Future and Emerging Technologies

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FET in Horizon 2020

Excellent Science pillar in H2020

- European Research Council
- Marie Skłodowska-Curie actions
- Future and Emerging Technologies
- Research infrastructures programme

FET: Pathfinding Europe's technological future
"Future and emerging technologies shall support collaborative research in order to extend Europe’s capacity for advanced and paradigm-changing innovation. It shall foster scientific collaboration across disciplines on radically new, high-risk ideas and accelerate development of the most promising emerging areas of science and technology as well as the Union wide structuring of the corresponding scientific communities."

COMMISSION PROPOSAL ON ESTABLISHING HORIZON 2020 - THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION (2014-2020)
FET's missions

To uncover 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 grasp European leadership in research and innovation on the most promising such future and emerging technologies early on.

To turn Europe into the best environment for responsible and dynamic multi-disciplinary collaborations on such future and emerging technologies.

To kick-start European research and innovation eco-systems around such future and emerging technologies, as seeds of future industrial leadership and the tackling of grand societal challenges.
FET – three complementary funding schemes

- **FET-Open**
  - Early Ideas
  - Individual research projects
  - Exploring novel ideas

- **FET Proactive**
  - Exploration and Incubation
  - Topical clusters of research projects
  - Developing topics & communities

- **FET Flagships**
  - Large-Scale Partnering Initiatives
  - Common research agendas
  - Addressing grand challenges

Open, light and agile → Roadmap based research
FET Open in FP7 a portfolio snapshot

Evolutionary microfluidix

Bacterial Computing with Engineered Populations

Artificial Wet Neuronal Networks from Compartmentalised Excitable Chemical Media

Innovative Robotic Artefacts Inspired by Plant Roots for Soil Monitoring

Enhance environmental awareness through social information technologies

A closed-loop neural prosthesis for dizziness suppression

ICT challenges of mineral extraction under extreme geo-environmental conditions

Optogenetic Neural stimulation platform

Body on a Chip

Hyper Interaction Viability Experiments which display adaptive tissue-like organisation

Social Interaction and Entrainment using Music PeRformance Experimentation

Curved Artificial Compound Eyes

Similarity-Based Pattern Analysis and Recognition

Linking biological and artificial neuronal assemblies to restore lost brain functions: towards the design of innovative bi-directional neuroprostheses

Electronic Chemical Cell
FET Open

+ Popular FET-hallmark scheme
+ Numerous success stories
+ Attracts new disciplines and actors, including many young ones and SMEs
+ A source of new directions and early signals
+ Largely academic, with some high-tech industry and SME participation
+ Highly competitive!
Coordination and Support Activities

Making Europe the best place in the world for collaborative research 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.

A range of actions geared towards some of the following impacts:

• 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 actors ready to take them forward.

• Improved readiness across Europe to engage in silo-breaking research collaboration and to take up new research and innovation practices.

• Improved understanding of impact mechanisms for long-term science and technology research.
FET Proactive - nurturing emerging themes and communities

• A set of thematic initiatives on promising emerging research themes.

• Building up a European pool of knowledge and new interdisciplinary communities.

• Joint exploration or consolidation of promising future technologies.

• Topics defined bottom-up (FET Observatory):
  • FET-Open portfolio analysis
  • Consultations
  • Participatory engagement with industry and society
  • Coordination and support actions
FET Proactive Initiatives in FP7
+ Balance between continuity and new directions
  + It can take time to mature an avenue
+ Creation of communities
  + for instance in, Bio-ICT, quantum technologies, Neuro-IT, complex systems
+ Successful transfers
  + for instance in quantum cryptography, cognition, nano-tech, robotics, bio-ICT
Future FET Proactives

Topics coming out of the on-line consultation

- Around 1400 contributions received to the FET on-line consultation on future pro-actives
- Structured around 9 candidate topics (see next slide)

*Complemented by a special action:*

- Towards exascale high-performance computing, as part of the High Performance Computing Public-Private Partnership.
FET evaluation

- FET-Open & FET-Pro-active (except HPC)
  Specific evaluation procedure
- FET-Flagship
  Specific evaluation procedure
FET Open: fostering novel ideas

Collaborative research
'Open is open': all technologies, no topical scope.

