FET-Open in Horizon 2020
Work Programme 2016-2017

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Future and Emerging Technologies
FET-Open
Research Executive Agency
Overview

• Future and Emerging Technologies (FET) in Horizon 2020

• FET-Open
  • Research and Innovation Actions
  • Coordination and Support Actions
  • Innovation Launchpad

• FET Proactive

• FET Flagships
H2020 Budget: 74.8 B€ (current prices)

- Excellent Science: 24.2 B€
- Industrial Leadership: 16.5 B€
- Societal Challenges: 28.6 B€
The pillar aims to **reinforce** and **extend** the excellence of the Union's **science base** and to **consolidate the ERA** in order to make the Union's research and innovation system more competitive on a global scale.

**Excellent Science pillar in H2020**

- European Research Council (13,1B€)
- Marie Skłodowska-Curie actions (6,2B€)
- **Future and Emerging Technologies**
- Research infrastructures programme (2,4B€)
Future and emerging technologies:

- collaborative research
- extend Europe’s capacity for advanced and paradigm-changing innovation.
- foster scientific collaboration across disciplines on radically new, high-risk ideas
- accelerate development of the most promising emerging areas of science and technology

Pathfinding Europe's technological future (s)
FET mission

• To promote and support the emergence of radically new technology areas that will renew the basis for future European competitiveness and growth and will make a difference for society in the decades to come.

• To initiate and shape the development of European research and innovation eco-systems around such future and emerging technologies, as seeds of future industrial leadership and potential solutions for societal challenges.

• To turn Europe into the best environment for responsible and dynamic multi-disciplinary collaborations on such future and emerging technologies, including facilitating the wider training of researchers in new areas.
The power of FET schemes

Individual research projects

FET-Open

Early Ideas
Individual research projects

Exploring novel ideas

40%

FET Proactive

Exploration and Incubation
Critical mass making a case

Developing topics & communities

FET Flagships

Large-Scale Partnering Initiatives
Common research agenda

Addressing grand challenges

Open, light and agile ← Roadmap based research
FET WP2016-17, overview

- **Call - FET-Open – Novel ideas for radically new technologies**
  - FETOPEN-01-2016-2017: FET-Open research and innovation actions
  - FETOPEN-02-2016: FET-Open Coordination and Support Actions
  - FETOPEN-03-2017: FET-Open Coordination and Support Actions
  - FETOPEN-04-2016-2017: FET Innovation Launchpad

- **Call - FET Proactive – Boosting emerging technologies**
  - FETPROACT-01-2016: FET Proactive: emerging themes and communities
  - FETPROACT-02-2017: FET ERANET Cofund
  - FETPROACT-03-2016: FET ERANET Cofund in Quantum Technologies

- **Call - FET Proactive – High Performance Computing**
  - FETHPC-01-2016: Co-design of HPC systems and applications
  - FETHPC-02-2017: Transition to Exascale Computing
  - FETHPC-03-2017: Exascale HPC ecosystem development

- **Call - FET FLAGSHIPS – Tackling grand interdisciplinary science and technology challenges**
  - FETFLAG-01-2016: Partnering environment for FET flagships

- **Other Actions**
  - FET Flagship Core Projects (within FPAs)
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- FET Proactive

- FET Flagships
Call - FET-Open – Novel ideas for radically new technologies

<table>
<thead>
<tr>
<th>FET-Open</th>
<th>259,5M*</th>
</tr>
</thead>
<tbody>
<tr>
<td>FETOPEN-1-2016-2017 FET-Open RIA</td>
<td>84+84+84M*</td>
</tr>
<tr>
<td>FETOPEN-2-2016 FET-Open CSA</td>
<td>3M</td>
</tr>
<tr>
<td>FETOPEN-3-2017 FET-Open CSA</td>
<td>1,5M</td>
</tr>
<tr>
<td>FETOPEN-4-2016-2017 FET Innovation Launchpad</td>
<td>3M</td>
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Continuity with WP2014-15 – more than 50% budget increase

*in part from 2018 budget
“FET-Open is open!”

