-design approach driven by a mix of ambitious applications and in close cooperation with the various scientific disciplines and stakeholders concerned. Proposals should show how their proposed solution improves energy efficiency and demonstrate the reduced energy-to-solution for the selected applications. Possible strategies for improving energy efficiency may include: reducing PUE (Power Usage Effectiveness), designing of cost-efficient approaches to the reuse of thermal energy, reducing the amount of energy spent for communication and data movement. Proposals should address the problem of maintaining reliability, coping with run-time errors and enabling stable operation of an HPC system that is able of extreme scaling; this issue may be addressed through holistic detection/recover approaches covering and orchestrating all layers of the HPC stack as well as significant advancements in fault prediction algorithms and smarter tools to prevent faults. Proposals should provide analytical or simulation models that allow to extrapolate the sustained performance on the given architecture for HPC systems. The target system architectures must scale to at least 100 PFlops and, for compute-centric workloads, a target of 15MW for 250 PFlops peak performance in 2019 is suggested. Proposals should explain how these scalability and energy-efficiency targets are achieved for the considered applications. APIs and interfaces between applications and underlying middleware, run-time and operating systems, i.e. all application-aspects impacting the underlying system design are included in this topic. Proposals should be able to demonstrate their achievements in integrated pre-exascale prototypes.

Expected Impact:

* Contribution to the realisation of the ETP4HPC Strategic Research Agenda, thus strengthened European research and industrial leadership in HPC technologies.
* Proof-of-concept through integrated pre-exascale prototypes for future exascale-class HPC systems and optimal co-design driven by ambitious applications.
* Covering important segments of the broader and/or emerging HPC markets, especially extreme-scale HPC systems.
* Impact on standards bodies and other relevant international research programmes and frameworks.

Type of instrument(s): Research and Innovation Actions. The Commission considers that proposals requesting a contribution between EUR 10 and 20 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Budget per type of instrument: 41 million from 2016

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### FETHPC-2 - 2017: Transition to Exascale Computing

Specific Challenge: Take advantage of the full capabilities of exascale computing, in particular through high-productivity programming environments, system software and management, exascale I/O and storage in the presence of multiple tiers of data storage, supercomputing for extreme data and emerging HPC use modes, mathematics and algorithms for extreme scale HPC systems for existing or visionary applications, including data-intensive and extreme data applications in scientific areas such as physics, chemistry, biology, life sciences, materials, climate, geosciences, etc.

Scope: proposals should address one of the following subtopics

a) **High productivity programming environments for exascale**: Proposals should have as target to simplify application software development for large- and extreme-scale systems. This can include the development of more productive programming models and environments, the easier combination of different programming models, and using increased intelligence throughout the programming environment. Key aspects include managing data transfers, data locality and memory management, including support for heterogeneous and reconfigurable systems as well as dealing with inter-application dynamic load balancing and malleability, adapting to changes in the number of processors. Unified performance tools are required supporting HPC, embedded and extreme data workloads, on diverse target systems. APIs, runtime systems and the underlying libraries should support auto-tuning for performance and energy optimisation. Automated support for debugging and anomaly detection is also included under this subtopic. To provide simplified development and to ensure the maintainability of domain-specific languages (DSLs), DSL frameworks are required which target a general-purpose stable programming model and runtime. Since large future systems will require the use of multiple programming models or APIs, an important aspect is interoperability and standardisation of programming model, API and runtime as well as the composability of programming models (the capability of building new programming models out of existing programming model elements)

b) **Exascale** **system software and management**: Proposals should advance the state of the art in system software and management for node architectures that will be drastically more complex and their resource topology and heterogeneity will require OS and runtime enhancement, such as data aware scheduling. In the area of hardware abstraction, proposals should address run time handling of all types of resources (cores, bandwidth, logical and physical memory or storage) and controls, e.g. for optimised data coherency, consistency and data flow. For applications, proposals should provide new multi-criteria resource allocation capabilities and interaction during tasks execution for resilience, interactivity, power and efficiency purposes. To cope with the exploding amount of data, the sequential analysis process (capture, store, analyse) is not sufficient; proposals should explore on-the-fly analysis methods offering reactivity, compute efficiency and availability. Graphical simulation interaction will require new real-time features; configuration and deployment tools will have to evolve to take into account the composability of software execution environments.

