



ERC

Approaches to Interdisciplinarity

European Research Council

Established by the European Commission

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ERC Executive Agency

First meeting of the ERC Scientific Council

A preliminary discussion took place on the strategy and implementation mechanisms for the ERC, focusing on the importance of adopting an **investigator-driven approach**, encouraging **excellent and innovative frontier research**, and giving a real opportunity to **young researchers** and new teams, by means of **competition at a European scale**. It was agreed that the ERC should establish itself as a dynamic new entity, with real added value, and **properly distinguished from existing funding schemes within the EU**.

October 2005

https://erc.europa.eu/sites/default/files/press_release/files/erc_statement_2005_scc_inaugural_meeting_19_october_en_0.pdf

Principles of ERC Funding

- **scientific excellence** is the sole criterion.
- applications can be made in **any field of research**.
- independent researchers of **any age and career stage** and **from anywhere in the world** can apply for **attractive, long-term** funding.
- host institutions must provide **independence for the Principal Investigator** to direct the research and manage its funding

ERC Approaches to Interdisciplinarity

- peer review panel structure
- definition of scientific excellence
- separate "ID domain" (2008 – 2011)
- mainstreaming approach (2012 -)
- Co-Investigator option in the Advanced Grant calls (2008 – 2011)
- Synergy Grant (2012 – 2013, 2018 -)
- separate call?

ERC Peer Review Panel Structure

- Coherence across all broad research domains and fields
- A forward-looking approach
- Encouragement to **interdisciplinarity**
- Funding allocations independent of the panel structure
- Flexibility and inclusiveness

July 2006

https://erc.europa.eu/sites/default/files/press_release/files/erc_scc_pr_2006_panel_structure_0.pdf

ERC peer review panel structure – Fundamental Principles

The ERC's peer review process will be carried out by panels of independent high level scientists and scholars, supported by written reports of referees. The Scientific Council has come to an agreement on the structure of panels for the evaluation ERC call for proposals. This structure responds to a series of *overriding principles* that were taken into account in the decision making process.

Coherence is essential in the design of all structures and operations of the ERC. The mandate of the ERC covers research in all fields of sciences and humanities, with funding decisions based only on excellence. This reflects an overarching vision of research as a unitary activity of the creative mind transcending the particularities of broad domains and individual disciplines. It also reflects the critical role of interdisciplinarity and the constantly evolving nature of disciplines.

The ERC has been set up with high hopes and great ambitions, and has set amongst its goals the instigation of *transformative changes* in the European research landscape. The Scientific Council aims to set new examples and standards by sending forceful signals for such transformative changes that track and support changes in the sciences themselves.

The panel structure chosen reflects a *forward-looking approach* to science and research. The focus is on bottom-up top quality, leading edge, innovative research, as reflected in the term that describes the ERC's remit: frontier research. The innovative structure of the panels signals openness to changes in paradigm and revolutionary rather than ordinary science.

The ongoing evolution of scientific disciplines also demands that the panel structure includes an appreciation for *interdisciplinarity*. Early on, the Scientific Council decided to keep the number of panels low, to promote such interdisciplinarity and a wide breadth of viewpoints within each panel.

The emphasis on excellence, independent of any other priority, leads naturally to a *funding allocation independent of panel structure*. This will be further guaranteed by retaining sufficient unallocated funds to support on a competitive basis highly meritorious proposals that bridge panels.

The panels themselves are to be interpreted in a *flexible and inclusive* manner with adequate space and arrangements for cross panel and interdisciplinary proposals. Furthermore the panel themselves will be adapted as necessary to the realities faced by the ERC during the evaluation process itself, including the number and distribution of proposals received. The Scientific Council is confident that the fundamental principles used in designing the panel structure are sound and robust and will enable an optimal evaluation process.

ERC Peer Review Panel Structure

https://erc.europa.eu/sites/default/files/document/file/erc_principles_peer_review_panel_structure.pdf

25 Panels for All Areas of Science

Life Sciences

- LS1 Molecular Biology, Biochemistry, Structural Biology and Molecular Biophysics
- LS2 Genetics, 'Omics', Bioinformatics and Systems Biology
- LS3 Cellular and Developmental Biology
- LS4 Physiology, Pathophysiology and Endocrinology
- LS5 Neurosciences and Neural Disorders
- LS6 Immunity and Infection
- LS7 Applied Medical Technologies, Diagnostics, Therapies and Public Health
- LS8 Ecology, Evolution and Environmental Biology
- LS9 Applied Life Sciences, Biotechnology and Molecular and Biosystems Engineering