- No thematic restriction, no emphasis on any subject
- New areas: space research, medicine, energy...
- Successful FET project result is a proof of a concept in a lab
- Bottom-up, but targeted - not blue sky research
- Collaborative research
FET-Open Research and Innovation Actions

**Scope:**

*This topic supports the early stages of research to establish a new technological possibility.* [...]

Diagram:

- **Dream**
- **'Vision'**
- **Establish possibility**
- **New knowledge**
- **New technologies and their applications**
- **S&T Breakthrough as Proof-of-Concept**
Scope:

 [...] Proposals are sought for collaborative research with all of the following characteristics ('FET gatekeepers'):

- Long-term vision
- Breakthrough scientific and technological target
- Novelty
- Foundational
- High-risk
- Interdisciplinary
FET-Open Research and Innovation Actions

Expected impact

- Establish baseline of feasibility and innovation potential
- European thought-leadership and future leaders
- New R&I practices
Conditions for the Call – FET Open

• **Single stage procedure**
  • Collaborative projects (RIA) up to 4M funding (indicative)
  • 1+15' pages

• **High quality peer review (remote) by 4 experts**

• Interdisciplinary final panel review

• Time table for evaluation and GA signature
  • Time to Inform (TTI) - **outcome of the evaluation** within **5 months**
  • Time to Grant (TTG) - **signature of the GA** within **8 months**

• Grant Agreement Preparation (GAP) - **grant completely based on proposal** (no negotiation)
Feedback to proposers - Evaluation Summary Report (ESR)

- **Collation of all evaluators' comments**, per sub-criterion, which may be mutually contradicting (no consensus) - full transparency
- Proposal score calculation (per criterion) - median of the scores from individual evaluators
- **Final score** per criteria is **decided by the final panel review**
- Total final score for the proposal is calculated as the **weighted sum of the final scores** from the 3 evaluation criteria
- Final panel review adds also some additional comments
EVALUATION

FETOPEN - RIA

Applicant

Research Executive Agency

- Eligibility check
- Expert selection
- Remote evaluations
- Quality check
- Cross-reading
- Panel review
- Ethics screening/assessment
Summary evaluation outcome previous Cut-offs: RIA

<table>
<thead>
<tr>
<th>Cut-off</th>
<th>Eligible Proposals received</th>
<th>Above threshold proposals</th>
<th>Grant requested by above threshold proposals</th>
<th>Retained Proposals</th>
<th>Grant requested by retained proposals</th>
<th>Success rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEPT 2014</td>
<td>639</td>
<td>254</td>
<td>805 M€</td>
<td>24</td>
<td>78,1 M€</td>
<td>3,7%</td>
</tr>
<tr>
<td>MAR 2015</td>
<td>665</td>
<td>326</td>
<td>1079 M€</td>
<td>11</td>
<td>41 M€</td>
<td>1,7%</td>
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<tr>
<td>SEPT 2015</td>
<td>800</td>
<td></td>
<td></td>
<td>Max 38,5 M€</td>
<td></td>
<td>1,1%-1,3% (est.)</td>
</tr>
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</table>
FET-Open is extremely competitive

Is FET-Open really the right scheme for you?

- Check out others work programmes
- FET is not ERC: collaboration, science and technology are all essential ingredients.
- It is not because something has not been done before that it is sufficiently novel for FET
- An exciting long-term vision is essential, but also a new and plausible idea on how to get there
- Writing a good FET-Open proposal is probably as hard as writing a good scientific publication.
Overview of topics covered*

- Energy, Transport, Environment: 16.9%
- Bio-Robotics and HCl: 12.2%
- Life Science, Medicine, Biology, NeuroBio: 9.8%
- Electronics, Telecom, Optics, Hardware, Sensors, Devices: 17.0%
- Computer Science, Bio-informatics, Complexity, Data mining: 10.6%
- Nanoscience, Quantum Physics, Astrophysics: 14.7%
- Materials, Chemistry: 18.8%

