

The European Research Council



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The ERC: a Success Story for the EU

Kurt Mehlhorn

Member of ERC Council

Max Planck Institute for Informatics



The ERC in a Nutshell



- Set up in 2007 by the EU.
- Supports frontier research throughout Europe in all scientific domains: Life Sciences (LS), Physical Sciences and Engineering (PE), and Social Sciences and Humanities (SH).
- Aims at retaining and attracting the best scientific talent to Europe,
- Substantial grants for up to 5 years.
- Budget: 1.8 Billion in 2017 DFG has 2.4 Billion
- **Has reached an amazing standing in only 10 years.**

The ERC in a Nutshell



- Four core funding schemes:
 - Starting, Consolidator, Advanced, Synergy
- Proof of Concept Grants, only open to grantees.
- For top researchers of any nationality and age who wish to carry out their frontier research in EU Member States or associated countries
- Simplicity: 1 Project, 1 Principal Investigator, 1 Host Institution, 1 Selection Criterion, namely scientific excellence

What does ERC offer?

ERC Grant Schemes



Starting Grants

starters
(2- 6 years after PhD)
up to € 1.5 Mio
for 5 years

Consolidator Grants

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

Advanced Grants

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

Synergy Grants

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

Proof-of-Concept

bridging gap between research - earliest
stage of marketable innovation
up to €150,000 for ERC grant holders

Extensions of eligibility window

Extensions of eligibility window possible for StG and CoG for documented cases of:

- Maternity – 18 months per child (before or after PhD)
- Paternity – actual time taken off
- Military service
- Medical speciality training
- Caring for seriously ill family members

- No limit to the total extension

Some Successes

- ERC grantees won prestigious awards:
 - 6 Nobel Prizes, 4 Fields Medals, 5 Wolf Prizes...
- In 2014 Europe surpassed the US in number of highly cited publications.
- The ERC has set a benchmark of competitive funding of basic research.
- New scientific councils and funding schemes launched in Member States.
- 17 countries have introduced initiatives to finance their best unfunded applicants.
- **Moedas: You are the best thing that happened to Europe in the past 10 yrs.**

The secrets of the success: The ERC is run by scientists for scientists.



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- ✓ The Scientific Council: 22 renowned scientists as decision makers
- ✓ The evaluators: high-level scientists from all over the world
- ✓ Strict bottom-up approach: no thematic priorities, all disciplines eligible
- ✓ Scientific and financial independence of the grantees
- ✓ The size of the grants: €1.5 million for Starting Grants, €2 million for Consolidator Grants, €2.5 million for Advanced Grants
- ✓ The simplicity of the schemes and of the procedures
- ✓ A very efficient management by the executive agency (ERCEA)

ERC Governance (High degree of autonomy)



The European Commission, Commissioner Carlos Moedas

- **Provides financing** through the EU framework programmes
- **Guarantees autonomy of the ERC**
- **Assures the integrity and accountability of the ERC**
- **Adopts annual work programmes** as established by the Scientific Council (cannot change, only veto)

The ERC Scientific Council

- **22 prominent researchers** proposed by an independent identification committee and appointed by the Commission (4 years, renewable once)
- **President: Jean-Pierre Bourguignon**
- **Establishes overall scientific strategy;** annual work programmes; peer review methodology; selection and accreditation of experts
- **Controls quality of operations and management**
- **Ensures communication with the scientific community**

The ERC Executive Agency

- **Executes annual work programme**
- **Implements calls for proposals**
- **Organises peer review evaluation**
- **Establishes and manages grant agreements**
- **Carries out communications activities**

ERC Evaluation process (StG, CoG & AdG)

Panel structure : 25 panels in 3 domains



Each panel :
Panel Chair and
10-16 Panel Members

Life Sciences (LS) 9 panels
Social Sciences and Humanities (SH) 6 panels
Physical Sciences and Engineering (PE) 10 panels

Allocation of budget to panels is by number of applications.

About 5% of the budget goes to PE6.

Physical Sciences & Engineering (PE) 10

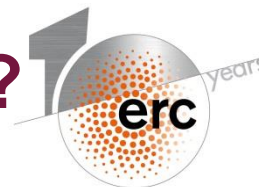
- PE1 Mathematics
- PE2 Fundamental Constituents of Matter
- PE3 Condensed Matter Physics
- PE4 Physical & Analytical Chemical sciences
- PE5 Synthetic Chemistry & Materials
- PE6 Computer Science & Informatics**
- PE7 Systems & Communication Engineering
- PE8 Products & Process Engineering
- PE9 Universe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