Physical Sciences & Engineering

- PE1 Mathematics
- PE2 Fundamental Constituents of Matter
- PE3 Condensed Matter Physics
- PE4 Physical and Analytical Chemical Sciences
- PE5 Synthetic Chemistry and Materials
- PE6 Computer Science and Informatics
- PE7 Systems and Communication Engineering
- PE8 Products and Process Engineering
- PE9 Universe Sciences
- PE10 Earth System Science

Social Sciences and Humanities

- SH1 Individuals, Markets and Organisations
- SH2 Institutions, Values, Environment and Space
- SH3 The Social World, Diversity, Population
- SH4 The Human Mind and Its Complexity
- SH5 Cultures and Cultural Production
- SH6 The Study of the Human Past

Excellence is the Sole Evaluation Criterion

Excellence of the Research Project

- ✓ Ground breaking nature
- ✓ Potential impact
- ✓ Scientific Approach

Excellence of the Principal Investigator

- ✓ Intellectual capacity
- ✓ Creativity
- ✓ Commitment

Definition of Excellence 2007

Ground-breaking nature of the research: Does the proposed research address important challenges in the field(s) addressed? Does it have suitably ambitious objectives, which go substantially beyond the current state of the art (e.g. **including trans-disciplinary developments** and novel or unconventional approaches)?

Potential impact: Does the research open new and important, scientific, technological or scholarly horizons?

January 2007 (WP 2007)

Definition of Excellence 2019

Ground-breaking nature and potential impact of the research project

- To what extent does the proposed research address important challenges?
- To what extent are the objectives ambitious and beyond the state of the art (e.g. novel concepts and approaches **or development between or across disciplines**)?
- To what extent is the proposed research high risk/high gain (i.e. if successful the payoffs will be very significant, but there is a higher-than-normal risk that the research project does not entirely fulfil its aims)?

September 2018 (WP 2019)

Cross-panel or ID Domain 2008 - 2011

The ERC Scientific Council has established the following indicative percentage budgets for each of the 3 main research domains:

Call	LS	PE	SH	"ID domain"
2007	40%	45%	15%	(20%)
2008	34%	39%	14%	13%
2009	34%	39%	14%	13%
2010	34%	39%	14%	13%
2011	35%	40%	15%	10%
2012	39%	44%	17%	mainstreamed

- ***Physical Sciences & Engineering: 39%***
- ***Life Sciences: 34%***
- ***Social Sciences & Humanities: 14%***

and an ***Interdisciplinary*** domain (including cross-panel and/or cross-domain research projects and research with the potential to open new fields) with an indicative budget of **13%**.

November 2007 (WP 2008)

Mainstreaming 2012 -

Research proposals of a multi and interdisciplinary nature are strongly encouraged throughout the ERC's schemes. Proposals of this type are evaluated by the ERC's regular panels with the appropriate external expertise. Given this, it is no longer considered necessary to establish an indicative percentage budget to fund proposals of a cross-panel and/or cross-domain nature. Funding for such proposals will come from the regular panels which perform the evaluation.

In cases where panels determine that a proposal is of a cross-panel or cross-domain nature, panels may request additional reviews by appropriate members of other panel(s) or additional referees.

March 2011 (WP 2012)

Mainstreaming 2012 -

The share of proposals marked cross-panel has declined from 37% in StG 2011 to 14% in StG 2017 and from 32% in AdG 2011 to 16% in AdG 2017.

At step 1 the success rate of cross-panel proposals has consistently been slightly lower across the main ERC calls (average of 23% for cross panel proposals versus 28% for single panel proposals).

At step 2 the success rates have been 44% and 46% respectively.