*first cut-off in 2014: 640 eligible RIA proposals - 77M€ budget - success rate ~3.75%
List of funded FET-Open RIA projects (first and second cut-off)

Accessible on CORDIS:

FET-Open Coordination and Support Actions

Scope

- FET Exchange – networking in future and emerging R&I areas [2016 and 2017]
- FET Communication – visibility and outreach [2016]
- FET Conference – 2018 [2016]
- FET Innovation Greenhouse – capacity for facilitating earliest stages of innovation from FET research [2016]
- FET Futures – looking for new topics and strategies [2017]
FET-Open Innovation Launchpad

New topic in WP2016-17

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.

Coordination and Support Action

Single step submission, '1+7' pages, 2 deadlines
New knowledge

New technologies and their applications

Establish possibility

S&T Breakthrough as Proof-of-Concept

Dream 'Vision'

An innovation engine

Reality
Indirect innovation from a FET project

- Innovation is usually not foreseen in original Grant Agreements for FET
- The 'Dream' of a FET project is rarely investor ready
- Can be done through follow-up projects but takes a long time (which may indeed be needed)
- Innovation may happen at the fringes of a project (a tool, a technique, an unexpected path)
- Entire consortium may not be interested
- Partners may not be the optimal vehicles to exploit
- An SME may not exist yet, or may have been created only as a side-effect of the original project
- There may be enthusiasm to exploit, but zero experience to do so, especially in FET (e.g. a PhD student who wants to take something up but has no clue how to go about doing it)
FET-Open Innovation Launchpad

**Scope**

- **Short and focused actions** (18 months indicative, 100K funding)
- Early innovation steps to improve market- and investor-readiness
- Based on results from an **ongoing or recently finished FET project**
  - Any FET-funded project (FP7 or H2020), ongoing or maximum a year from end-date of originating project to call deadline
- **No additional S&T research**
- Actions not foreseen in originating project
- **No direct link needed with originating consortium**
- **Single participant possibility**
- **Assurance on necessary intellectual property rights and agreements to be stated in the proposal**
## Conditions for the Call – FET-Open

<table>
<thead>
<tr>
<th>Topic</th>
<th>Budget 2016 (€ Million)</th>
<th>Budget 2017 (€ Million)</th>
<th>Deadlines</th>
<th>Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>FETOPEN-01-2016-2017 (RIA)</td>
<td>84.00</td>
<td>84.00</td>
<td>11 May 2016 17 Jan 2017 27 Sep 2017</td>
<td>8 Dec 2015</td>
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<tr>
<td>FETOPEN-02-2016 (CSA)</td>
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<td>11 May 2016</td>
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<td>FETOPEN-03-2017 (CSA)</td>
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<tr>
<td>FETOPEN-04-2016-2017 (CSA)</td>
<td>1.20</td>
<td>1.80</td>
<td>29 Sep 2016 27 Sep 2017</td>
<td>1 Mar 2016</td>
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<tr>
<td><strong>Total:</strong></td>
<td><strong>88.20</strong></td>
<td><strong>113.80</strong></td>
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• FET Flagships
Call - FET Proactive – Boosting emerging technologies

**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.

<table>
<thead>
<tr>
<th>FET-Proactive – boosting emerging technologies</th>
<th>95M</th>
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<tbody>
<tr>
<td>FETPROACT-01-2016 Emerging themes and communities</td>
<td>80M</td>
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<tr>
<td>FETPROACT-02-2017 FET ERANET Cofund</td>
<td>5M</td>
</tr>
<tr>
<td>FETPROACT-03-2016 FET ERANET Cofund on quantum technologies</td>
<td>10M</td>
</tr>
</tbody>
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Call - FET-Proactive – boosting emerging technologies

Emerging themes and communities

• Almost 3x budget increase compared to WP2014-15
• Further opening up to all technology areas
• 10 sub-topics identified from on-line public consultation and other sources
• New design in WP2016-17 - more 'bottom-up' while still strategic