Excellence is the sole evaluation criterion

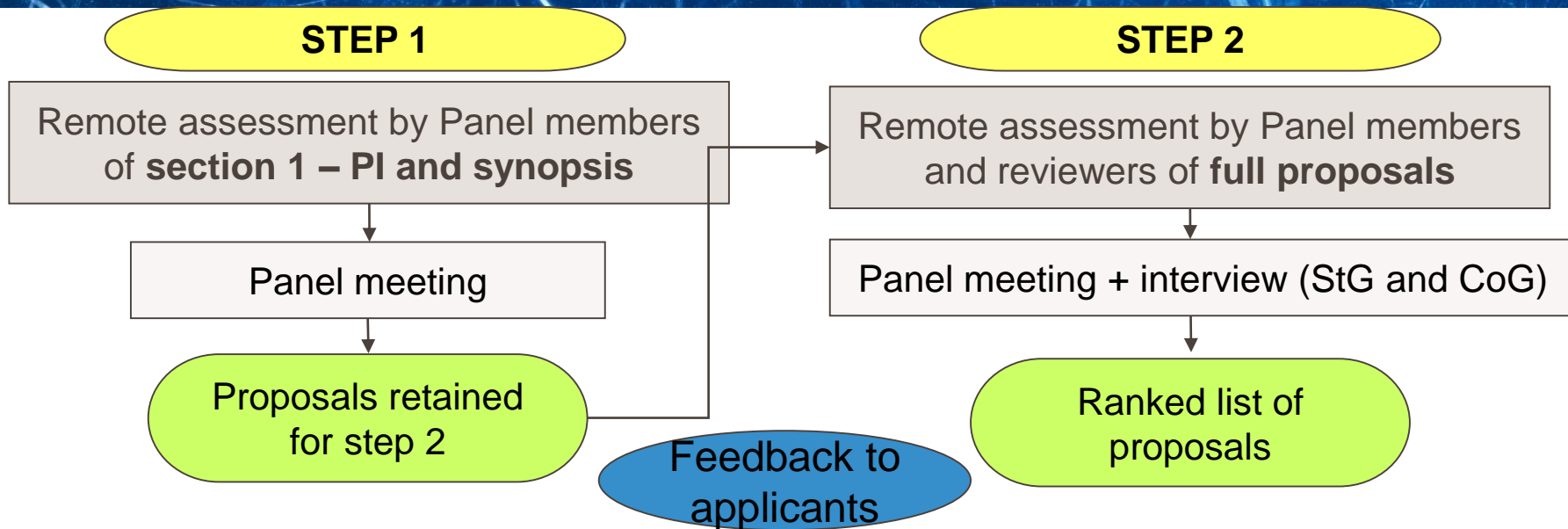
- **Excellence of the Research Project**
 - ✓ **Ground breaking nature**
 - ✓ **Potential impact**
 - ✓ **Scientific Approach**
- **Excellence of the Principal Investigator**
 - ✓ **Intellectual capacity**
 - ✓ **Creativity**
 - ✓ **Commitment**

How ERC research proposals are evaluated?

Evaluation of proposals: review procedure



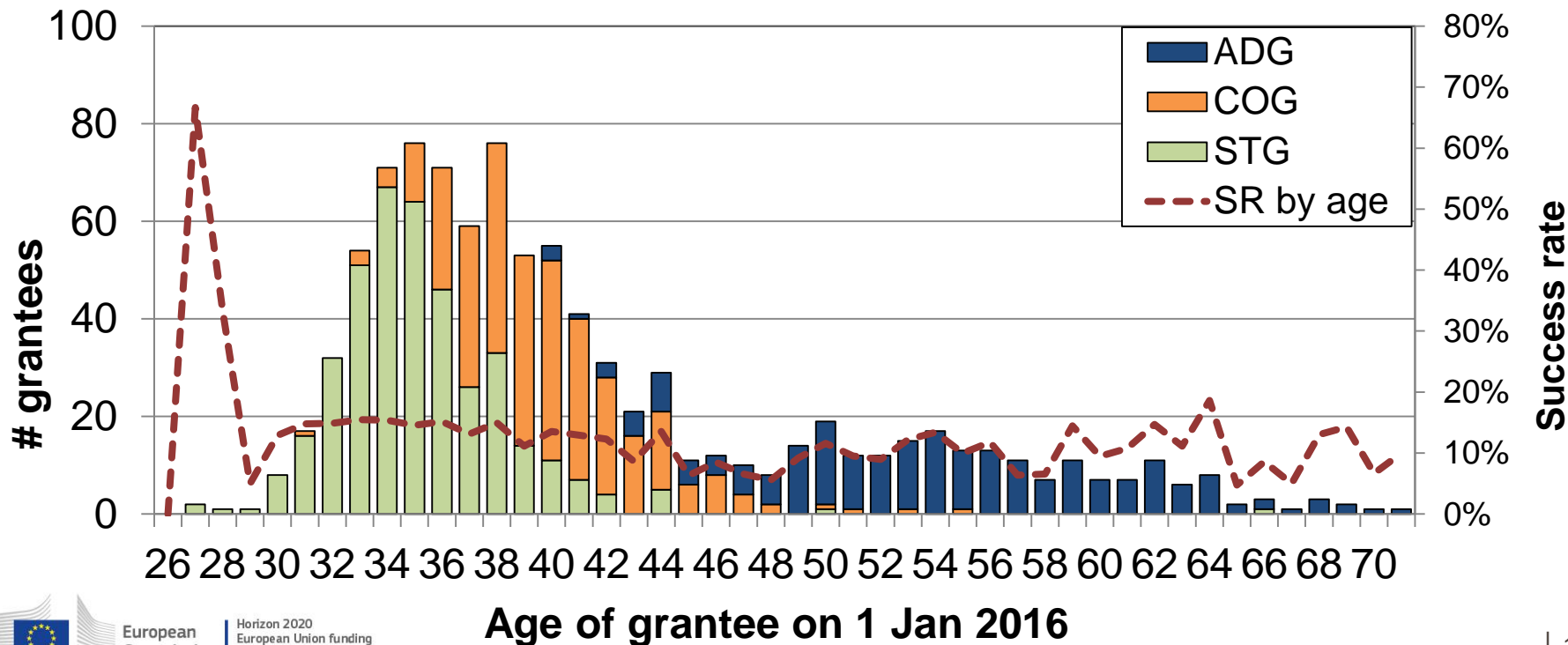
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- Right balance between generalist + specialized review
- Appropriate treatment of interdisciplinary proposals