- Bottom-up, but targeted - not blue sky research

40% of the FET budget in H2020 (>1B€).

FET gatekeepers define the kind of research that FET is looking for.

- An end-to-end light and fast scheme:
  - 15 page proposals
  - 1 step submission, 1 stage evaluation
  - 3 evaluation criteria

Instruments

- Research and Innovation Actions
- Coordination and Support actions
FET Proactive (except HPC) – Thematic call

Collaborative research

A set of thematic initiatives on promising emerging research themes.

- Fixed deadline calls
- 15 page proposals
- 1 step submission, 1 stage evaluation
- 3 evaluation criteria

Instrument
- Research and Innovation Actions
One step submission

- Part A: Administrative part of the proposal
- Part B: Scientific part of the proposal

15 pages (excluding cover page and ethics section)

- Cover page
- Section 1: S&T Excellence
- Section 2: Impact
- Section 3: Implementation
One stage evaluation

1. Individual Evaluation Report
2. Individual Evaluation Report
3. Individual Evaluation Report
4. Individual Evaluation Report

Proposal

Step 1: Evaluators prepare Individual Evaluation Report (IER)

Step 2: EC Quality check of IER

Step 3: EC merge IER comments & average score per criteria

Step 4: Optional Panel review ESR

Step 5: Ranking based on total score

Evaluation report (ESR)

Ranking

IER Quality check
FET Evaluation criteria (1)

- **S/T quality** weight 60%, threshold 4/5
  - 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.
  - Appropriateness of the research methods.
FET Evaluation criteria (2)

• **Impact** weight 20%, threshold 3,5/5
  • 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.
FET Evaluation criteria (3)

• **Implementation** weight 20%, threshold 3/5
  • Quality of the workplan and clarity of intermediate targets.
  • Relevant expertise in the consortium.
  • Appropriate allocation and justification of resources (person-months, equipment, budget).
The EC Communication "High-Performance Computing: Europe's place in a global race", adopted 15 Feb 2012, describes an ambitious strategy for HPC, combining three elements:

- a) Computer Science: towards exa-scale High Performance Computing;
- b) providing access to the best supercomputing facilities and services for both industry and academia;
- c) achieving excellence in HPC applications;

Complemented with training, education and skills development in HPC.
FET Flagships - tackling grand interdisciplinary science and technology challenges

FET Flagships are ambitious, large-scale, long-term, science-driven, goal-oriented, roadmap-based research initiatives that are expected to:

- provide a strong S&T basis for future technological innovation and substantial benefits for society
- help overcome fragmentation and increase the impact of European research and innovation efforts

They require:

- a long-term commitment of all key stakeholders sharing a common scientific vision and under a strong leadership
- a joint effort of EU and national programmes to provide a large financial support (~ 100 M€/year) over a long period (~10 years)

FET Flagships: state of play

Two FET Flagships were selected through a bottom-up competitive call:

- Graphene: development of the science and technologies for a new class of material beyond the era of silicon, bringing graphene and related 2D-materials, from academic labs to industry, manufacturing and society.
- Human Brain Project: simulation and understanding of the Human Brain to develop new diagnostic tools and treatments for brain diseases, and a new class of low-energy technologies with brain-like intelligence, such as neuromorphic computing.
Information Day in Brussels

What?
- H2020 proposal guidelines and submission procedures
- Overview of the first FET-Proactive objectives
- Presentation of ideas for projects and networking

When?
- 20 January, 2014

Where?
- Brussels, Conference Centre Albert Borschette (CCAB)*

Deadline for registration?
- 12 January, 2014

* to be confirmed
Thank you for your attention!