c) **Exascale I/O and storage in the presence of multiple tiers of data storage**: proposals should address exascale I/O systems expected to have multiple tiers of data storage technologies, including non-volatile memory. Fine grain data access prioritisation of processes and applications sharing data in these tiers is one of the goals as well as prioritisation applied to file/object creates/deletes. Runtime layers should combine data replication with data layout transformations relevant for HPC, in order to meet the needs for improved performance and resiliency. It is also desirable for the I/O subsystem to adaptively provide optimal performance or reliability especially in the presence of millions of processes simultaneously doing I/O. It is critical that programming system interoperability and standardised APIs are achieved. On the fly data management supporting data processing, taking into account multi-tiered storage and involving real time in situ/in transit processing should be addressed.

d) **Supercomputing for Extreme Data and emerging HPC use modes**: HPC architectures for real-time and in-situ data analytics are required to support the processing of large-scale and high velocity real-time data (e.g. sensor data, Internet of Things) together with large volumes of stored data (e.g. climate simulations, predictive models, etc.). The approaches should include support for real-time in-memory analysis of different data structures, direct processing of compressed data and appropriate benchmarking method for performance analysis. Interactive 3-D visualisation of large-scale data to allow users to explore large information spaces in 3-D and perform on-demand data analysis in real-time (e.g. large scale queries or analytics) should be addressed. Interactive supercomputing is required to execute complex workflows for urgent decision making in the field of critical clinical diagnostics, natural risks or spread of diseases; this implies adapting operational procedures of HPC infrastructures, developing efficient co-scheduling techniques or improving checkpoint/restart and extreme data management

e) **Mathematics and algorithms for extreme scale HPC systems and applications working with extreme data:** Specific issues are quantification of uncertainties and noise, multi-scale, multi-physics and extreme data. Mathematical methods, numerical analysis, algorithms and software engineering for extreme parallelism should be addressed. Novel and disruptive algorithmic strategies should be explored to minimize data movement as well as the number of communication and synchronization instances in extreme computing. Parallel-in-time methods may be investigated to boost parallelism of simulation codes across a wide range of application domains. Taking into account data-related uncertainties is essential for the acceptance of numerical simulation in decision making; a unified European VVUQ (Verification Validation and Uncertainty Quantification) package for Exascale computing should be provided by improving methodologies and solving problems limiting usability for very large computations on many-core configurations; access to the VVUQ techniques for the HPC community should be facilitated by providing software that is ready for deployment on supercomputers.

Expected Impact:

* Contribution to the realisation of the ETP4HPC Strategic Research Agenda, thus strengthened European research and industrial leadership in HPC technologies.
* Successful transition to exascale computing for the addressed specific element of the HPC stack.
* Covering important segments of the broader and/or emerging HPC markets, especially extreme-computing and extreme-data HPC systems.
* Impact on standards bodies and other relevant international research programmes and frameworks.
* European excellence in mathematics and algorithms for extreme parallelism and extreme data applications to boost research and innovation in scientific areas such as physics, chemistry, biology, life sciences, materials, climate, geosciences, etc.

Type of instrument(s): Research and Innovation Actions. The Commission considers that proposals requesting a contribution from the EU between EUR 2 and 4 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Proposals should clearly indicate the subtopic which is their main focus. At least one project per subtopic will be funded.

Budget per type of instrument: 40 million from 2017

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### FETHPC 3 – 2017: Exascale HPC ecosystem development

Specific challenge: to develop a sustainable European exascale HPC Ecosystem

Scope: proposals shall address one of the two following topics:

a) Coordination of the Exascale HPC strategy and International Collaboration: Proposals must include activities for promoting a joint community structuring and synchronisation; the further development and update of the Strategic Research Agenda for High Performance Computing as well as the application and applied mathematics exascale roadmaps; prepare the ground for targeted international research collaboration on specific aspects of the exascale challenges. Proposed actions should also seek to create synergies with other HPC related activities under H2020, in particular concerning the underlying basic technologies that are required for exascale computing (e.g. *LEIT/Advanced Computing,* *LEIT/Photonics*, and *ECSEL* (Electronic Components and Systems for European Leadership)); and concerning the relevant research in applications which progress critically rely on cutting-edge HPC systems (*LEIT/Big-Data*, *LEIT/Cloud* area as well as relevant research in applications emerging from the *H2020 Societal Challenges* in domains such as health (e.g. VPH initiative), genomics, climate change, energy, mobility and smart cities).