2016 STG-COG-ADG Calls

Age of grantees



Threats

- Success rate is between 11% and 15%. Goal: 15.
- Grants have not grown in 10 years.
- Transition from Start-Up to Steady Phase.
- Pressure to add impact as a criterion.
- The valley of death: Success rate is lowest in 44 – 48 age bracket.
- Have asked to double the budget in next FP.
 - Can processes (reviews, agency) handle this? How to adjust without losing the spirit of the ERC?
 - Adjust grant structure?
- ERC is not a legal entity. Politics needs to renew it in every framework program.

Comments, Suggestions and Complaints



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- Contact me or Jean-Pierre Bourguignon.

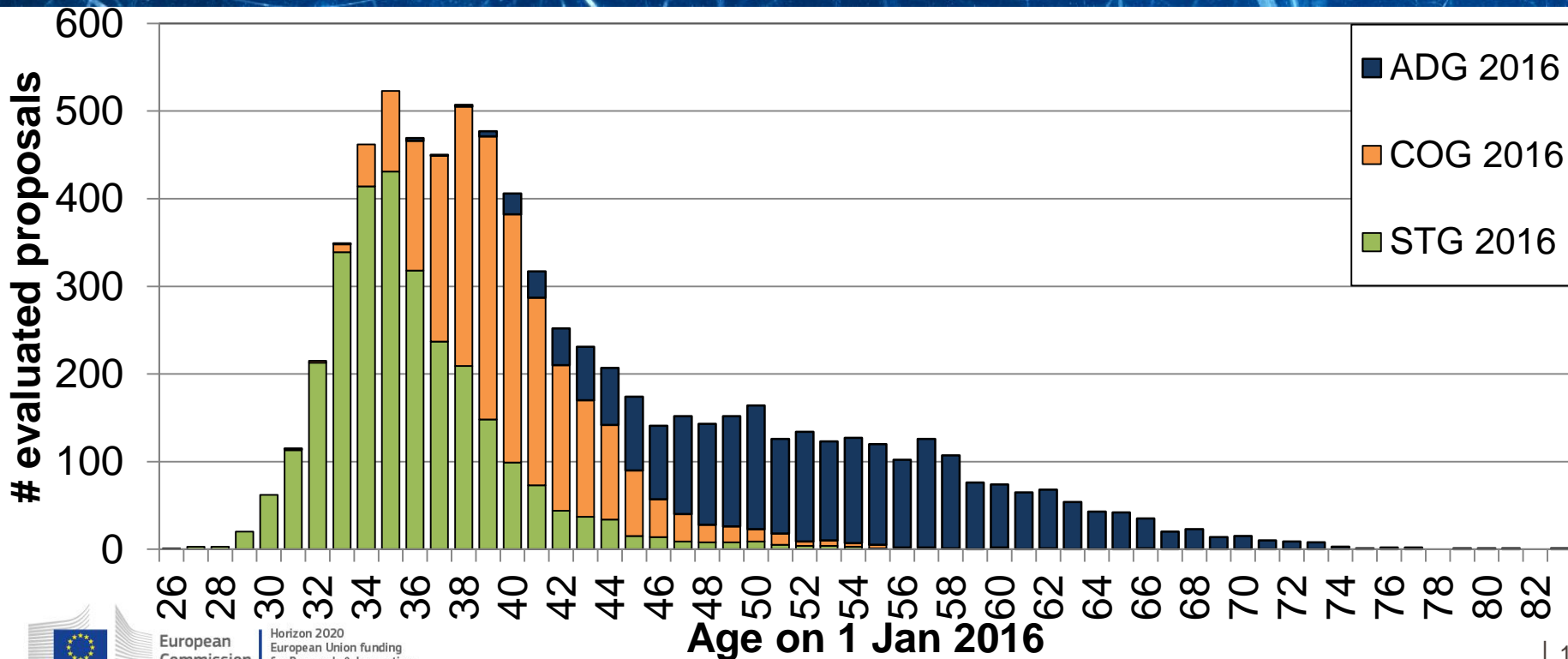
- Thank You

2016 STG-COG-ADG Calls

Age of applicants



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How to prepare and submit an ERC research proposal?



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Proposal structure

PART A – online forms

- A1** Proposal and PI info
- A2** Host Institution info
- A3** Budget

Annexes – submitted as .pdf

- HI support letter
- copy of PhD (StG, CoG);
- document for extension of eligibility window (StG, CoG)

PART B1 – submitted as .pdf

- Extended Synopsis 5 p.
- CV 2 p.
- Early Achievements (StG and CoG) or 10-year Track Record (AdG) 2 p.

