



European  
**eic INNOVATION**  
Council *BETA*

**EMPOWERING EUROPEAN INNOVATORS**

FET Open: the EIC's  
exploratory engine for  
research on future  
disruptive technologies

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Research Executive Agency  
European Commission

Research and  
Innovation



- The European Innovation Council pilot 2018-2020
- Future and Emerging Technologies - FET Open:
  - general overview
  - call for proposals and evaluations
  - statistics 2014-2017
  - project examples

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# EIC European Innovation Council

Commissioner Moedas had already announced his vision for the EIC initiative in June 2015

A true one-stop shop for innovation funding, the EIC is open to innovations in any technology or sector including novel innovations that cut across technologies and sectors.

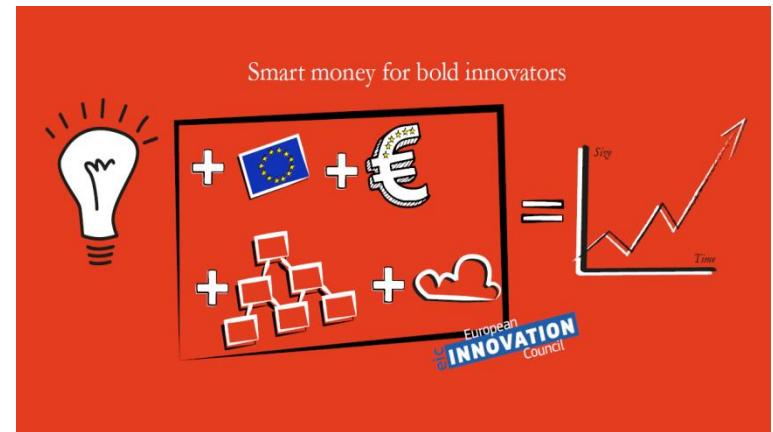
It supports high-risk, high-gain innovation to create the markets of the future

brings together existing instruments: the SME Instrument, inducement prizes, **FET-Open** and Fast Track to Innovation.

# Objective: Strengthen breakthrough innovations and boost the number of high-growth companies

Focus on people, companies and research organisations with ideas for :

- **Radically new**, breakthrough products, technologies, services, processes or business models
- That **open up new markets** with the potential for rapid **European and global-scale growth** (high risk, need for significant investment)
- Take shape at the **intersection** between different technologies, industry sectors and scientific disciplines





- new initiative to support Europe's most promising innovators from 2018-2020
- funding of innovation for rapid scale up, growth and jobs
- overall budget (€2.7bn), bringing key instruments under one umbrella
- reforming instruments to support innovation
- Launch on 27<sup>th</sup> October
- calls open on 7<sup>th</sup> November
- EIC Horizon Prizes aim to solve major global challenges

# FET Open and EIC: a win-win

*Early science-driven technological innovation...*

*... a key starting point for radical innovation; only done by FET*

*Exploring the unknown...*

*... FET-Open is a wide-ranging exploratory engine for novelty*

*Inspiring the entrepreneurial mind...*

*... even when far from market, all FET-Open projects are full of inspiring ideas for the entrepreneurial minds in EIC*

*Early detection of opportunities...*

*... Where researchers see possibilities, they see more research.*

*Exchange between research and innovation world...*

*... so that FET attracts also new and high-potential innovators*

*Accelerator towards impact...*

*... FET Innovation Launchpad is a fast learning track into the EIC*

# FET-Open is extremely competitive

- Don't waste time on a proposal that has no chance to make it through the FET-Open evaluation.
- Is FET-Open really the right scheme for you?
- Check out LEIT and Societal Challenges 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.
- FET is not the long-term end of an established industry's road-map
- A long-term vision is essential, but also a plausible idea on how to get there.
- Writing a good proposal is probably as hard as writing a good scientific publication (and more intellectually rewarding).



# Writing a good FET proposal

*Be ambitious, follow your 'dream'*

- Novelty is essential
- Incremental refinements rarely make it – high-risk does
- Boil down the vision to a concrete and ambitious target
- Check with others but keep it your proposal (e.g. FET NCPs through IDEALIST)

*Consortium*

- There are no hidden expectations from our side (beyond the rules for participation), i.e. no cosmetic roles – keep it simple
- Look for renewal here too - novelty probably starts here
- Narrow inter-disciplinarity will not be good enough to win (look beyond your comfort zone – this is not ERC-like career building)
- Commitment: will the project transform the partner(ship)? (mission vs. role)

# Writing a good FET proposal

*Collaborate, collaborate, collaborate...*

- Take inter-disciplinarity seriously - write your proposal together
- Collaboration throughout the project, driven by joint questions, goals and mutual learning, not just passing on results between silos
- Explore new ways of working/learning/changing together

*Communicate engage*

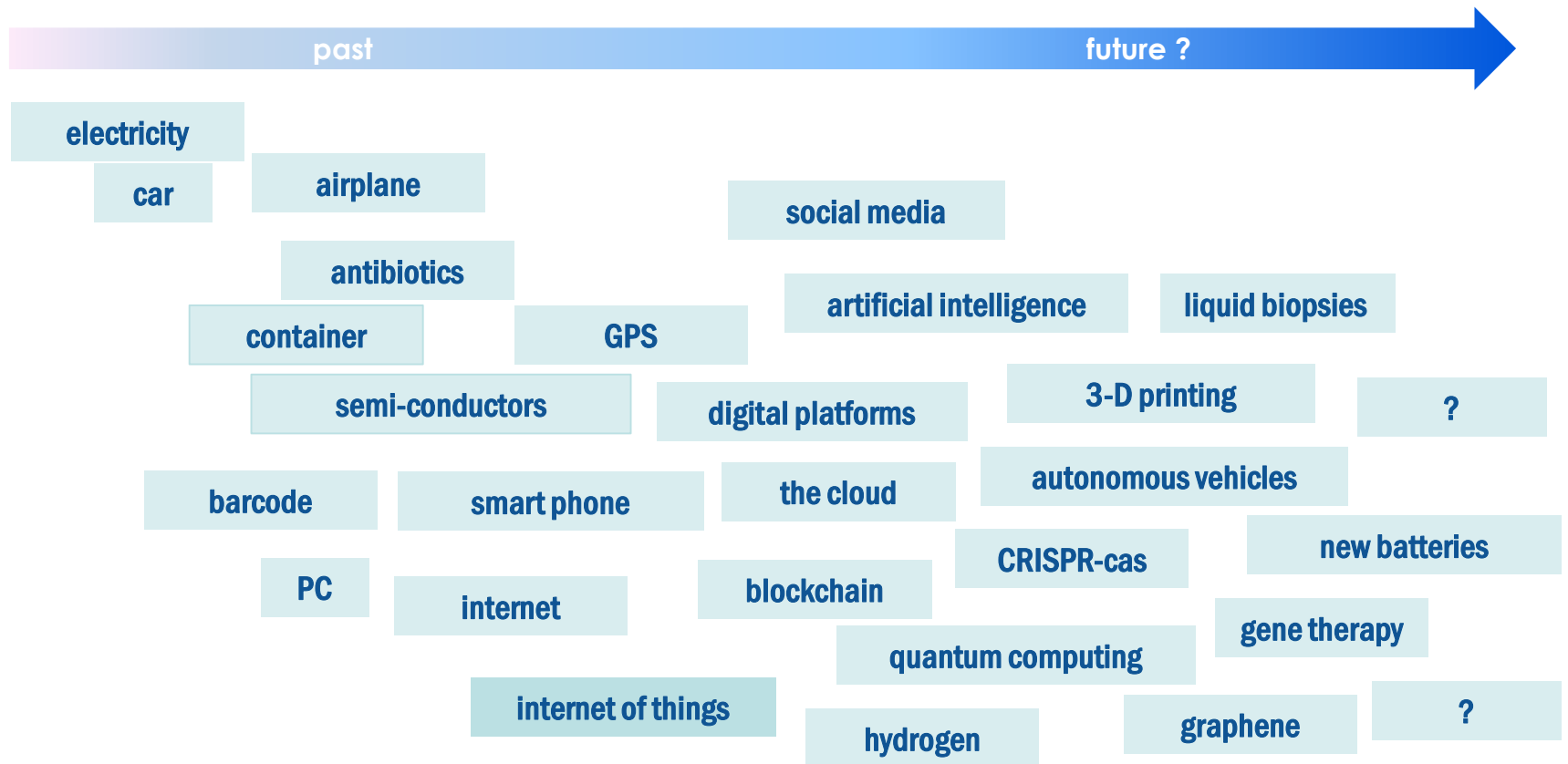
- Scientific publications
- Social networks & media
- Public engagement

*Keep it simple*

- Focus on the high-risk parts with crisp targets
- Don't write for 'us', but for people like you
- Check your deliverables list – write what *you* need and what *you* want