b) Excellence in Exascale Computing Systems: The focus should be in boosting European HPC academic research excellence in future exascale-class computing cutting across all levels – hardware, architectures, programming, applications – and including specific actions to better structure the European academic HPC research, create stronger links with HPC providers and HPC users, attract venture capital, promote entrepreneurship and foster industry take-up.

Expected Impact:

* Strengthened European research and industrial leadership in the supply, operation and use of HPC systems.
* Contribution to the realisation of the ETP4HPC Strategic Research Agenda.
* Development of a competitive European ecosystem for building and exploiting a wide range of next-generation extreme performance computing systems.
* Structuring the efforts of stakeholders for implementing the European HPC strategy;
* Reinforced cooperation in international endeavours on HPC software and systems towards exascale.
* European Excellence in Exascale Computing systems.

Type of instrument(s): Coordination and Support Actions. The Commission considers that proposals requesting a contribution between EUR 1 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Separate proposals per subtopic are expected.

Budget per type of instrument: 4 MEuro from 2017 budget

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### *Conditions for this call (FETHPC)*

Opening date:[[13]](#footnote-14) <XXX>
Deadline(s)[[14]](#footnote-15):

|  |  |  |
| --- | --- | --- |
|  | 2016 | 2017 |
| FETHPC 1 | 27/09/2016 |  |
| FETHPC 2 |  | 26/09/2017 |
| FETHPC 3 |  | 26/09/2017 |

Overall indicative budget: EUR 41 million from the 2016 budget[[15]](#footnote-16), EUR 44 million from the 2017 budget[[16]](#footnote-17).

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2016EUR million  | *2017**EUR million* |  |
| FETHPC 1 | 41 |  |  |
| FETHPC 2 |  | *40* |  |
| FETHPC 3 |  | *4* |  |

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide associated with this call.

- Indicative timetable for evaluation and grant agreement:

|  |  |  |
| --- | --- | --- |
|  | Information on the outcome of the evaluation | Indicative date for the signing of grant agreements |
| FETHPC 1 FETHPC 2FETHPC 3 | Maximum 5 months from the final date for submission | Maximum 8 months from the final date for submission |

Consortium agreements: In line with the Rules for Participation and the Model Grant *Agreement, participants in Research and Innovation Actions or in Innovation Actions are* required to conclude a consortium agreement prior to grant agreement.

## Call FET FLAGSHIPS – tackling grand interdisciplinary science and technology challenges

Flagships are science-driven, large-scale, multidisciplinary research initiatives oriented towards a unifying goal, aiming at transformational impacts on science and technology and substantial benefits for European competitiveness and society. The goals of such initiatives are visionary and highly ambitious in terms of scientific challenges, resources and coordinated efforts. They require cooperation among a range of disciplines, communities and national, regional and European programmes. The implementation model of the Flagships and their governance structure are described in the Commission Staff Working Document on FET Flagships[[17]](#footnote-18).

Two Flagships, Graphene and the Human Brain Project, have been launched in 2013, as well as an ERANET action bringing together national and regional funding agencies from several Member States and Associate Countries in support of the two Flagships. A Framework Partnership Agreement (FPA) has been established for each of the two Flagships, creating a stable and structured partnership between the Commission and research organisations that are committed to implement the Flagships. This work programme aims to launch actions to advance the two Flagships on the basis of these FPAs, following an initial Specific Grant Agreement (SGA) and other actions launched under previous work programmes.

Proposals are invited against the following topics:

### FETFLAG-1 2016: Partnering environment for FET Flagships

Specific challenge: To support funding and coordination of partnering projects (PPs) of the two Flagships.

PPs are projects supported by national/regional funding agencies and/or by private funding. They are addressing areas relevant for the Flagships and contribute to their objectives. Their role and activities and their integration into the Flagships were described in the above mentioned Staff Working Document17.