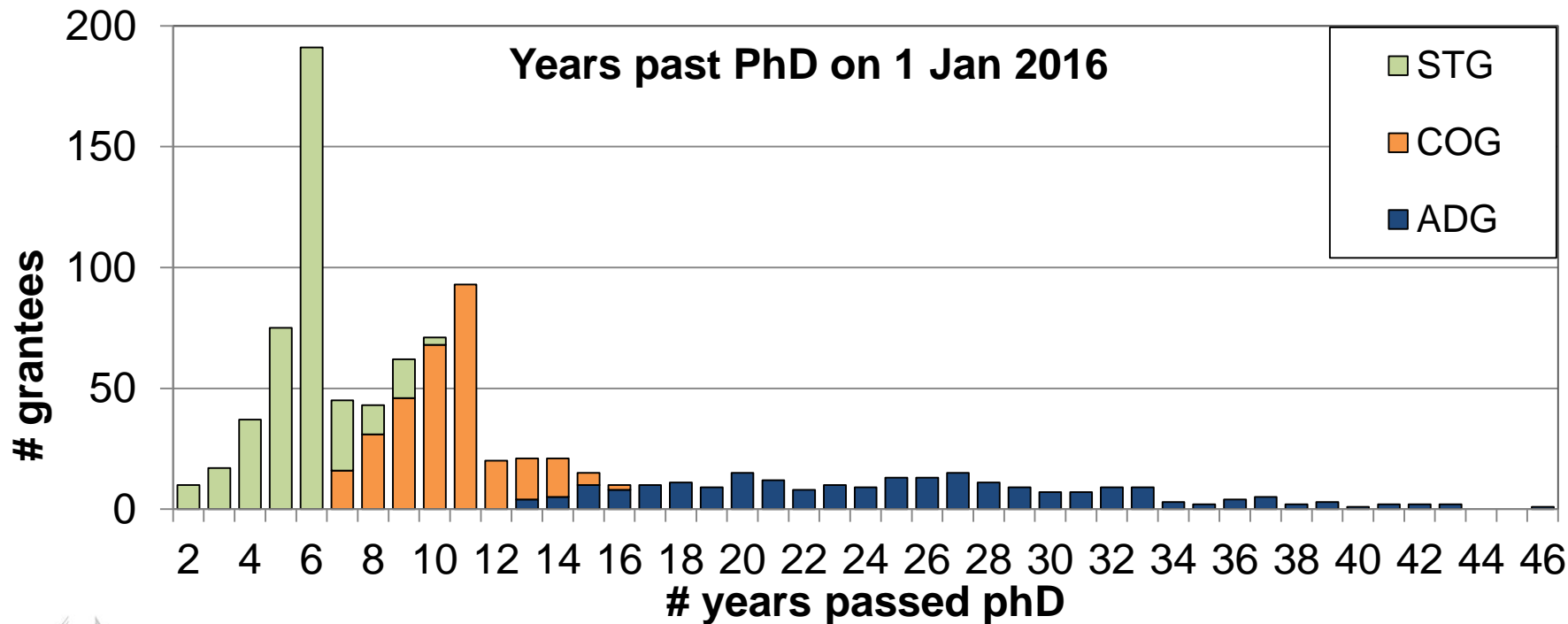
PART B2 – submitted as .pdf

- Scientific Proposal 15 p.