# Market-creating innovations?

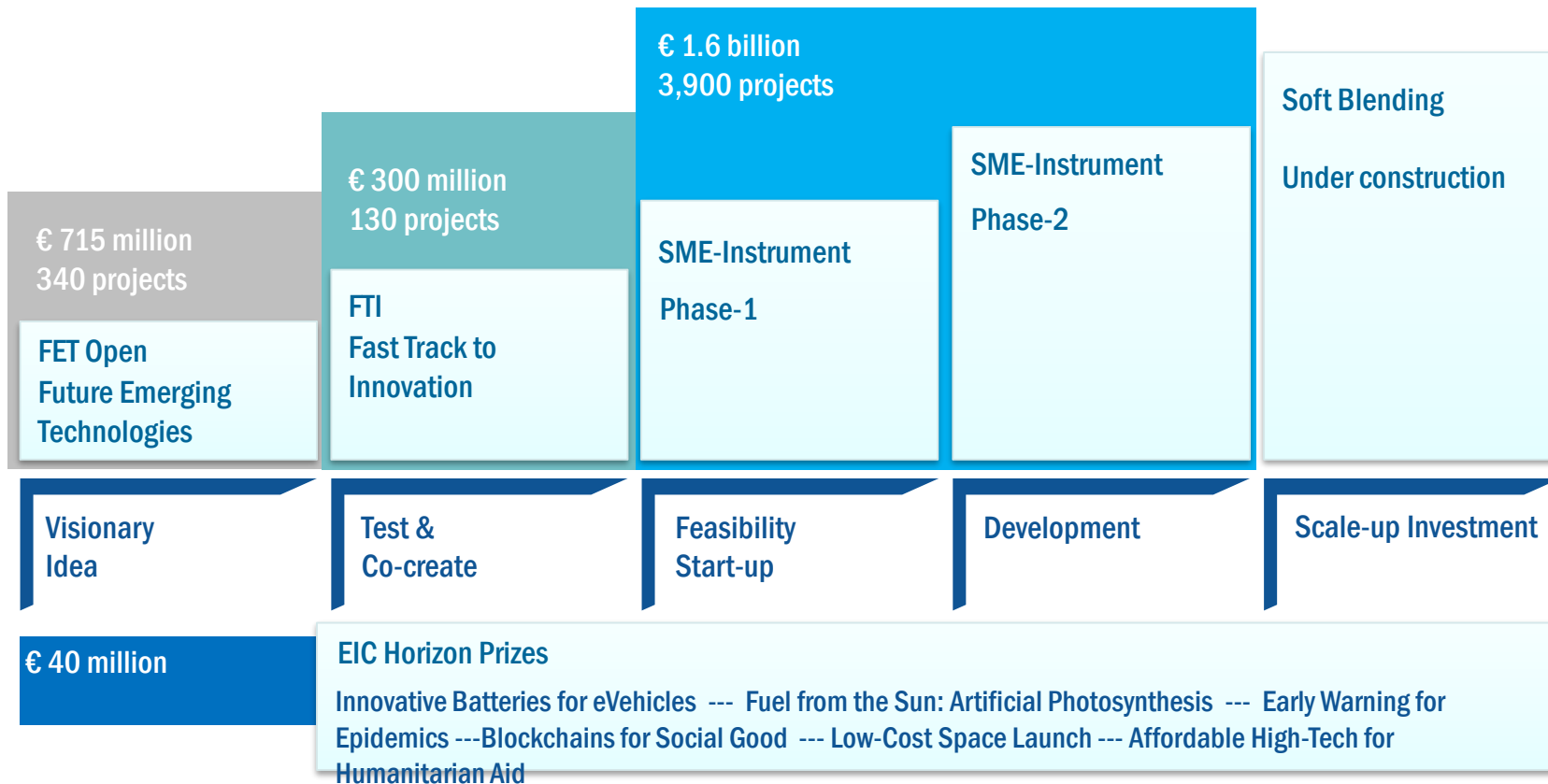
some eye-catchers based on WIPO, MIT, WEF, OECD, Harford, etc.



# Comprehensive package - 4 schemes in 1

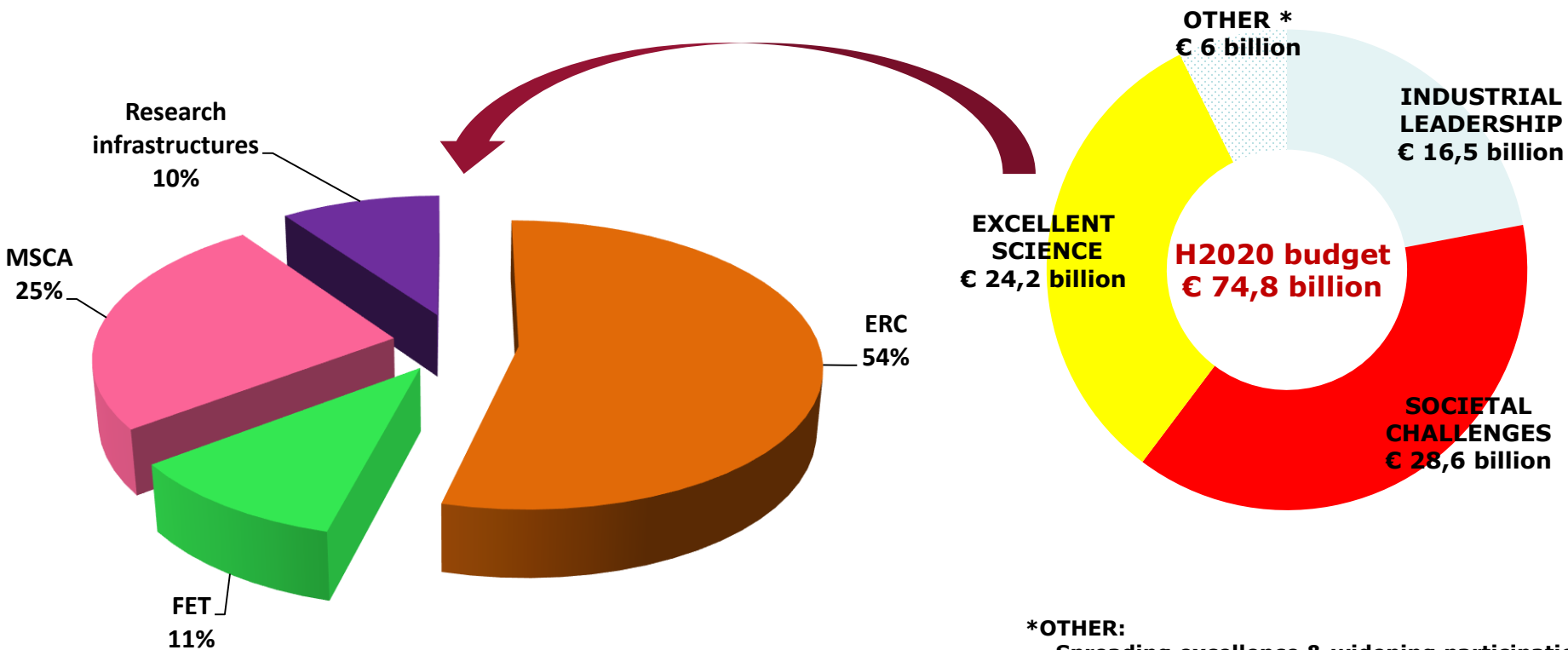
Ecosystem support

Coaching, mentoring and business acceleration services for all SMEs



- The European Innovation Council pilot 2018-2020
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## H2020: A strong, clear focus



- \*OTHER:**
- Spreading excellence & widening participation
  - Science with and for society
  - JRC
  - EIT

## Future and Emerging Technologies: lines of activities

### FET activities

- Fertile ground for multidisciplinary collaborations on FET
- Kick-starting European R&I eco-systems
- Seeds for future industrial leadership and tackling society's challenges
- Focus on research beyond what is currently known

Open, light and agile ←-----→ Roadmap based research

#### FET-Open

*Early Ideas*

*40% H2020 budget*

**Exploring novel ideas**

#### FET Proactive

*Exploration and Incubation*

**Developing topics and communities**

#### FET Flagships

*Large-Scale Partnering Initiatives*

**Addressing grand challenges**

# FET Open: let's try even if it fails!



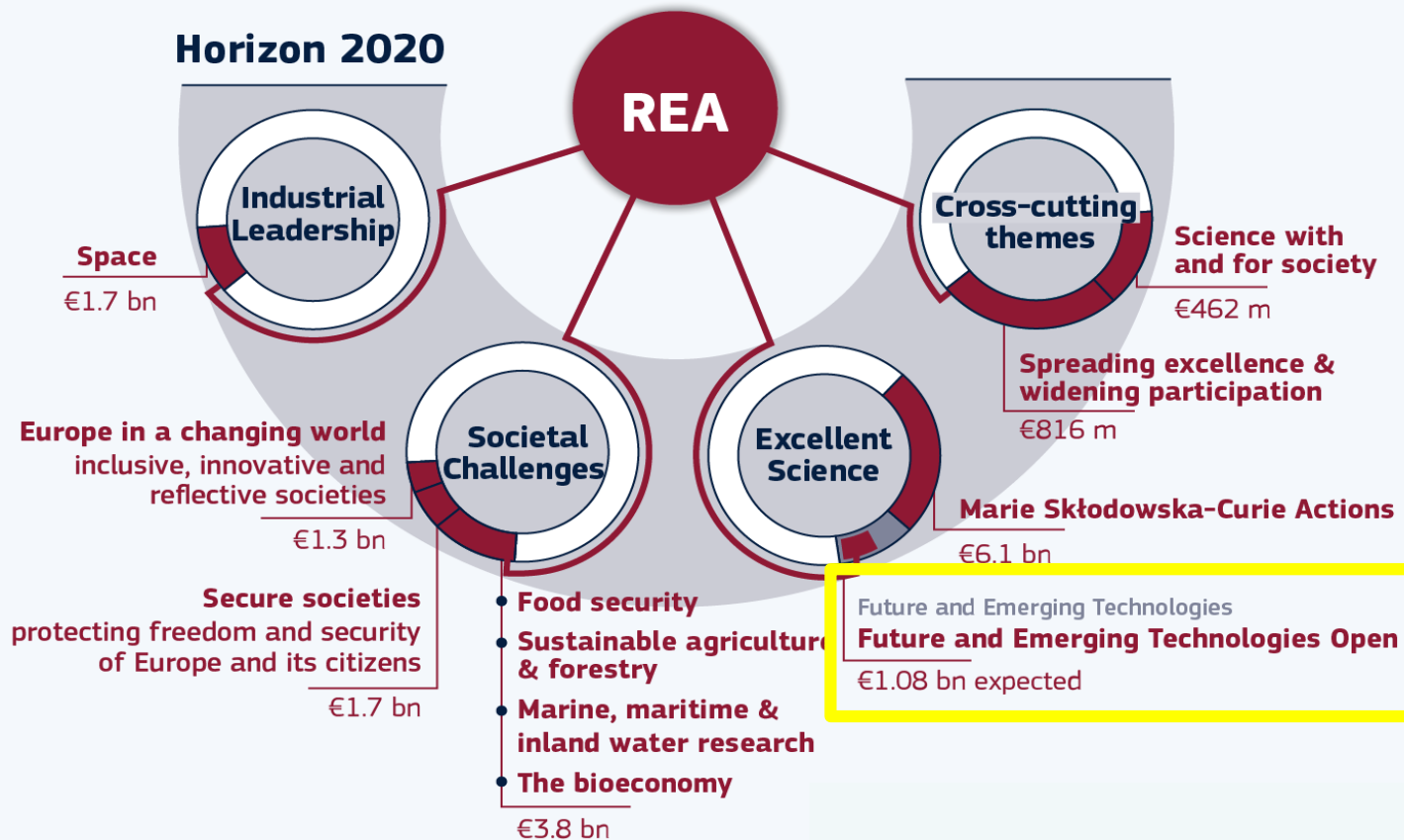
From  
knowledge  
...