The aim is to bring together national funding agencies from Member States and Associated Countries to fund such PPs, as well as supporting these and other PPs in their networking, coordination and participation in Flagship activities.

Scope:

**a. ERA-NET Cofund action**

One follow-up action to the FLAG-ERA ERANET (<http://www.flagera.eu/>) aiming to coordinate national and regional research programmes to fund PPs of the two Flagships through a joint call for proposals between several such programmes complemented by EU co-funding, possibly followed by further calls for proposals without EU co-funding. The action may also organise additional joint activities between the participating funding agencies in support of the two Flagships.

**b. Coordination and Support action**

One action will be funded which will support all of the following points, for both Flagships:

* the participation of PPs in meetings, workshops or other relevant activities organised by the Core Project of each Flagship;
* the participation of PPs in the governance activities of each of the Flagships;
* the networking and coordination of the PPs for helping them contribute to the research roadmaps of each Flagship and for disseminating their activities to promote Flagships at the regional/national level.

Proposals for such an action need to demonstrate how they add value beyond the activities already foreseen in the Flagships to liaise with PPs.

The action should be driven by (one or more) stakeholders representing relevant scientific communities.

Expected impact:

**a. ERA-NET Cofund action**

Closer coordination and greater mobilisation and pooling of resources between regional, national and EU research programmes for realising the research goals of the FET Flagships;

**b. Coordination and Support Action**

Creating mutual benefit between the PPs and their Core Project, enhancing the impact of the Flagships on national and regional research programmes and fostering the role of PPs in the governance of the Flagships.

Types of instrument(s):

a. ERA-NET Cofund Action.

b. Coordination and Support Action

Budget per type of instrument: EUR 8 million for (a) and 1 million for (b) from the 2016 budget

***The conditions related to this topic are provided at the end of this call and in the General Annexes.***

### *Conditions for this call (FETFLAG)*

Opening date:[[18]](#footnote-19) <XXX>
Deadline(s)[[19]](#footnote-20):

|  |  |
| --- | --- |
| FETFLAG 1 | 29/2/2016at 17.00.00 Brussels time |

Overall indicative budget: EUR 9 million from the 2016[[20]](#footnote-21).

|  |  |
| --- | --- |
|  | 2016EUR million  |
| FETFLAG 1 | 9 |

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

|  |  |
| --- | --- |
| FETFLAG 1 | Up to one project per topic shall be funded. |

Evaluation criteria, scoring and threshold:

The criteria, scoring and thresholds for CSAs and ERA-NET Cofund actions are described in part H of the General Annexes to the work programme.

**Priority order for proposals with the same score**

As part of the evaluation by independent experts, a panel review will recommend one or more ranked lists for the proposals under evaluation, following the scoring systems indicated above. A ranked list will be drawn up for every indicative budget shown in the call fiche.

If necessary, the panel will determine a priority order for proposals which have been awarded the same score within a ranked list. Whether or not such a prioritisation is carried out will depend on the available budget or other conditions set out in the call fiche. The following approach will be applied successively for every group of *ex aequo* proposals requiring prioritisation, starting with the highest scored group, and continuing in descending order:

Proposals will be prioritised according to the scores they have been awarded for the criterion *scientific and/or technological excellence*. When these scores are equal, priority will be based on scores for the criterion *impact.* If necessary, any further prioritisation will be based on other appropriate characteristics, to be decided by the panel, related to the contribution of the proposal to the European Research Area and/or general objectives mentioned in the work programme.

- Indicative timetable for evaluation and grant agreement:

|  |  |  |
| --- | --- | --- |
|  | Information on the outcome of the evaluation | Indicative date for the signing of grant agreements |
| FETFLAG 1  | Maximum 5 months from the final date for submission | Maximum 8 months from the final date for submission |

## Other actions

### 1 – External expertise

This action will support the use of appointed independent experts for the evaluation of project proposals and, where appropriate, for the monitoring of running projects.