2016 STG-COG-ADG Calls

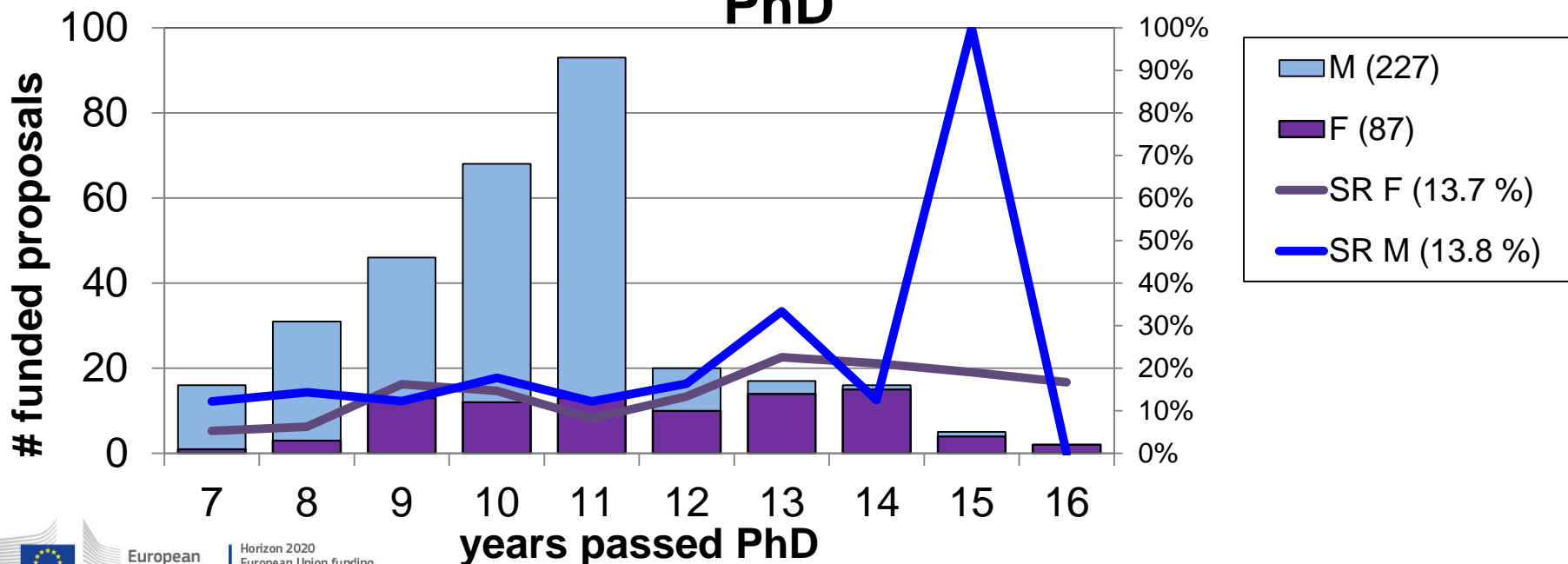
"Academic age" of grantees



COG 2016

Success rates by years past PhD

COG 2016 funded proposals by years passed PhD



A few tips and advice (1/2)



- Be ambitious and "daring"; panels instructed to seek out high-risk research
- Grab interest and attention of readers/ reviewers
- Remember that Part B1 will be seen by "generalists" (panel members)
- If you make it to Step 2, reviewers see both B1 and B2, so do not repeat / duplicate part B1 in part B2
- Do not include unnecessary partners and

Some tips and advice (1/2)

- For interviews (StG and CoG):
 - Get Panel Members interested in you and what you are doing
 - Practice thoroughly, several (many?) times; typically a 10 minute presentation followed by 10-15 minutes of questions
 - Panels want to see that these are *your* ideas, not those of your supervisor
 - It is normal to be nervous...



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Synergy

Background



- **2012-2013:** two pilot Synergy grant calls
 - ➔ 1.5 - 3% success rate: 24 projects funded
- **2016:** Following a detailed analysis of the funded SyG projects, the Scientific Council decided to re-launch the scheme

Synergy grant assessment report - outcome



- Synergy grant scheme would be a valuable addition to the current ERC frontier schemes because of:
 - ➔ Its **high international recognition** - putting European research on the global map, often in leading position;
 - ➔ The **highly ambitious research goals** it will trigger – that cannot be achieved by a single PI;
 - ➔ The **complementarity of PIs/teams** it favours;
 - ➔ The **close collaboration** it triggers which goes much

Synergy Grant – Objectives



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- **Minimum two to maximum four Principal Investigators** and their teams
- To bring together **complementary skills, knowledge, and resources** in new ways, in order to **jointly** address **ambitious** research problems.
- **Transformative research** not only at the forefront of European science but also to become a benchmark **on a global scale**.
- Applicants Principal Investigators must demonstrate the synergies, complementarities and added value that could lead to **breakthroughs that would not be possible by the individual Principal Investigators working alone**.

Profile of the ERC Synergy Grant Principal Investigators



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One of the Principal Investigators must be designated as the **Corresponding Principal Investigator**.

Each Principal Investigators must present an early achievement track-record or a 10-year track-record whichever is most appropriate for their career stage (Starting, Consolidator or Advanced Grant profile).

Synergy Grant – Restrictions

2018 Work Programme text

pending the adoption of the ERC Work Programme 2018 in July 2017



Restrictions that Scientific Council intends to apply

*A Principal Investigator whose proposal was evaluated as **category B** at **step 1 or step 2** in the Synergy Grant call for proposals under Work Programme 2018 may not submit a proposal to the Synergy Grant calls for proposals made under Work Programme 2019.*

*A Principal Investigator whose proposal was evaluated as **category C** at **step 1** in the Synergy Grant call for proposals under Work Programme 2018 may not submit a proposal to any ERC research grant calls for proposals made under Work Programme 2019 or for the Synergy Grant call in 2020.*

Outline

- **ERC Starting, Consolidator and Advanced Grants**
- **Synergy Grants**
- **Upcoming deadlines**

Design of the 2018 Synergy call

pending the adoption of the ERC Work Programme 2018 in July 2017



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- Indicative budget foreseen for 2018: 250 M€
 - To select 25-30 projects
- 2 or 3 or 4 Principal Investigators
- No restrictions on location of PIs
 - PI can come from the same corridor in one HI, different HIs within one country, or from different countries (within EU or AC)
- Indicative call closure: 14 November 2017
- Proposals to be evaluated between November 2017 and September 2018.

Design of the 2018 Synergy call – continued



pending the adoption of the ERC Work Programme 2018 in July 2017

- PIs to be considered as equal, but a corresponding PI to be designated who will be the administrative contact for the duration of the project.
- Normal maximum budget of 10 M€ per grant
 - With additional 4 M€ more in case:
 - a) "start-up" costs for Principal Investigators moving to the EU or AC and/or
 - b) the purchase of major equipment and/or
 - c) access to large facilities
- Time commitment: $\geq 50\%$ of working time in EU or AC and

SyG 2018 evaluation process



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Step 1

Single panel
≤~700 proposals

Remote evaluation of
short proposals

- SyG PMs + PEVs (PMs of other calls)