Mono-Panel/Cross-Panel Success Rate

	LS01	LS02	LS03	LS04	LS05	LS06	LS07	LS08	LS09	PE01	PE02	PE03	PE04	PE05	PE06	PE07	PE08	PE09	PE10	SH01	SH02	SH03	SH04	SH05	SH06
1.02_StG2009	0,69	1,57	2,71	1,20	1,25	2,21	0,70	0,72	1,71	3,95	1,27	0,81	2,04	1,39	1,11	0,55	0,35	1,81	4,27	1,47	1,37	0,67	1,30	0,00	1,95
1.03_StG2010	1,26	0,73	2,47	1,97	0,70	1,01	0,74	0,42	0,24	1,19	1,38	1,54	1,07	2,26	3,99	0,75	0,61	1,81	0,66	5,16	0,65	3,60	0,74	0,13	1,36
1.04_StG2011	7,68	0,44	0,98	2,05	0,90	2,46	1,21	2,24	0,73	7,40	0,95	1,35	1,51	1,62	1,02	0,93	0,39	0,46	1,15	2,27	0,92	0,84	1,78	1,30	1,96
1.05_StG2012	1,32	0,88	2,13	1,26	0,88	1,67	0,84	0,73	1,27	4,61	0,94	1,93	1,08	1,66	11,14	0,73	1,34	2,98	0,63	####	2,73	0,88	0,78	6,25	5,55
1.06_StG2013	3,51	3,38	7,50	3,54	####	####	1,80	1,59	0,68	####	4,19	1,15	2,86	0,78	1,85	0,73	0,75	1,54	1,05	3,01	2,18	0,40	0,60	0,36	1,62
1.07_StG2014	3,22	1,38	1,65	1,12	7,15	2,25	1,68	2,88	0,79	####	0,55	####	0,84	1,71	2,56	1,81	0,95	1,21	1,52	####	1,89	3,26	1,66	1,81	2,71
1.08_StG2015	0,91	4,67	0,64	0,88	2,16	####	1,25	0,40	0,57	####	1,02	####	1,00	1,71	1,27	1,19	3,16	####	####	####	0,94	3,91	1,17	0,62	####
1.09_StG2016	0,52	0,72	1,46	2,14	0,74	1,13	1,22	1,43	1,05	1,23	2,81	2,41	0,65	3,56	3,26	0,60	3,63	####	0,87	####	0,37	0,80	0,85	1,58	####
1.10_StG2017	0,64	0,96	1,26	0,76	2,50	1,67	1,14	1,52	1,02	####	1,39	2,39	1,06	0,77	0,82	0,56	1,22	0,79	0,47	####	####	3,71	0,66	0,67	0,45
2.01_CoG2013	2,21	1,00	2,27	1,65	3,67	2,41	3,18	0,88	0,89	####	2,27	1,20	1,28	1,53	1,89	4,03	0,98	####	1,67	2,90	1,88	2,32	1,79	0,33	1,63
2.02_CoG2014	1,35	0,76	2,95	0,85	1,74	1,00	1,22	0,81	0,79	2,33	0,64	0,87	0,80	1,72	0,83	3,83	0,38	1,22	####	0,69	1,01	0,98	1,10	4,67	2,09
2.03_CoG2015	1,01	1,58	1,26	0,64	1,19	2,00	2,78	1,12	0,51	1,46	1,08	2,57	1,93	0,73	1,91	0,94	1,00	1,08	0,57	####	####	1,00	3,89	1,45	1,93
2.04_CoG2016	####	1,67	0,92	1,37	1,13	1,53	1,22	####	####	1,22	1,57	0,80	0,77	####	1,04	2,20	1,07	0,85	####	####	0,57	2,79	0,77	0,72	2,03
2.05_CoG2017	0,61	####	1,41	1,18	1,06	1,46	####	1,55	0,48	1,16	####	1,31	####	1,13	1,07	####	0,85	####	0,78	####	1,06	0,97	1,40	0,67	1,86
3.01_AdG2008	0,98	0,00	0,22	0,83	1,46	1,11	0,35	0,97	1,46	0,78	3,94	1,36	0,79	1,04	0,79	1,89	0,68	1,58	0,56	1,79	0,57	1,50	0,33	0,32	0,79
3.02_AdG2009	1,00	2,45	1,43	3,00	0,97	2,68	1,05	2,31	1,50	0,64	3,07	1,42	0,54	0,88	0,65	6,00	1,93	####	2,95	0,66	4,52	####	3,68	0,91	1,30
3.03_AdG2010	1,01	1,10	0,51	1,63	7,89	1,37	0,47	1,55	3,00	1,99	1,31	1,58	1,02	4,60	1,37	0,95	1,36	1,19	0,87	0,48	4,67	2,24	0,65	2,00	0,80
3.04_AdG2011	0,62	1,14	0,43	1,17	1,65	1,25	0,51	0,64	1,03	1,35	1,53	0,62	0,69	1,08	####	1,25	1,58	1,69	0,72	####	3,38	2,47	1,87	1,22	0,95
3.05_AdG2012	0,45	0,83	1,93	1,00	3,26	1,27	1,22	0,97	1,67	####	0,95	3,73	1,06	1,64	2,89	0,69	0,37	0,86	1,40	####	0,64	####	0,84	0,97	0,62
3.06_AdG2013	0,56	2,12	6,53	0,73	2,74	1,36	1,92	0,78	0,45	####	1,81	2,24	5,33	1,67	0,70	1,09	0,87	1,25	0,96	####	1,38	2,12	1,78	1,10	1,32
3.07_AdG2014	0,63	0,81	1,77	0,35	####	1,49	2,72	1,37	1,34	####	####	0,56	1,14	2,42	0,52	0,66	####	####	####	####	0,28	####	1,00	0,78	2,26
3.08_AdG2015	0,63	3,09	1,04	1,56	1,80	####	2,96	1,83	0,32	####	2,85	2,27	0,96	1,19	1,88	1,57	0,81	####	0,81	####	0,74	0,83	0,35	1,00	2,58
3.09_AdG2016	0,48	0,71	####	####	1,82	####	0,45	1,30	0,78	####	0,30	1,15	1,69	####	####	0,66	0,46	0,77	1,03	####	2,05	0,65	####	####	0,92
3.10_AdG2017	2,47	1,46	1,40	1,49	####	####	2,62	1,29	####	####	####	####	2,57	####	1,84	1,43	####	####	1,64	####	1,33	0,80	####	0,71	0,51