... to new  
technolo  
gy



# REA's responsibilities in Horizon 2020

2014-2020



## FETOPEN-01-2018-2019-2020: FET-Open Challenging Current Thinking (RIA)

+ Foundations for radically new future technologies  
+ Cutting-edge high-risk / high-impact interdisciplinary research with  
"FET gatekeepers":

- **Radical vision**
- Have a clear and radical vision for new technology challenging current paradigms
  - incremental research following a well-established roadmap will not be funded
- **Breakthrough technological target**
- blue-sky exploratory research without a clear technological objective will not be funded
- **Ambitious interdisciplinary research**
- that opens up new areas of investigation
  - proposals with only low-risk incremental research will not be funded

### Expected Impact:

- **Scientific and technological contributions to the foundation of a new future technology**
- **Potential for future social or economic impact or market creation**
- **Building leading research and innovation capacity across Europe by involvement of key actors that can make a difference in the future**

## FET-Open is OPEN!

- No thematic restriction, no emphasis on any subject
- All areas: physics, chemistry, mathematics, ICT, materials, medicine, biology, energy, social sciences...
- Completely bottom-up, but with a clear target – NOT blue sky research!
- Successful FET-Open project can be a proof-of-concept...
- Combination of high scientific ambition with concrete technological implications
- Collaborative research (**min. 3 partners from different EU/AC**)
- Interdisciplinary consortia (new connections between remote disciplines – unexpected collaborations)
- High risk projects potentially leading to ground breaking breakthroughs
- EU contribution of up to 3M€ (indicative)

# FET Open – changes for 2018

## FET Open - Novel ideas for radically new technologies

- FET Open Challenging Current Thinking
  - FET gatekeepers reduced from 6 to 3 for clearer scoping
  - Evaluation strengthens role of scope and discourages poor resubmissions
  - Indicative size 'up to EUR 3 million'
  - Single stage, continuously open with regular cut-off dates
- FET Open Coordination and Support Actions (CSA)
  - Focused on impact enhancing measures for Communication, Innovation and Horizon Scanning (Observatory)
- FET Open FET Innovation Launchpad
  - Call text simplified, taking into account lessons learned

Total budget for FET Open in Horizon 2020 (incl. CSAs) will be around 1070 M€, i.e., meeting the target of 40% of the total FET budget in Horizon 2020

# FET Open CSAs: FETOPEN-02-2018

Call deadline: 11/04/2018. Total budget= 2M€

- FET Communication and Outreach: communication activities on the FET programme and its achievements, targeting a wide range of audiences going well beyond the world of academia and research. (up to 0.7 M€)
- FET Innovation: Stimulate the impact on innovation from FET-funded research and improve the innovation readiness levels of FET results. (up to 0.5 M€)
- FET Observatory: Ongoing and systematic identification of new and emerging technologies from FET portfolio analysis, trends analysis and broader horizon scanning.

## CSAs: FETOPEN-02-2018

- FET Communication and Outreach: communication activities on the FET programme and its achievements, targeting a wide range of audiences going well beyond the world of academia and research. (up to 0.7 M€)
- Examples:
  - Activities to stimulate the emergence of a FET community
  - Activities to stimulate connection to relevant stakeholders, e.g. network industry events, open days for investors
  - Activities using a diversity of channels and interventions: Competitions, code/booth camps, hackathons, etc.

## CSAs: FETOPEN-02-2018

- FET Innovation: Stimulate the impact on innovation from FET-funded research and improve the innovation readiness levels of FET results. (up to 0.5 M€)
- Examples:
  - “market place” for FET technologies (e.g. for use and exploitation of IPR)
  - connecting the world of research with:
    - potential users
    - technology leaders,
    - technology transfer organisations,
    - Entrepreneurs and startups
    - Early stage investors
    - alternative financing channels (donation or reward CF)

## FET Open – Research and Innovation projects

- EU contribution up to 3 Mio € (indicative)
- Consortium of minimum 3 partners from 3 EU / associated countries

### A typical Research and Innovation Action project



Average funding  
per project:

**3.4 million €**



Average number of  
partners per project:

**6**



Average project  
duration:

**41 months**



## Expected Impact:

- Scientific & technological contributions to the foundation of a new future technology
- Potential for future social or economic impact or market creation
- Building leading R&I capacity across Europe by involvement of key actors, for example:
  - excellent young researchers
  - ambitious high-tech SMEs
  - first-time participants to FET under H2020

# FET Open – tackling oversubscription

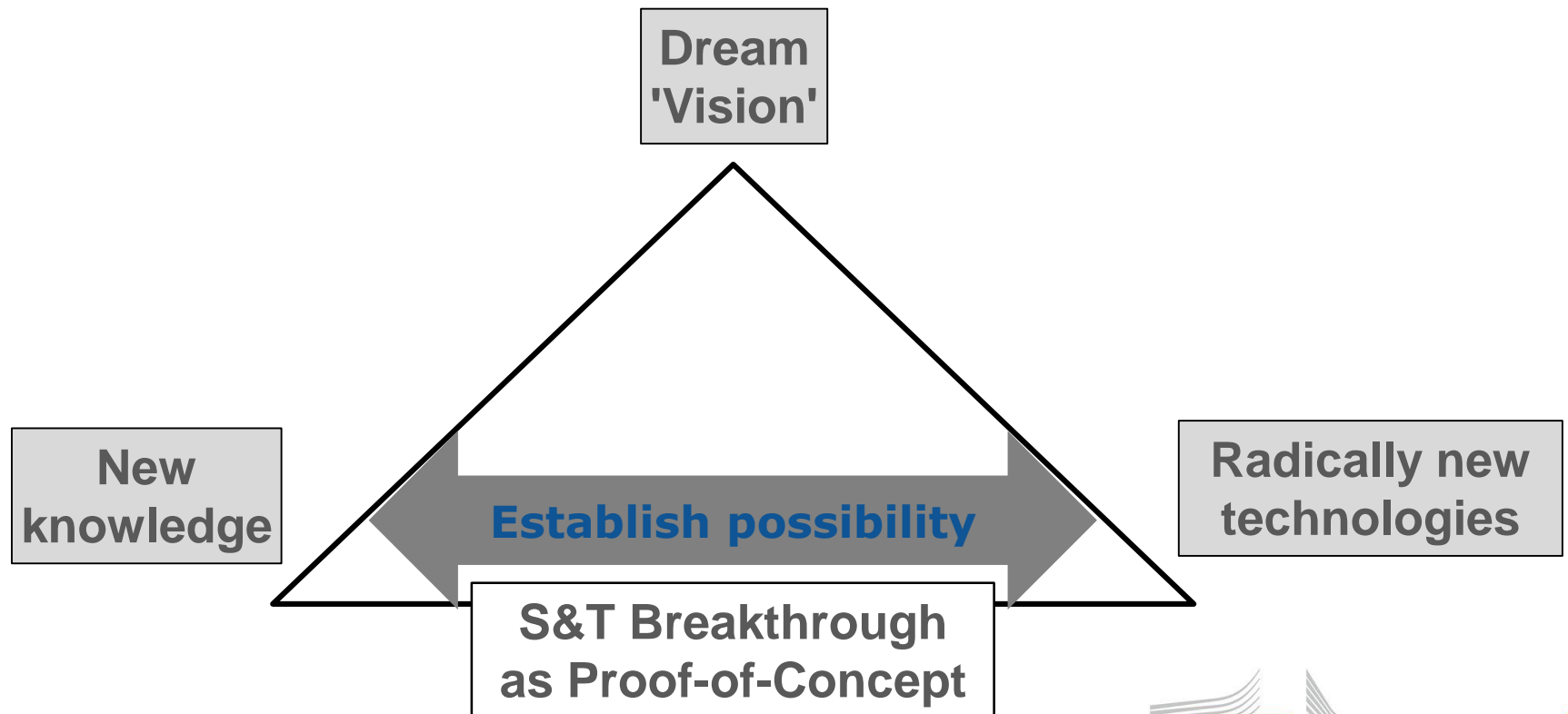
FET-Open - Measures for reducing oversubscription and increasing success rate