SyG panel chairs
meet: preselect
proposals for full
review

• No of proposals: 130-170, up to ~7x call budget

Step 2

5 panels dynamically
formed
~130-170 proposals

Remote evaluation of
full proposals

- SyG PMs + external specialized reviewers

Panels meet:
preselect proposals
for interview

- No of proposals: ~60, up ~3x call budget

Step 3

max 5 interview
panels dynamically
formed

~60 proposals

PMs reassess the
retained proposals

- based on step 2 reports + interviews
- Interviews: all PIs of all proposals in step 3 to be present in Brussels

Panels rank the
fundable proposals

- ~30 proposals

Take home messages



- ERC foresees it being a highly competitive call
 - ➔ only exceptional proposals are likely to be funded that will demonstrate that the **truly ambitious** research questions could lead to breakthroughs **only through the joint effort** of the complementary and synergistic group of PIs.
- ‘Synergy’ is not simply a successful collaboration
 - ➔ The interaction would yield something more than just the sum of the individual parts.
 - ➔ To yield possibly either unforeseen, completely new science, to cross fertilize disciplines or to solve important research problems that until now could not be dreamt of solving.

ERC 2017 UPCOMING CALLS



- Deadlines 2017 Calls
 - AdG: Currently open, closes 31 Aug 2017
 - Expect ~2500 submissions
 - PoC 2017: Currently open,
 - Final deadline 5 September 2017
 - Existing grantees only may apply

ERC 2018 CALLS

Provisional dates



- Planned deadlines 2018 Calls:
 - **StG 2018:** 17 October 2017
 - **SyG 2018:** 14 November 2017
 - **CoG 2018:** 15 February 2018
 - **AdG 2018:** 30 August 2018

How to prepare and submit an ERC research proposal?



- Have a bright, original and exciting idea, and design a research project to implement it
- Get a letter of support from a HI where the project is to be carried out (the HI must be located in EU or any of the H2020 associated countries)
- Write your research proposal and submit it within the deadline!

ERC Research Turns into A.I. Spin-Off



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- ❖ Breakthrough technology to automate data extraction from content on the web developed thanks to ERC funding
- ❖ February 2017: spin-off **Wrapidity** was purchased by Meltwater, a leader in data intelligence.

Prof. Georg GOTTLOB, *University of Oxford*

DIADEM (Domain-centric Intelligent Automated Data Extraction Methodology) ERC Advanced Grant 2009
+ **ExtraLytics**, 2014 Proof of Concept



[Yahoo Finance](#), 22 February 2017

Meltwater acquires Oxford University data extraction spinout Wrapidity



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Thank you

For further information...



- **ERC Web site: <http://erc.europa.eu/>**
- **Documents:**
 - ➔ ERC Work Programme (published annually)
 - ➔ Information for Applicants (published with each call)
- **National Contact Points**

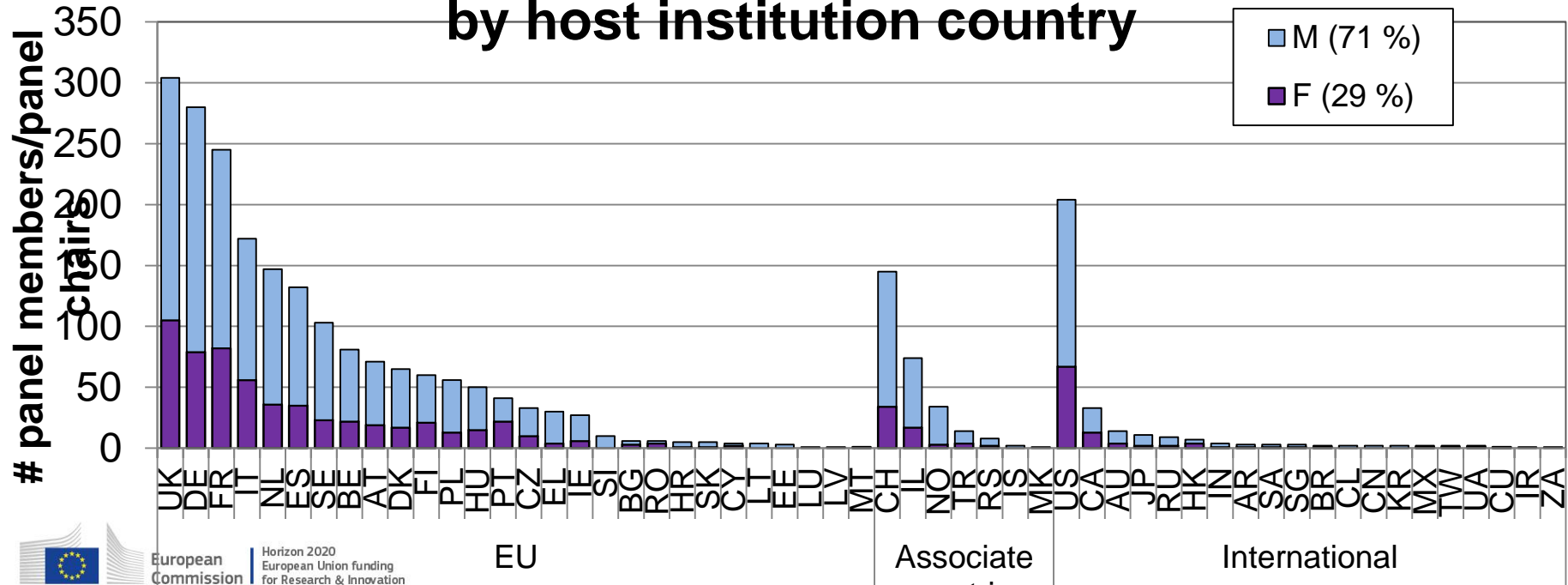
ERC panel members by country of HI and gender