Co-Investigator Option 2008 - 2011

To **encourage interdisciplinarity**, as an exception, when an interdisciplinary proposal is grounded in the necessary combination of knowledge and skills from more than one discipline ("co-investigator project"), a Principal Investigator (PI) may identify members of his/her individual team, who are active in these disciplines, as co-Investigators. The contribution of Principal Investigators and co-investigators must be carried out in the EU or associated countries. In order to appropriately cover the disciplines, the evaluation panel (see below) may, if necessary, invite one or more members of a complementary panel to contribute to the evaluation of the proposal. The evaluation panel will carefully assess the scientific added value of any co-investigator to the project; in particular the participation of any additional legal entity will only be permitted if it is clearly necessary from the scientific perspective.

November 2007 (WP 2008)

Under the Co-I scheme around 10% of proposal to the AdG were Co-I proposals.

Synergy Grant 2012

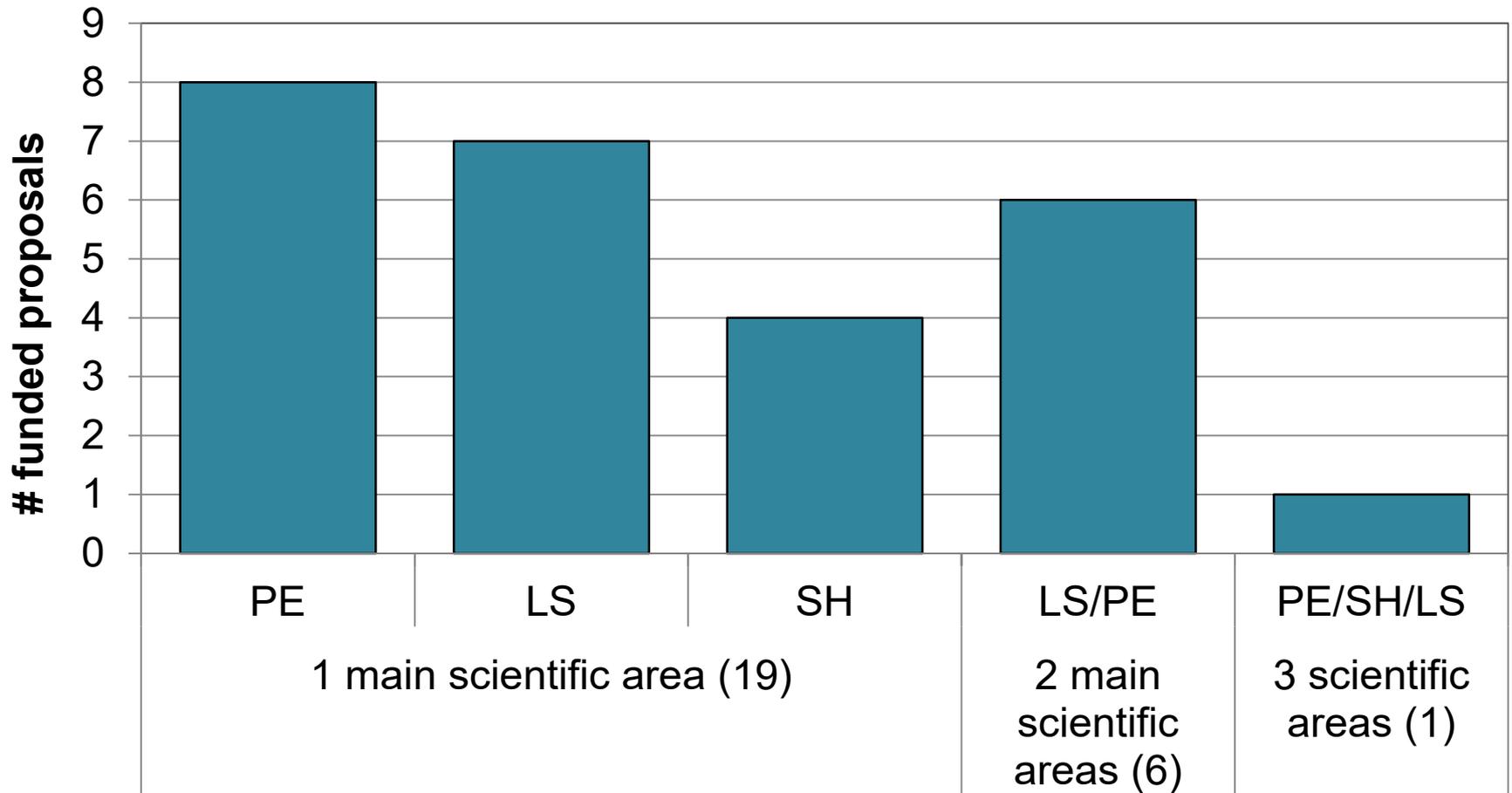
ERC Synergy Grants are intended to enable a small group of Principal Investigators and their teams to bring together complementary skills, knowledge, and resources in new ways, in order to jointly address research problems. The aim is to promote substantial advances in the frontiers of knowledge, and to encourage new productive lines of enquiry and new methods and techniques, including unconventional approaches and **investigations at the interface between established disciplines**. The peer review evaluation will therefore look for proposals that demonstrate the synergies, complementarities and added value that could lead to breakthroughs that would not be possible by the individual Principal Investigators working alone.