Type of action: Expert contracts

Indicative budget: EUR <XXX> million from the 2016 budget and EUR <XXX> million from the 2017 budget

### 2 – FET-Open budget reallocation 2015

Actions submitted under H2020-FETOPEN-2014-2015-RIA for the call deadline 29/09/2015, as foreseen in the Horizon 2020 Work Programme 2014-2015 for Future and Emerging Technologies.

Type of action: RIA

Indicative budget: EUR <XXX> million from the 2016 budget

### 3 - FET Flagship Core Projects

**a – Graphene FET Flagship Core Project**

Within the Graphene Framework Partnership Agreement (FPA) awarded under topic FETFLAG 1 - 2014 of the Call FET Flagships, the selected consortium will be invited to submit a proposal for a second Specific Grant Agreement (SGA) that will implement the next two years (indicative) of the action plan defined in the FPA.

The proposal should adhere to the programme of activities as envisioned in the FPA. It should address key parts of the FPA research roadmap while taking into account, whenever relevant, the changing state of the art throughout the world.

The proposal should describe how the coordination and management of the overall Flagship initiative as described in the FPA is implemented. The coordinating role must include in particular the concrete actions needed to ensure the overall continuity and coherence in the management of the Flagship initiative, such as (i) the governance of the Flagship initiative as a whole, (ii) updating the research roadmap and its innovation branches, and (iii) the collaboration with other research initiatives or programmes at regional, national, European or international level.

The proposal should focus on those areas that have the greatest innovation potential and impact on economy and society. This may require refocusing the Flagship resources accordingly. Any modification to the FPA selected Consortium partners should be sufficiently motivated and based on the highest standards of scientific and technological excellence and on open and transparent criteria.

The proposal should detail activities in areas such as human capital, education and training, dissemination, ethics and societal aspects.

This action allows for the provision of financial support to third parties in line with the conditions set out in Part K of the General Annexes.

Expected impact**:** Contribution to the targeted impacts defined in the action plan of the FPA.

Type of instrument(s):Research and Innovation Action funded through a Specific Grant Agreement under the Graphene Framework Partnership Agreement.

Indicative timetable: Second quarter of 2017

Indicative budget: EUR 88 million from the 2017 budget

***The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.***

**b – Human Brain Project FET Flagship Core Project**

Within the Human Brain Project (HBP) Framework Partnership Agreement (FPA) awarded under topic FETFLAG 1 - 2014 of the call FET Flagships, the selected consortium will be invited to submit a proposal for a second specific Grant Agreement (SGA) that will implement the next two years (indicative) of the action plan defined in the FPA.

The proposal should adhere to the programme of activities as envisioned in the FPA. It should describe how the activities carried out during the first SGA will be built upon, maintaining a multi-disciplinarily approach and involving the relevant scientific communities in neuroscience, medicine and computing. It should take into account, whenever relevant, progress made by other large brain research initiatives.

The proposal should explain how the project will involve the related scientific and medical communities, including a large number of end-users, in the development and validation of the HBP ICT platforms and ensure their wide adoption and use. It should also explain how the HBP partners will trigger concrete innovation activities by liaising with industry and other relevant stakeholders.

The proposal should describe how the coordination and management of the overall Flagship initiative as described in the FPA is implemented. The coordinating role must include in particular the concrete actions needed to ensure the overall continuity and coherence in the management of the Flagship initiative, such as (i) the governance of the Flagship initiative as a whole, (ii) updating the research roadmap and its innovation branches, and (iii) the collaboration with other research initiatives or programmes at regional, national, European or international level.

The proposal should detail activities in areas such as human capital, education and training, dissemination, ethics and societal aspects.

This action allows for the provision of financial support to third parties in line with the conditions set out in Part K of the General Annexes.

Impact: Contribution to the targeted impacts defined in the action plan of the HBP FPA.

Type of instrument(s): Research and Innovation Action funded through a specific grant agreement under the HBP FPA.