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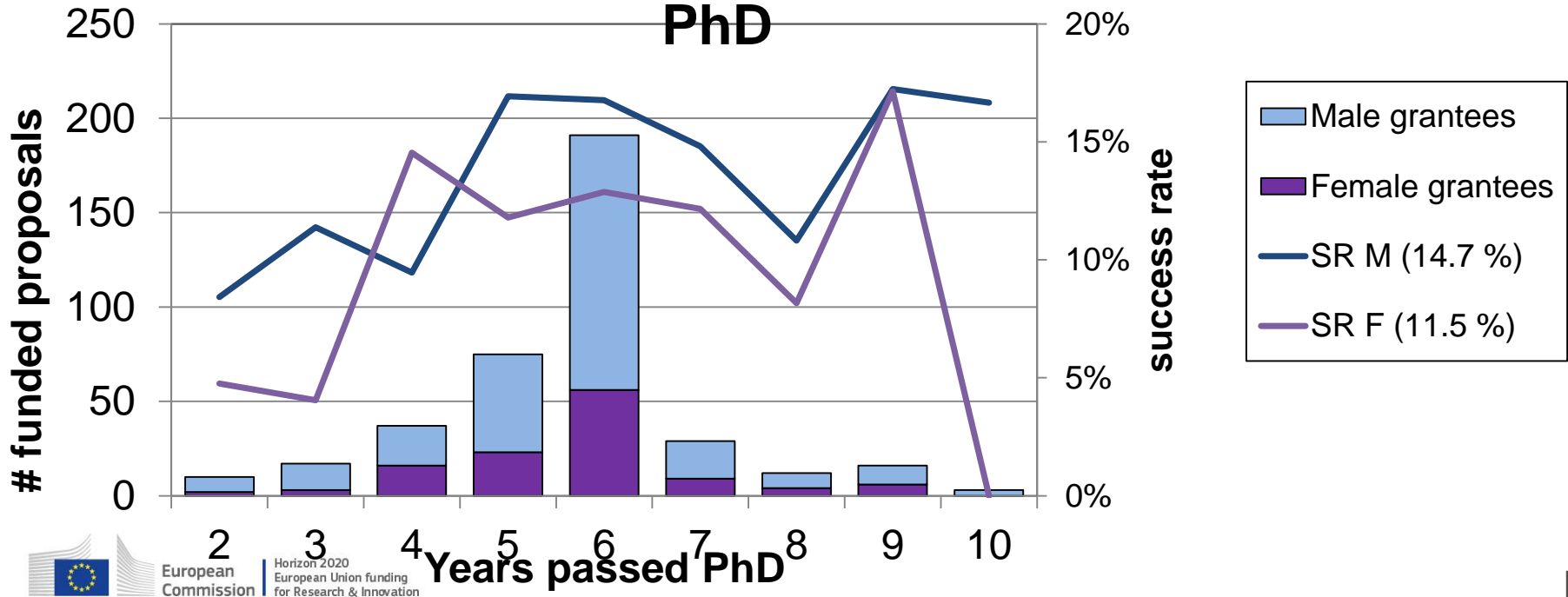
ERC Starting, Consolidator and Advanced grant calls 2007 - 2014

ERC STG COG ADG panel members 2007-2014 by host institution country



STG 2016 Funded proposals gender Success rates by years past PhD

STG 2016 Funded proposals by years passed PhD



Indicative summary of 2018 calls

	<i>Starting Grant</i>	<i>Consolidator Grant</i>	<i>Advanced Grant</i>	<i>Synergy Grant</i>	<i>Proof of Concept Grant</i>
<i>Call identifier</i>	ERC-2018-StG	ERC-2018-CoG	ERC-2018-AdG	ERC-2018-SyG	ERC-2018-PoC
<i>Call Opens</i>	18/07/2017	24/10/2017	17/05/2018	19/07/2017	18/07/2017
<i>Deadline or cut-off dates for PoC</i>	17/10/2017	15/02/2018	30/08/2018	14/11/2017	16/01/2018
					18/04/2018
					11/09/2018
<i>Budget million EUR (estimated number of grants)</i>	582 (391)	551 (287)	450 (194)	250 (30)	20 (130)
<i>Planned dates to inform applicants (after each step or cut-off date)</i>	14/05/2018	06/07/2018	29/01/2019	23/04/2018	30/03/2018
				29/08/2018	21/06/2018
				19/10/2018	10/12/2018
<i>Indicative date for signature of grant agreements (by cut-off date for PoC)</i>	14/12/2018	30/03/2019	08/08/2019	19/02/2019	30/07/2018
					21/10/2018
					10/04/2019