March 2011 (WP 2012)

https://erc.europa.eu/sites/default/files/document/file/erc_2012_work%20programme.pdf

SyG 2018 Results

SYG 2018 Results - scientific domain



Interdisciplinary Call?

Conclusions

Cross-Panel/ Cross-Domain Interactions

An analysis of the FP7 funded projects showed that on average, 42% of the projects funded by any of the panels have a connection to another panel within the same or a different domain. This figure varies across the three domains: the LS domain has the highest share of funded projects with a cross-panel component (54%) and the PE domain the lowest share (31%), with the SH domain in the middle (45%). Most of the cross-panel connections are between panels within the same domain.

Figure 4. Map of cross-panel connections. Colours are associated with the strength of the connection between two given panels



ERC Science Behind The Projects October 2014

<https://erc.europa.eu/sites/default/files/publication/files/ERC Science behind the projects FP7-2007-2013.pdf>

Science Governed vs Politically Governed

- The political community agrees to provide resources to the scientific community and to allow the scientific community to retain its decision-making mechanisms and in turn expects forthcoming but unspecified benefits.
- Research should help reach national, politically-determined goals.
- Research should be planned and organised to that end.
- Research should be more interdisciplinary, in order to solve real-world problems.
- The universities are rigid, organised by discipline and unable to change themselves. They should be 'reorganised' in order to contribute more to the solution of societal problems and to reach national goals.