FET ERANET Cofund

FET ERANET Cofund on quantum technologies
FET-Proactive – emerging themes and communities

**Scope:** Proposals should 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 as well as a fertile ground for its future take-up (e.g., through public engagement processes when relevant, or through formal and informal education). Proposals should address a single of the specific subtopics within one of the following areas:

- **Area 1:** Future technologies for societal change
- **Area 2:** Biotech for better life
- **Area 3:** Disruptive information technologies
- **Area 4:** New technologies for energy and functional materials
10 sub-topics from FET Pro-active consultation

*Future technologies for societal challenges*
- **Being human in a technological world**  
- **New science for a globalised world**  

*Biotech for better life*
- **Intra- and inter-cell bio-technologies**  
- **Bio-electronic medicines and therapies**  
- **Cognitive neuro-technologies**  

*Disruptive information technologies*
- **New computing paradigms and their technologies**  
- **Quantum engineering**  
- **Hybrid opto-electro-mechanical devices at the nano-scale**  

*New technologies for energy and functional materials*
- **Ecosystem engineering**  
- **Complex bottom-up construction**  
- **Ecosystem engineering**
FET-Proactive – emerging themes and communities

**Expected Impacts**

- Maturing themes and structuring communities through jointly exploring options
- Emergence of a broader innovation eco-system for a new technology

Larger projects: 4-10MEuro, up to 5 years (compare FET-Open: up to 4MEuro) addressing a single theme

Optional use of cascade funding (e.g., for prize)

Single deadline, single step submission
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FET Flagships address ambitious S&T challenges that require:

• Setting up large-scale partnerships that bring together the leading researchers from a large number of research organisations (academia and industry);

• Commitment to a strong science investment over a long time period that cannot be carried out alone by the Commission or any single Member State
Graphene, is a 2D material, a single layer of carbon atoms, stronger than diamond, yet lightweight and flexible and an exceptional electricity conductor.

The Graphene Flagship will bring graphene, and related 2D materials, from academic labs to industry, manufacturing and society.

Examples Applications:

- electronic paper; bendable smartphones; enhanced solar cells and batteries; lighter and more energy efficient airplanes ...
- On the longer term, graphene is expected to give rise to new computers and revolutionary medical applications such as artificial retinas.
This research lays the scientific and technical foundation for medical progress: identifying new drug targets and treatments in response to the urgent need to combat brain diseases and their associated costs to society.

HBP will also produce brain-inspired ‘neuromorphic’ computing systems that could drastically reduce power-consumption for super-computers and enhance robots.
Call - FET FLAGSHIPS – Tackling grand interdisciplinary science and technology challenges

**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.

<table>
<thead>
<tr>
<th>FET-Flagships</th>
<th>185M</th>
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<tbody>
<tr>
<td>FETFLAG-01-2016 Partnering environment for FET Flagships</td>
<td></td>
</tr>
<tr>
<td>ERA-NET Cofund action (deadline 1 March 2016)</td>
<td>8M</td>
</tr>
<tr>
<td>Coordination and Support Action (deadline 1 March 2016)</td>
<td>1M</td>
</tr>
<tr>
<td>[2017] Pro memori: Core project funding (through 'Other Actions')</td>
<td>88+88M</td>
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</table>
The implementation model of the Flagships aims to link together and ensure coordination and synergy of all those research activities relevant for the Flagship that are funded by the Commission and the Member States.*

Partnering Projects 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.**


Call for experts!

- Do you have high-level of expertise in the relevant fields of research and innovation of H2020?

- Can you be available for occasional, short-term assignments

Sign up at the participant portal:
http://ec.europa.eu/research/participants/portal/desktop/en/experts/
Thanks for your attention!

Antonio.Loredan@ec.europa.eu

H2020 website:
http://ec.europa.eu/programmes/horizon2020/

Participant portal:

FET Work Programme 2016-2017 call text:

Twitter: @FET_EU