- Increasing available budget per cut-off date
- Clearer definition of mandatory "FET gatekeepers", including by stating for each what we don't aim to fund.
- Possibility to declare proposals out of scope based on gatekeepers
- Direct mapping from gatekeepers to evaluation criteria.
- Indicative funding per project "up to 3MEuro"
- Possibility to give feedback to proposers with respect to an eventual future resubmission

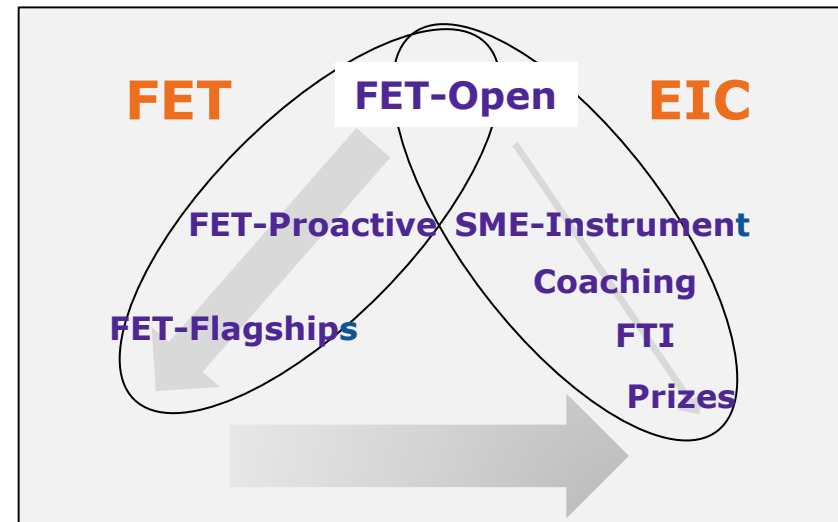
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# FET-Open spirit

FET-Open Research and Innovation Actions support the early stages of research to establish a new technological possibility



- The European Innovation Council (EIC) pilot supports innovators developing breakthrough innovations with the potential to create new markets and boost jobs, growth and prosperity in Europe. This is a support with no thematic restrictions, particularly aimed at people and companies who have ideas that are radically different from existing products or services on the market or under development (not incremental improvements), are highly risky, and require significant investments to get to market.
- FET Open uses interdisciplinary collaboration to tap into Europe's excellent science base for exploring radically new technologies, which may become the game-changers of the future (no change in scope and orientation).
- Governance of FET Open remains under DG CNECT and the ERC-FET-MSCA Programme Committee
- SMEs in FET Open can benefit of networking, coaching and mentoring as foreseen in the EIC Work Programme



***"FET Open aims to establish European leadership in the early exploration of future technologies. It looks for opportunities of long-term benefit for citizens, the economy and society. It aims to mobilise Europe's most creative and forward thinking researchers from all disciplines to work together and explore what may become the leading technology paradigms of the future."***

## **Call FET Open – Novel ideas for radically new technologies**

**H2020-FETOPEN-2018-2020 – 3 topics:**

- **FETOPEN-01-2018-2019-2020: FET-Open Challenging Current Thinking**
- **FETOPEN-02-2018: FET-Open Coordination and Support Actions**
- **FETOPEN-03-2018-2019-2020: FET Innovation Launchpad**

**The FET-Open call is a part of the European Innovation Council (EIC) pilot.**

# Call conditions and evaluation

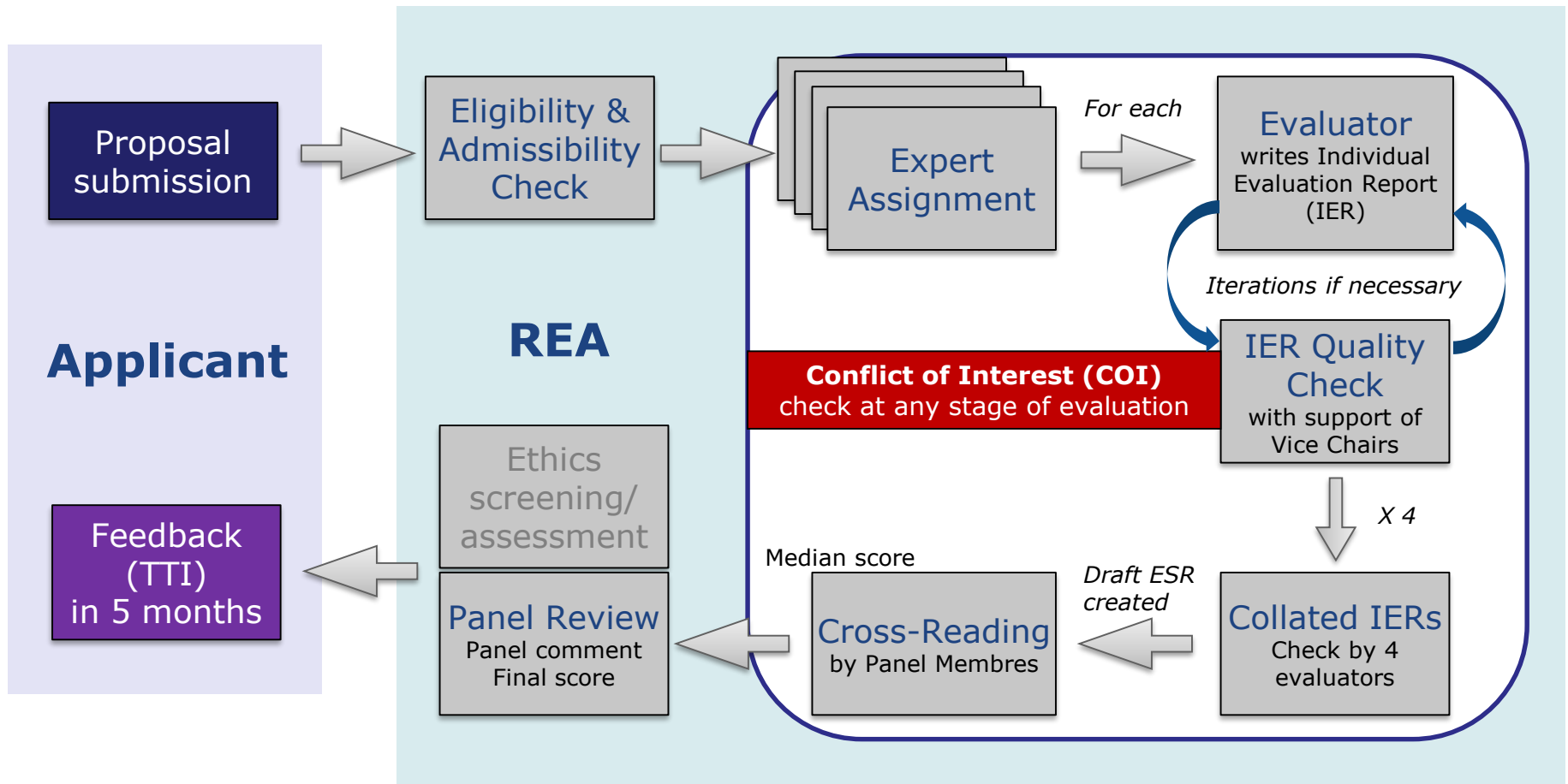
## Dates and indicative budget

Topic (Type of Action)	Budget 2018  EUR million	Budget 2019  EUR million	Budget 2020  EUR million	Deadlines (cut-off dates)
<b>FETOPEN-01-2018-2019-2020 (RIA)</b>	123,70	160,40 160,40	203,00	16 May 2018 24 January 2019 18 September 2019 13 May 2020
<b>FETOPEN-03-2018-2019-2020 (CSA)</b>	2,50	2,70	3,00	16 October 2018 8 October 2019 14 October 2020

**Total budget for RIA: 647,50 M€ (92,7% more per cut-off than in WP 2016-2017)**  
**Total budget for FET Innovation Launchpad (CSA): 8,2M€ (82,2% more per cut-off than in WP 2016-2017)**

**Opening of the call: 7 November 2017 at 17h00 CET**

# FET-Open Evaluation process (example for RIA)





## FET-Open Call Conditions and Evaluation

- Single stage procedure (submission and evaluation)
- High quality peer review by experts
- Timetable 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
- Eligibility and admissibility conditions – parts B and C of the General Annexes to the Work Programme (exception for FETOPEN-03-2018-2019-2020)
- Grant Agreement Preparation (GAP) – grant completely based on proposal (no negotiation)
- Consortium Agreement for RIA: to be concluded in principle prior to signature of Grant Agreement (GA)

**Note: Evaluation procedure, criteria, scoring and threshold are described in General Annex H of the work programme (but exceptions apply to both topics!)**

Excellence	Impact	Quality and efficiency of the implementation
<p><b>Adherence to the "FET gatekeepers"</b></p> <ul style="list-style-type: none"> <li>□ <u>Clarity</u> of the <b>radical vision</b> of a science-enabled technology and its differentiation from current paradigms.</li> <li>□ <u>Novelty</u> and <u>ambition</u> of the proposed <b>science-to-technology breakthrough</b> that addresses this vision.</li> <li>□ <u>Range</u> of and <u>added</u> value from <b>interdisciplinarity</b> for opening up new areas of research; <b>non-incrementality</b> of the research proposed.</li> <li>□ <b>High-risk, plausibility and flexibility</b> of the <u>research approach</u>.</li> </ul>	<ul style="list-style-type: none"> <li>□ The extent to which the outputs of the project would contribute to the <b>expected impacts</b> listed in the work programme under this topic.</li> <li>□ <u>Effectiveness</u> of measures and plans to <b>disseminate</b> and <b>use the results</b> (including management of IPR) and to <b>communicate</b> about the project to different target audiences.</li> </ul>	<ul style="list-style-type: none"> <li>□ <b>Coherence</b> and <b>effectiveness</b> of the <u>research methodology</u> and <u>work plan</u> to achieve project objectives and impacts, including <b>adequate allocation</b> of <u>resources</u> to tasks and partners.</li> <li>□ <b>Role</b> and <b>complementarity</b> of the <u>participants</u> and extent to which the consortium as a whole brings together the necessary expertise.</li> </ul>
<p><u>Threshold:</u> <b>4/5</b> <u>Weight:</u> <b>60%</b></p>	<p><u>Threshold:</u> <b>3.5/5</b> <u>Weight:</u> <b>20%</b></p>	<p><u>Threshold:</u> <b>3/5</b> <u>Weight:</u> <b>20%</b></p>