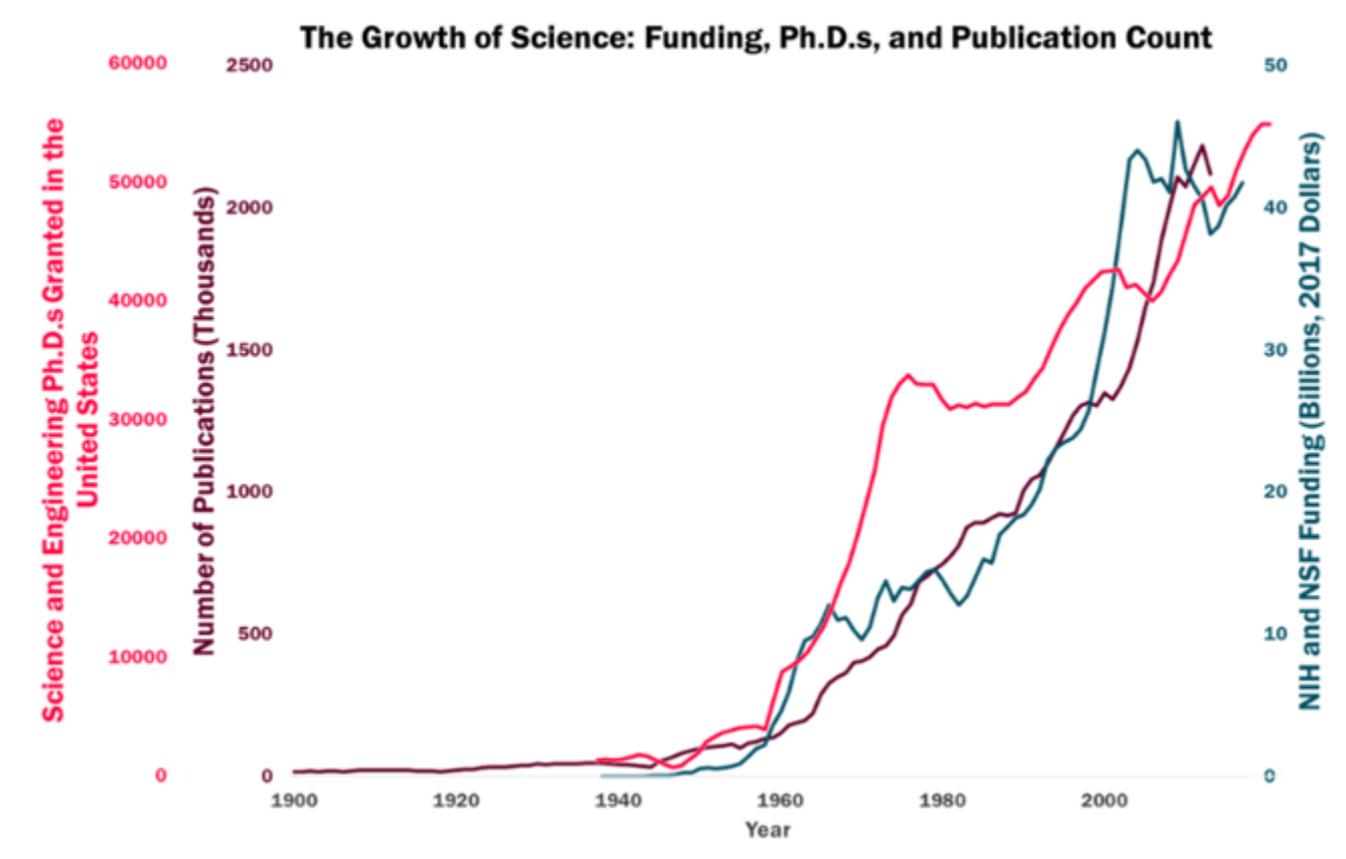
Getting the Balance Right: Basic Research, Missions and Governance for Horizon 2020 October 2012

http://www.earto.eu/fileadmin/content/03_Publications/FINAL_TECH_REPORT2012.pdf



Are we designing for how humans actually behave or how we want them to behave?

Diminishing Returns?



Science Is Getting Less Bang for Its Buck November 2018

<https://www.theatlantic.com/science/archive/2018/11/diminishing-returns-science/575665/>

Additional Slides

ERC Grant Schemes

Starting Grants

starters
(2-7 years after PhD) up
to € 1.5M
for 5 years

Consolidator Grants

consolidators
(7-12 years after PhD)
up to € 2M
for 5 years

Advanced Grants

track-record of
significant research
achievements in the
last 10 years
up to € 2.5M
for 5 years