Indicative timetable: Second quarter of 2017

Indicative budget: EUR 88 million from the 2017 budget

***The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.***

**Specific Evaluation Criteria applicable to this action**

Due to the specific nature of the flagship initiatives, which span over a longer period and link to complementary projects as well as national and transnational programmes, special criteria are used to assess the core projects of these initiatives.

|  |  |
| --- | --- |
|  | Sub-criteria |
| Criterion 1Excellence | * Degree of adherence to the programme of activities as envisioned in the framework partnership agreement
* Soundness of scientific concept, quality of objectives and progress beyond the state-of-the-art
* Quality and effectiveness of the workplan (including milestones, flexibility and metrics to monitor progress)
* Quality of measures for the coordination of activities across the Flagship Initiative, in particular to ensure overall continuity and coherence of the initiative.
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| Criterion 2Impact | * Contribution to the expected impacts listed in the work programme
* Extent to which the proposal makes use of complementarities, exploits synergies, and enhances the overall outcome of related regional, national, European and international research programmes
* Effectiveness of measures for use of results, management of intellectual property and dissemination of knowledge
* Effectiveness of measures relating to human capital, education and training at European level
* Approach to address societal benefit and potential ethical and legal implications, including engagement with authorities and end-users
 |
| Criterion 3Quality and efficiency of the implementation | * Quality of the governance, including management procedures and risk management
* Quality and relevant experience of the individual participants, and their contribution to the common goal
* Quality of the consortium as a whole (including complementarity, balance, involvement of key actors)
* Openness and flexibility of the consortium
* Appropriateness of the allocation and justification of the resources to be committed (e.g. in-kind contributions, infrastructures, person-months, equipment and budget)
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Thresholds are set at 3 for each criterion in topics 1-3. A proposal failing to achieve any of these threshold scores, or an overall score of 10, will be rejected. Each of these three criteria has equal weight.

1. Note that 40% of the H2020 budget for FET is earmarked for FET Open. [↑](#footnote-ref-2)
2. Project end date at most one year before the deadline of submission. [↑](#footnote-ref-3)
3. The Director-General responsible may decide to open the call up to one month prior to or after the envisaged date of opening [↑](#footnote-ref-4)
4. The Director-General responsible may delay this deadline by up to two months. [↑](#footnote-ref-5)
5. Subject to the availability of the appropriations provided for in the draft budget for 2016 after the adoption of the budget for 2016 by the budgetary authority or if the budget is not adopted as provided for in the system of provisional twelfths.. [↑](#footnote-ref-6)
6. The budget amounts are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2017. [↑](#footnote-ref-7)
7. The budget amounts are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2017 [↑](#footnote-ref-8)
8. This topic is aligned with the Commission communication SWD(2014) 211 'Towards a circular economy: a zero waste programme for Europe' and its annex, which describes specific contributions expected from FET. [↑](#footnote-ref-9)
9. The Director-General responsible may decide to open the call up to one month prior to or after the envisaged date of opening [↑](#footnote-ref-10)
10. The Director-General responsible may delay this deadline by up to two months. [↑](#footnote-ref-11)
11. Subject to the availability of the appropriations provided for in the draft budget for 2014 after the adoption of the budget for 2014 by the budgetary authority or if the budget is not adopted as provided for in the system of provisional twelfths. [↑](#footnote-ref-12)
12. See http://www.etp4hpc.eu/strategy/strategic-research-agenda/ [↑](#footnote-ref-13)
13. The Director-General responsible may decide to open the call up to one month prior to or after the envisaged date of opening [↑](#footnote-ref-14)
14. The Director-General responsible may delay this deadline by up to two months. [↑](#footnote-ref-15)
15. Subject to the availability of the appropriations provided for in the draft budget for 2016 after the adoption of the budget for 2016 by the budgetary authority or if the budget is not adopted as provided for in the system of provisional twelfths.. [↑](#footnote-ref-16)
16. The budget amounts are indicative and will be subject to a separate financing decision to cover the amounts to be allocated for 2017. [↑](#footnote-ref-17)
17. SWD(2014) 283 final of 16.09. 2014 [↑](#footnote-ref-18)
18. The Director-General responsible may decide to open the call up to one month prior to or after the envisaged date of opening [↑](#footnote-ref-19)
19. The Director-General responsible may delay this deadline by up to two months. [↑](#footnote-ref-20)
20. Subject to the availability of the appropriations provided for in the draft budget for 2016 after the adoption of the budget for 2016 by the budgetary authority or if the budget is not adopted as provided for in the system of provisional twelfths.Bu [↑](#footnote-ref-21)