## Proposal composition (RIA)

- **Part A: Administrative part of the proposal**
- **Part B: Narrative part of the proposal (core proposal)**
  - **Section 1: Excellence**
  - **Section 2: Impact**
  - **Section 3: Quality and efficiency of the implementation**
  - **Section 4: Members of the consortium (additional information)**
  - **Section 5: Ethics and security (additional information)**

**Pages limit: Sections 1 to 3 together are limited to 15 pages A4 (clearly shown) and Sections 4 to 5 are not covered by the page limit**

## FETOPEN-03-2018-2019-2020: FET Innovation Launchpad (CSA)

+ Turning results from FET-funded projects into genuine societal or economic innovations

- Short (up to 18 months) individual or collaborative focused actions
- Early innovation from an ongoing or recently finished FP7/H2020 FET project (precise link)
- No additional S&T research; limited low-risk technology development is possible if necessary
- No actions that are/were foreseen in originating project
- Declaration of necessary rights and ownership/agreements for results to be exploited
- No prescribed activities, but 'fit for purpose'

**EU contribution of up to 0.1M€**

## FETOPEN-03-2018-2019-2020: FET Innovation Launchpad (CSA)

### Expected impact:

- Increased value creation from FET projects by picking up innovation opportunities
- Improved societal and market acceptance of concrete high-potential innovations from FET projects
- Stimulating, supporting and rewarding an open and proactive mindset towards exploitation beyond research world
- Contributing to the competitiveness of European industry/economy by seeding future growth and creation of jobs from FET research

### Proposed activities (non-exhaustive list):

Commercialization process, market and competitiveness analysis, technology assessment, verification of innovation potential, consolidation of IPRs, business case development etc.

## Evaluation criteria, Scoring and Thresholds (FET Innovation Launchpad)

Excellence	Impact	Quality and efficiency of the implementation
<ul style="list-style-type: none"> <li><input type="checkbox"/> <u>Clarity</u> and <u>quality</u> of the <b>innovation idea</b> and its link with the previous or ongoing FET project indicated in the proposal.</li> <li><input type="checkbox"/> <u>Concreteness</u> of <b>objectives</b> and their <u>pertinence</u> for moving the output of FET research through the initial steps of a process leading to a <b>commercial or social innovation</b>.</li> <li><input type="checkbox"/> <u>Suitability</u> and <u>necessity</u> of the proposed <b>activities</b> to reach the stated objectives, including their complementarity to actions already foreseen or expected from the previous or ongoing FET project.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Added innovation potential</b> with respect to the FET project from which this innovation originates.</li> <li><input type="checkbox"/> <u>Extent</u> of <b>economic and/or societal benefits</b> resulting from this innovation as identified in the proposal.</li> <li><input type="checkbox"/> <u>Suitability</u> of <b>measures</b> for taking the <u>innovation beyond the research world</u>, including through engagement with prospective exploitation partners, other stakeholders, users or society.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> <u>Quality</u> of <b>workplan</b> and <b>management</b>.</li> <li><input type="checkbox"/> <u>Relevance</u> of <b>expertise</b> in the consortium.</li> <li><input type="checkbox"/> <u>Appropriate allocation of resources</u> (person-months).</li> </ul>
<p><u>Threshold</u>: <b>3/5</b> <u>Weight</u>: <b>40%</b></p>	<p><u>Threshold</u>: <b>3.5/5</b> <u>Weight</u>: <b>40%</b></p>	<p><u>Threshold</u>: <b>3/5</b> <u>Weight</u>: <b>20%</b></p>

## Proposal composition (FET Innovation Launchpad)

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## Feedback to applicants – Evaluation Summary Report (ESR)

- Collation of all individual comments, per sub-criterion, from the IERs – may be mutually contradicting (no consensus): full transparency
- Consensus score of the proposal, per criterion, is calculated as a median of all individual scores from Individual Evaluation Reports (IERs)
- Final score is decided by the final Panel Review and calculated as a weighted sum of scores from all 3 criteria
- Final Panel Review adds also some additional comments, possibly including the advice not to resubmit the proposal



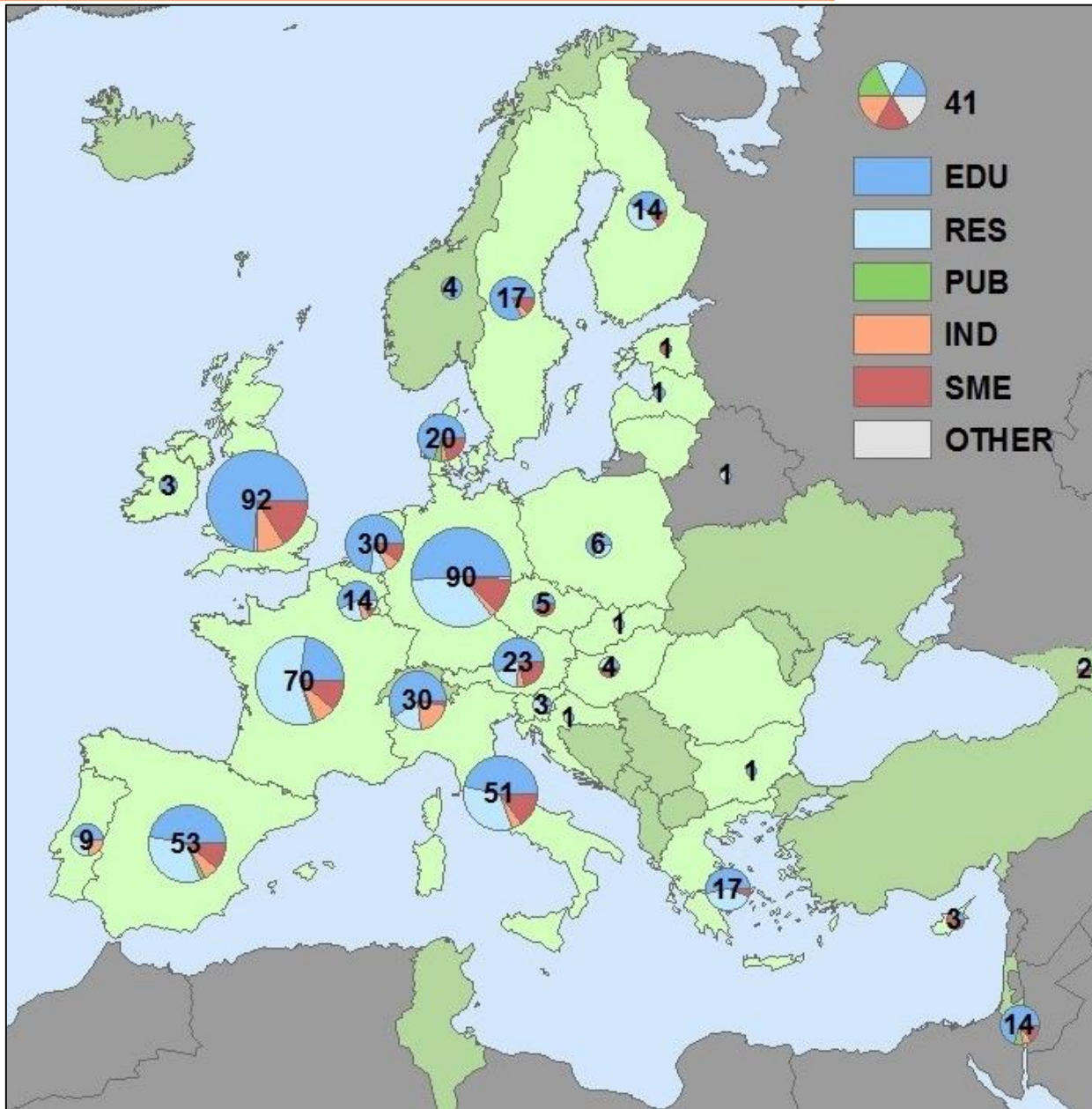
## Additional important information

- No more "cover page"!
- In/Out of scope (decided by each evaluator) - "does the proposal convincingly satisfy all FET gatekeepers?": assessment under Criterion 1 (RIA)
- Operational capacity – reflected in the score for Criterion 3
- Ethics screening/assessment – not part of the evaluation
- Research Data sharing (default, but possible opt-out) as stipulated under Art. 29.3 of the Horizon 2020 Model Grant Agreement (MGA) - deliverable "*Data Management Plan*" due at month 6