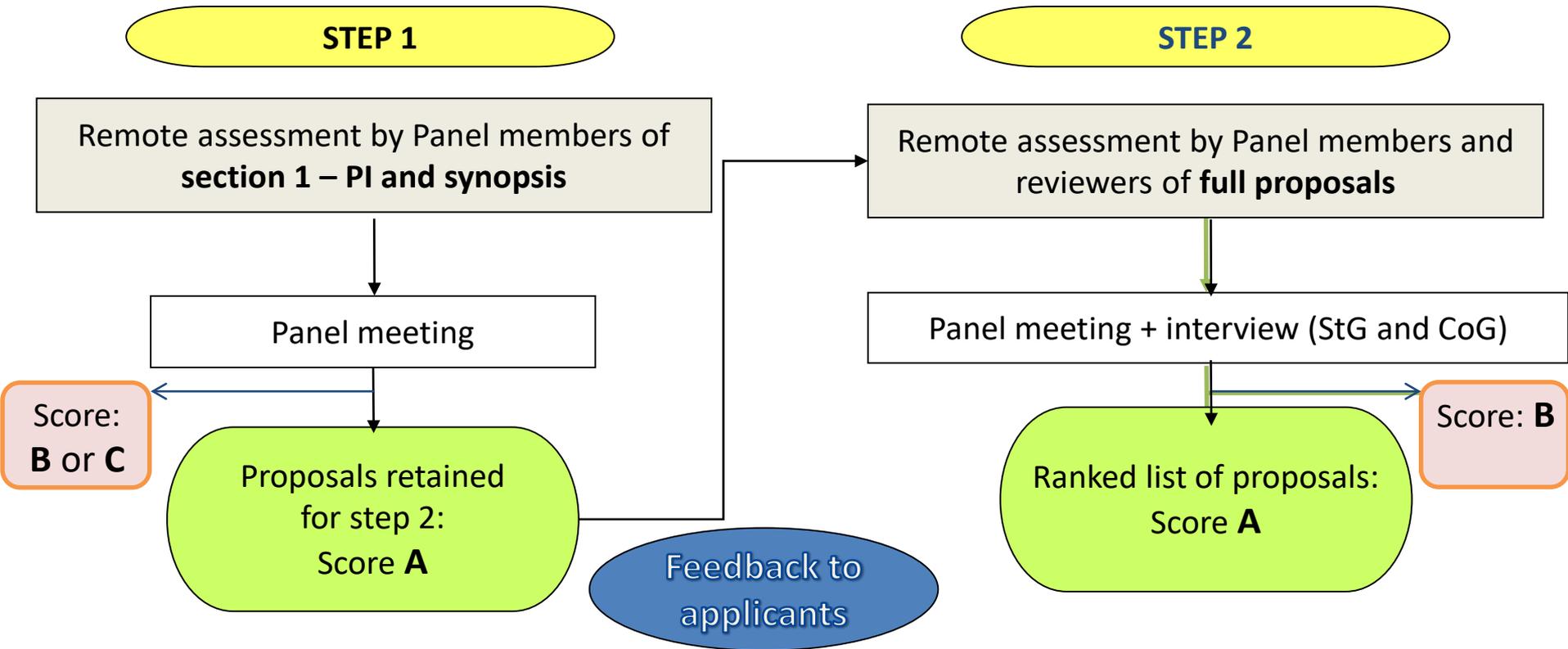
Proof-of-Concept

bridging gap between research - earliest stage
of marketable innovation
up to €150K for ERC grant holders

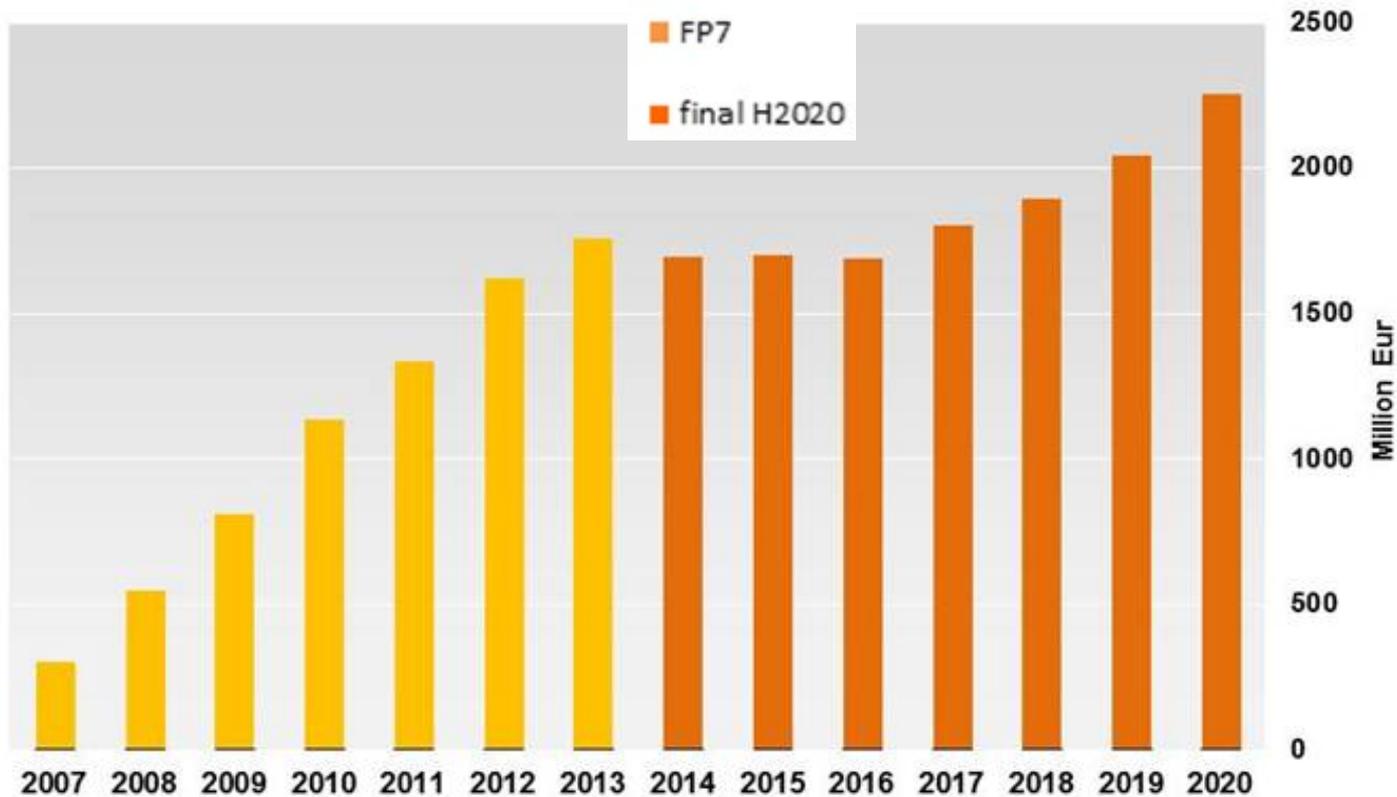
Synergy Grants (re-launched 2018)