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# FET Open in 2014-2017

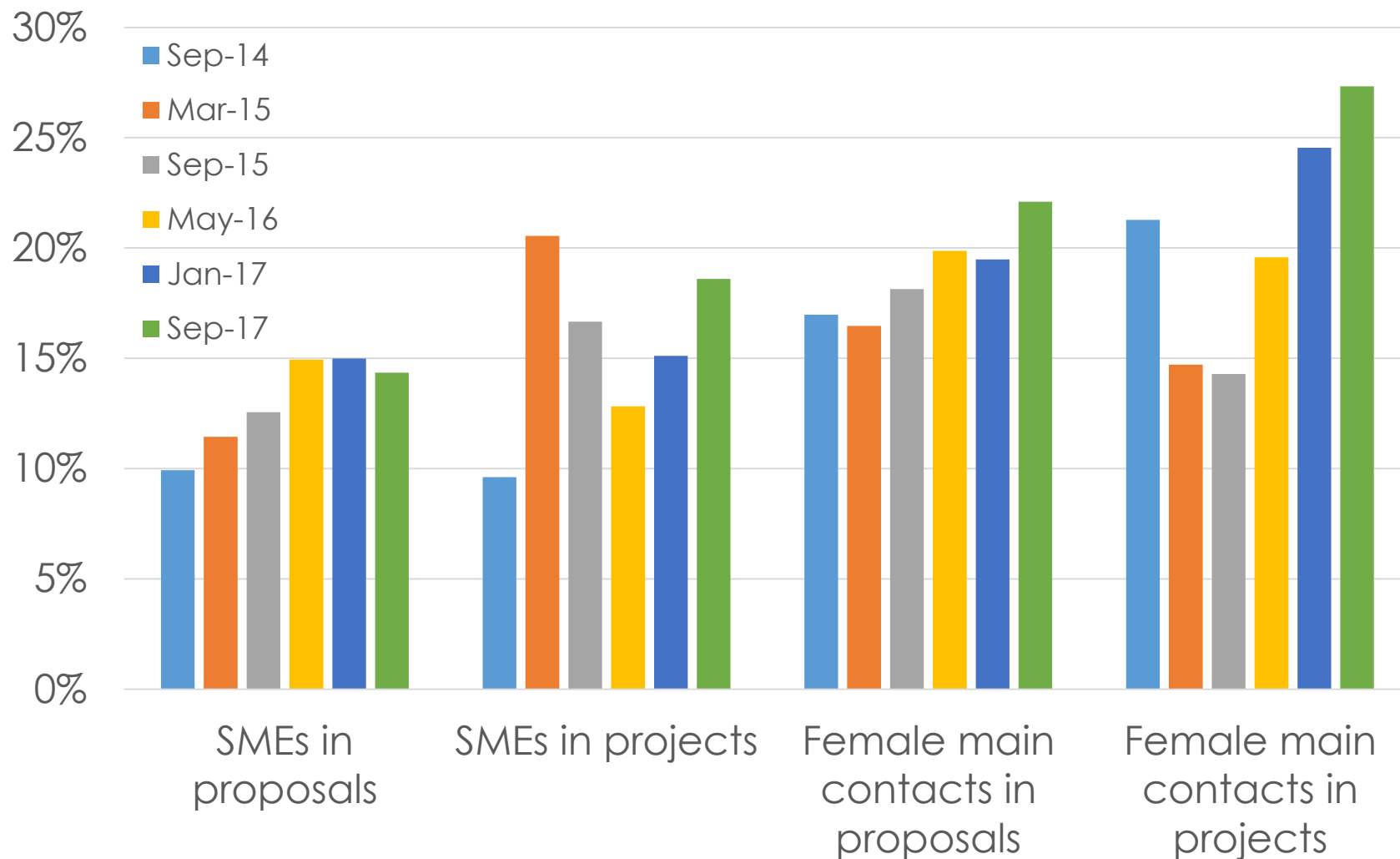
Calls	Total # of eligible proposals	Number of grants	Success rate	Total Budget (M€)
Sep-14	639	24	3,8%	78,1
Mar-15	665	11	1,7%	41
Sep-15	800	11	1,4%	37,8
May-16	544	23	4,2%	87,8
Jan-17	365	26	7,1%	84,8
Sep-17	395	27	6,8%	85,3
<b>Total</b>	<b>3408</b>	<b>122</b>		<b>414,8</b>



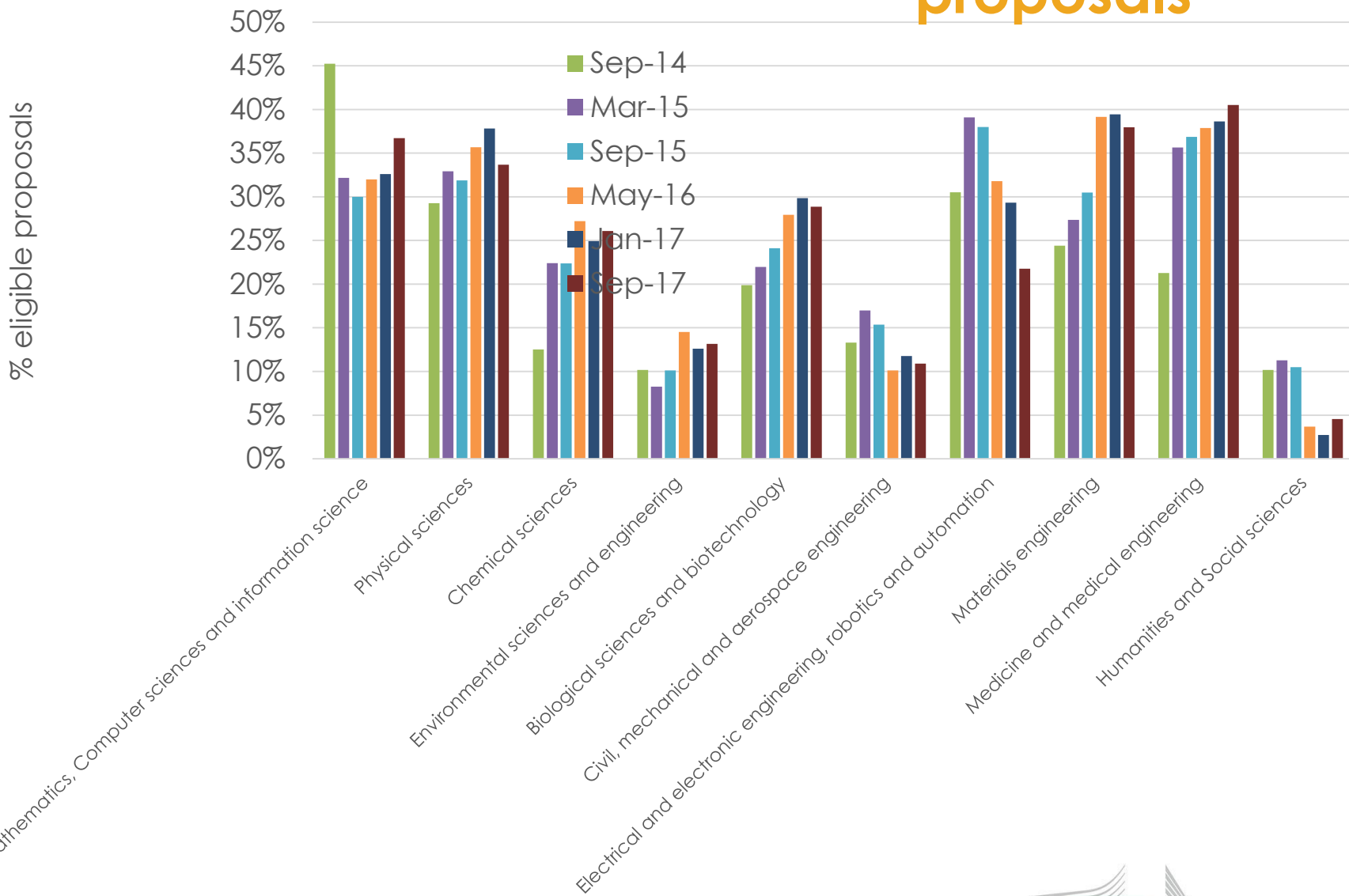
# Country participation

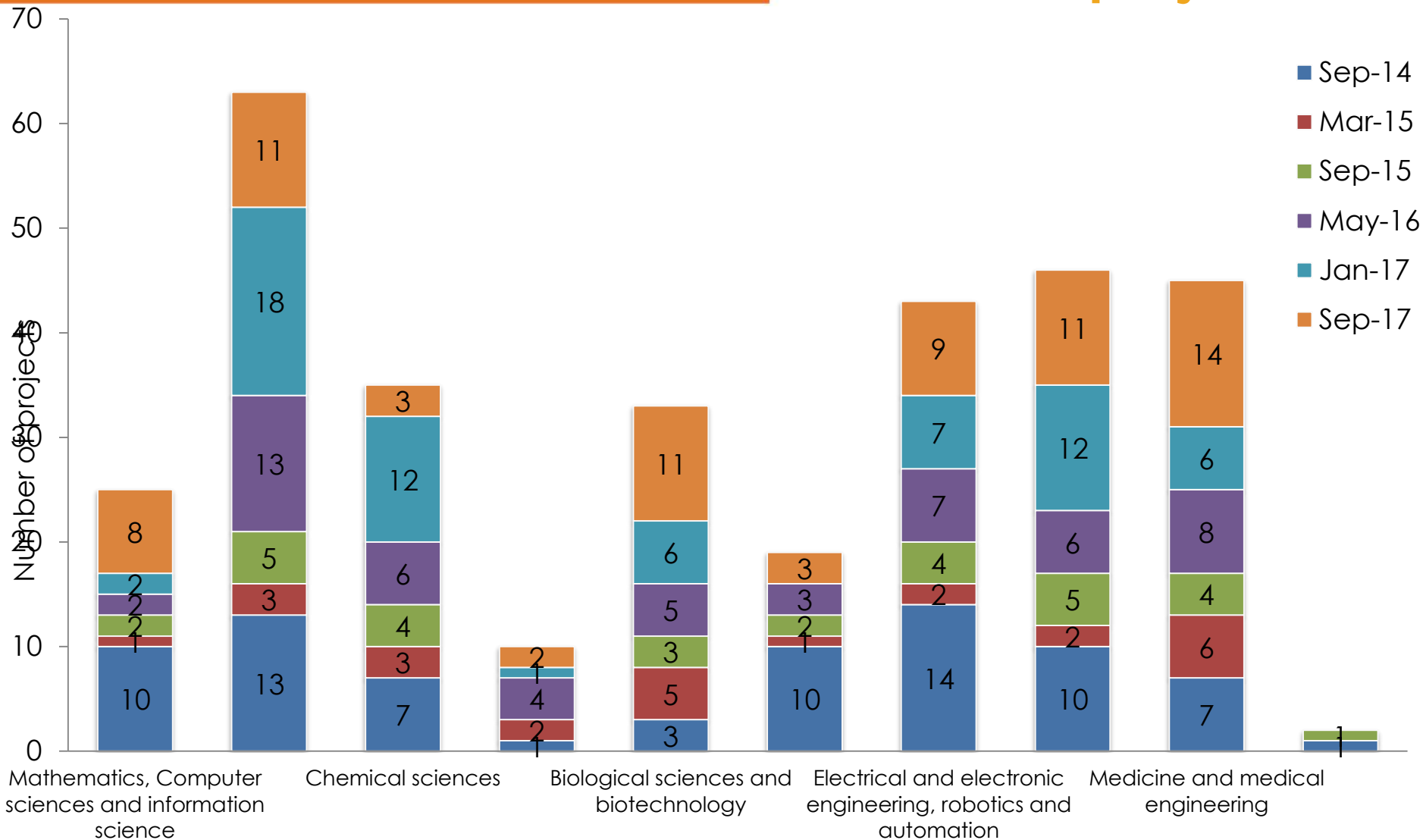
## FET Open 2014-2017 (RIA signed grants)

Participant Legal Name	Country	Number of projects' coordinator	Total number of projects
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	FR	6	32
CONSIGLIO NAZIONALE DELLE RICERCHE	IT	7	16
AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	ES	3	11
MAX-PLANCK-GESELLSCHAFT ZUR FORDERUNG DER WISSENSCHAFTEN	DE	1	11
AARHUS UNIVERSITET	DK	2	10
COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR	2	10
EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH	CH	1	10
UNIVERSITY OF OXFORD	UK	1	8
UNIVERSITY OF GLASGOW	UK	1	8
FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	EL	4	7
FRAUNHOFER GESELLSCHAFT	DE	0	7
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE	CH	1	6
UNIVERSITE PARIS-SUD	FR	1	6
UNIVERSITY COLLEGE LONDON	UK	0	6
IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE	UK	0	6



# Trends in proposals





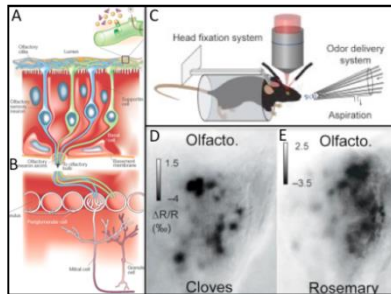


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# NanoSmell: Artificial remote-controlled odors

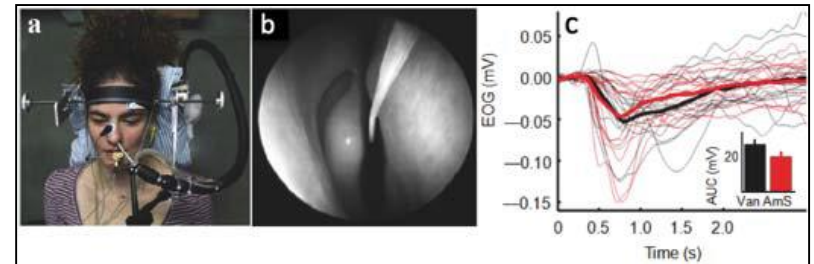
## Action objectives (S&T breakthrough)

- revolution in **understanding of the olfactory code** (link between odorant structure, neural activity and odour perception – so far it still remains a mystery)
- To study a new physical and physiological paradigm of **controlled odour emission** and its perception from insect, rodent and human perspectives
- To establish a proof-of-principle of a new technological possibility for **odour emitting component in devices** such as TV, phone, computer etc.



Left: Odour maps in mouse olfactory bulb;  
Right: Electrical recording of OSN activity at human olfactory epithelium

Credit: NanoSmell Consortium, Proposal 662629 submitted to H2020 FET-Open 2014-15/1 (2014)



## Impact

- **Revolution of human experience with daily life technologies**
- **Revolution in medical technologies** – new solution to skin wound healing, novel therapies for Alzheimer, Parkinson, depression, drug addiction etc.
- **Revolution in pest-control industry/technology** – remote controlled activation of attractants

Research and Innovation

## Excellence (methods)

- Clearly multi-disciplinary approach in **solving olfactory code** (comprehensive analytic model)
- Use of **switchable DNA nanodevices** (DNA/RNA aptamers - SELEX process) exposed to external electromagnetic fields (ON/OFF for odours)

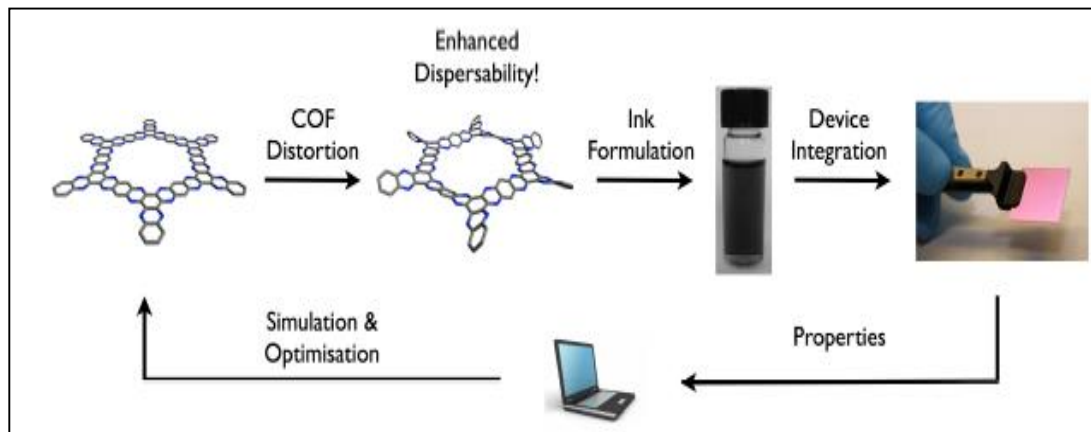
## The project goal

Explores radically new manufacturing and processing technologies for novel 2D semiconducting materials

## How?

**Proof-of-Principle** of covalent organic frameworks (COF)-based inks that exceed the current limits of graphene-based inks.

- Establishing **Precursor synthesis** and assembly protocols
- Developing localised **distortions** of the planar aromatic framework
- **Formulating inks from dispersions** of stable monolayers to enable low-cost processing.
- COF inks will be **evaluated against state-of-the-art semiconducting inks**



## Impact on

**Science** - framework to encourage creativity in the synthesis of COF

**Technology** - realisation of ultra-thin, transparent and flexible electronic devices

**Society** - new 2D

# The project goal

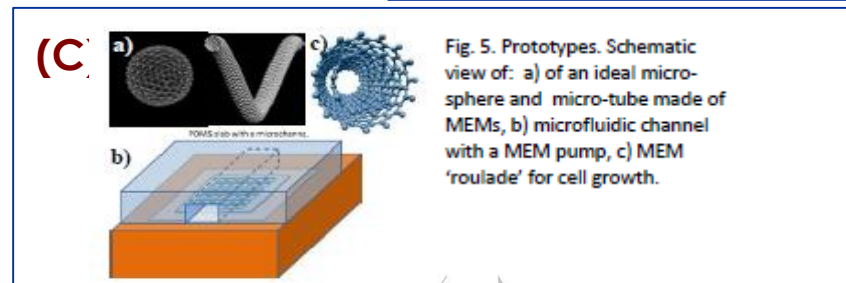
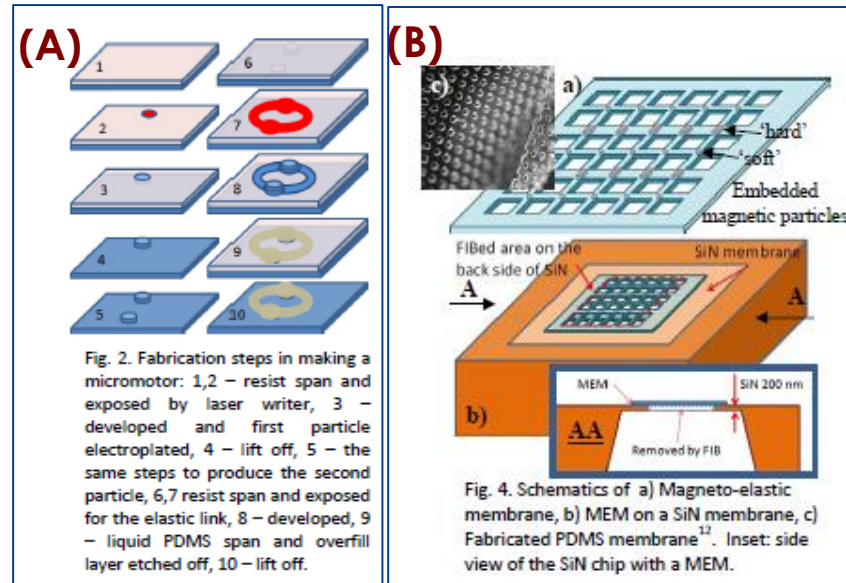
To create a new class of **magnetically actuated soft metamaterials**, as a basis for novel micro and macro-mechanical devices.