2 – 4 Principal Investigators
up to € 10M for 6 years

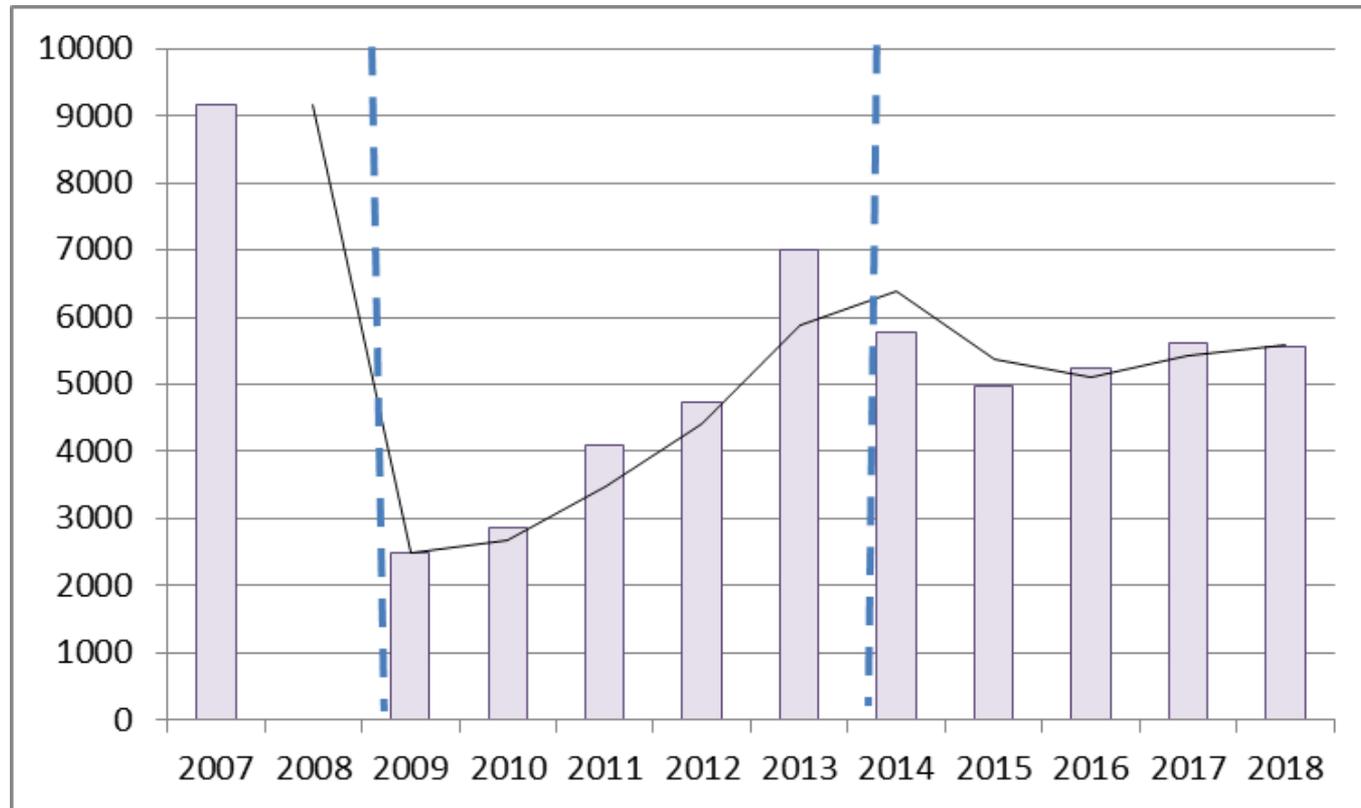
ERC Evaluation Process



ERC Budget



Application Trends



Applications stabilised due to strict restrictions on submissions announced in 2014.

More Information

- Website: erc.europa.eu
- National Contact Points:
erc.europa.eu/national-contact-points
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