## How?

- Implementing and demonstrating a **microscopic version of magnetic micromotors (A)**
- Developing and exploring **magneto elastic membranes** based on the microscopic motors (B)
- Building **prototypes**: 3D microfluidic constructs, microfluidic pump, cell growth templates, tuneable optic/photonic materials and artificial muscle analogues.

## Impact on

- **Tissue engineering** – regenerative medicine
- **Microfluidics** - disposable chips for diagnostics and chemical analysis, micropumps, innovation microstirrers and microvalves.



## The project goal

Development of a scientific clock that reaches a **much higher precision** compared to the best clocks that are operated today

## How?

- Identification and characterization of the  $^{229}\text{Th}$  isomer transition.
- Development of trapping and cooling techniques for  $^{229}\text{Th}$  ions together with solid-state approaches to furnish thorium ensembles for direct laser spectroscopy.

## Impact on

- **Scientific impact** –the  $^{229}\text{Th}$  isomer state will be accessible to direct laser manipulation.
- **Technological impact** – Th-based clocks → simpler, smaller, cheaper, more robust, smaller uncertainty compared to others.
- **Societal impact** – Improved next-generation global positioning. Applications and impact on: communication and navigation. Satellite and space missions, sensors in geodesy and precise timing.

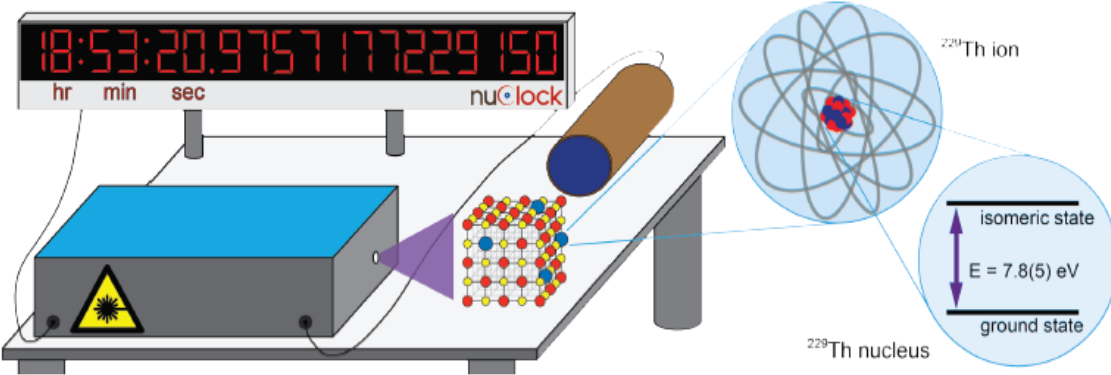


Figure 1: Nuclear clock operation principle. A laser (developed in WP4) operating at  $\sim 160 \text{ nm}$  illuminates  $^{229}\text{Th}$  nuclei embedded in a crystal (task 2.3). Once the laser is on resonance with the isomer transition, a change in fluorescence is detected. To reach the highest precision, the crystal will be replaced by an ion trap (task 2.1). The frequency of the laser then provides the periodic signal for a highly stable clock.

# Impact on

# PHENOMEN

## The project goal

- Development of *novel phononic-based components* driven by light, primarily focusing on
  - (i) phonon sources/lasers
  - (ii) phonon detectors
  - (iii) phonon waveguides and
  - (iv) RF-light transducers

## How ?

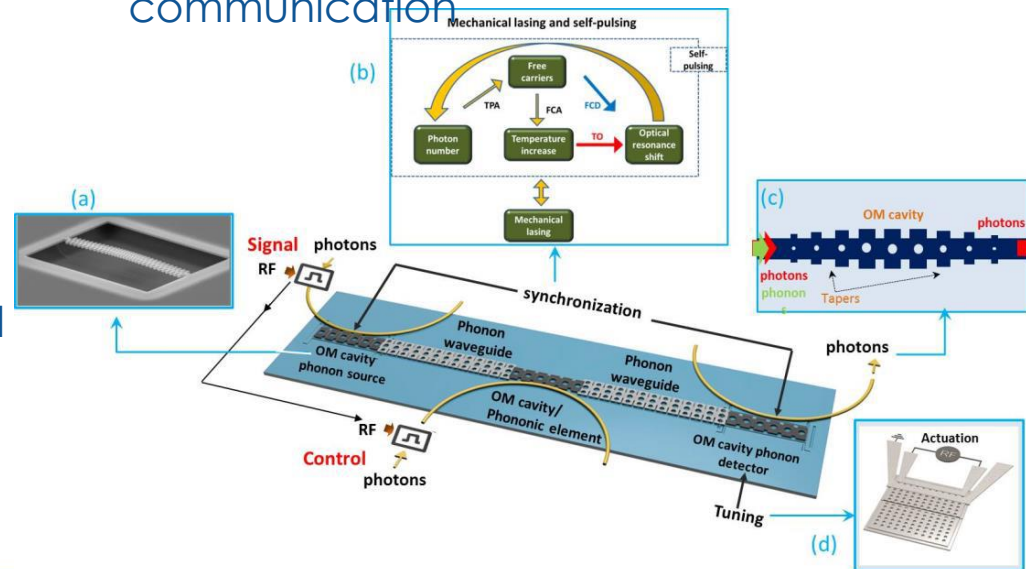
- Theory and multi-scale modeling
- Nanofabrication of optomechanical and phononic components
- Full system integration

### 1. ICT:

Telecommunication process can be done in a passive way (faster and more efficient) without additional power consumption and without electrical connection

### 2. Space:

Developed new chips can be used for high efficiency and high speed information processing for satellite communication



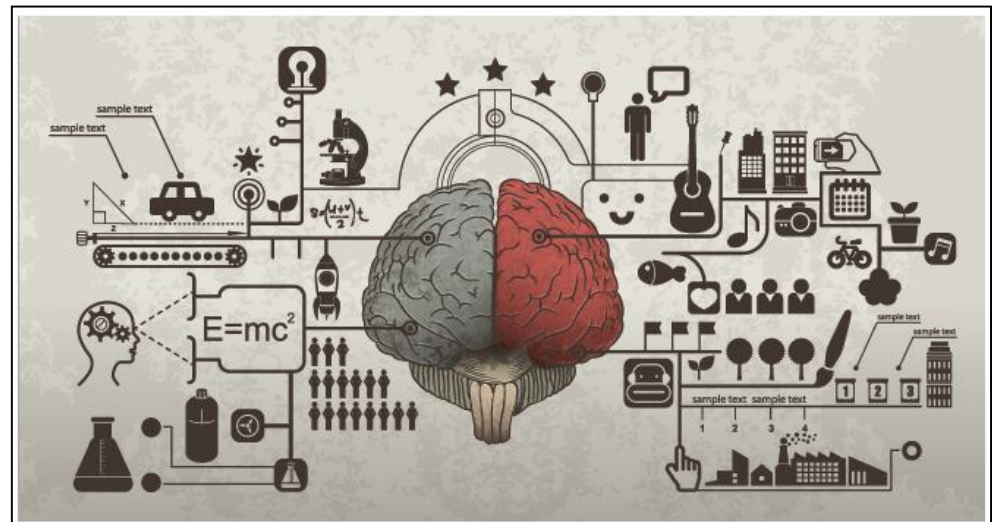
# IBSEN: Bridging the gap from individual behaviour to the socio-technical man

## Action objectives (S&T breakthrough)

To lay the foundations of simulators of human individuals and groups behaviour to allow for interaction with real human beings on the large scale or as a decision tool for policymakers

## Excellence (methods)

- Building a proof-of-concept of a social simulator by designing agent based models of the social issues
- Experimental Platform and Data Storage by using a web platform called LASER
- Deducing behavioural rules



Source: <https://ibsen-h2020.eu/project-objectives/>

## Impact

- Tool for societal studies and policy making
- Predicting the spread of innovations through populations (ICT-type, new socio-political ideas and health innovations)



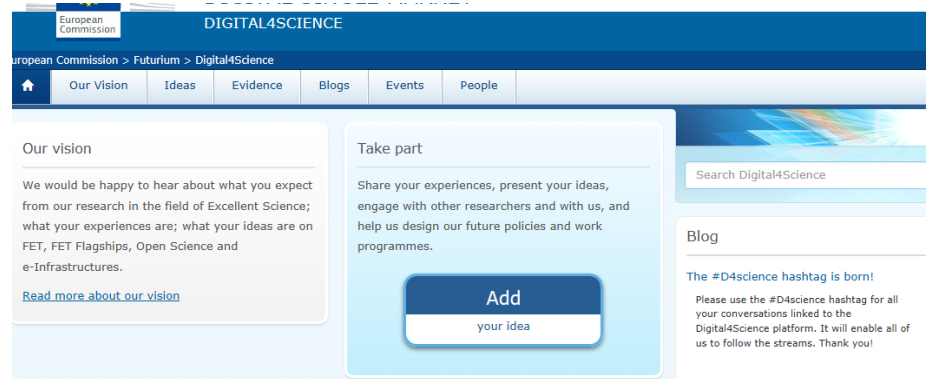


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**Research and Innovation**

# Thank you for your attention

## Useful links:

**FET2RIN CSA** (Helping FET projects to reach the market):

<http://www.fet2rin.com>

**EIC website:** <http://ec.europa.eu/eic>

**FET-Open website:**

<http://ec.europa.eu/programmes/horizon2020/en/h2020-section/fet-open>

**FET Innovation Launchpad call:**

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/fetopen-01-2018-2019-2020.html>

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