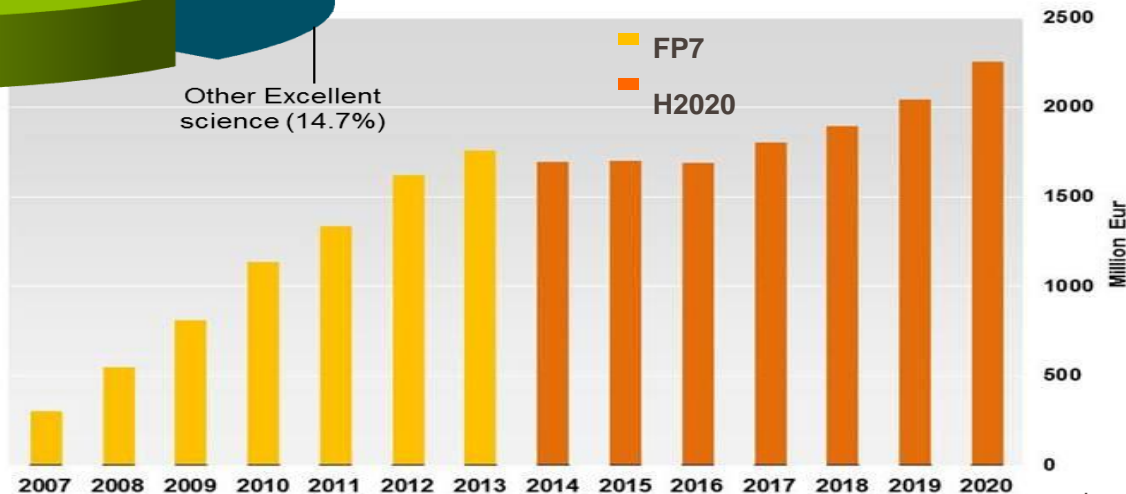
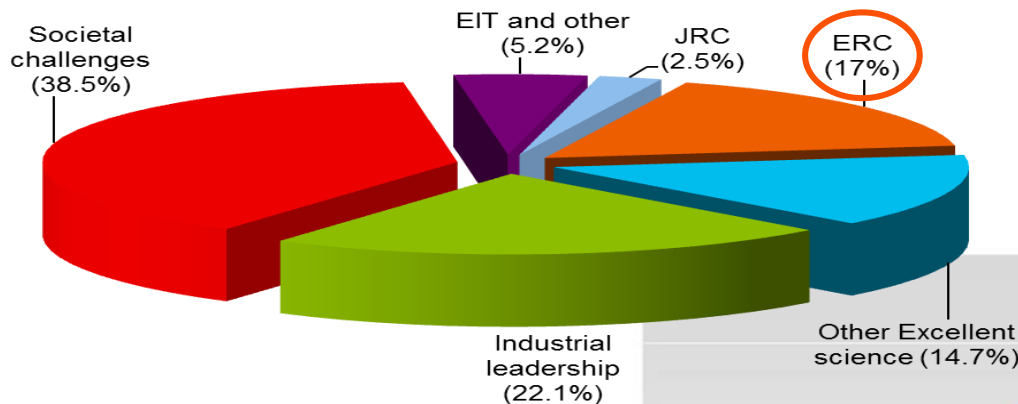
What is the ERC?

Horizon 2020 Budget € 77 billion

ERC Budget € 13 billion



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What do ERC grants offer?

Creative Freedom of the Individual Grantee



ERC offers independence, recognition & visibility

- fund research on **any topic: completely "bottom-up"**
- **financial autonomy** for 5 years
- ability to negotiate with the host institution the **best conditions** of work
- to attract **top team members and collaborators**



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Beyond the first 10 years

10 Reasons to Celebrate



Horizon 2020
European Union funding
for Research & Innovation



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Beyond the first 10 years

Examples of projects



Horizon 2020
European Union funding
for Research & Innovation



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Beyond the first 10 years

The Secrets of the ERC Success



Horizon 2020
European Union funding
for Research & Innovation

1. Supporting Research Talent

- ✓ 7,000 "research champions" and their teams supported
- ✓ 50,000 team members, mostly PhDs and postdocs, working on ERC projects



3. Enhancing Visibility of European Research Results

- ✓ 100,000 publications resulting from ERC projects
- ✓ 7% of these publications rank in the top 1% most cited worldwide. Also thanks to this, in 2014 Europe surpassed the US for the first time in this top 1%.



4. Attracting Scientific Talent

- ✓ The ERC tackles the brain-drain by making Europe a more attractive place for bright minds
- ✓ Around 17% of the ERC team members are from non-EU countries
- ✓ 9 countries (including US, China, Korea, Brazil) have signed specific agreements with the EU that allow ERC grantees to cooperate with young scientists from around the world



5. Promoting Innovation



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- ✓ There is no innovation without frontier research!
- ✓ Almost 600 Proof of Concept Grants awarded
- ✓ ERC projects have led to 800 patent applications and setting up 75 new ventures (2007-2013)



Energy storage: better, more efficient

Method: uses of 2-dimensional nanomaterials, including graphene, to create and print batteries

Result: could increase the lifetime of a battery of about 5000 times

Valeria Nicolosi, Trinity College Dublin
(Ireland)

3D2DPrint (3D Printing of Novel 2D Nanomaterials: Adding Advanced 2D Functionalities to Revolutionary Tailored 3D Manufacturing)



6. Addressing Societal Challenges

- ✓ The ERC funds projects related to major health challenges, energy efficiency, demographic changes, etc.
- ✓ ERC-funded research contributes to economic growth and benefits the society at large



Paths to Success for 2nd-Generation Migrants

- ❖ The ERC project studied the factors behind second-generation migrants' success in overcoming barriers to employment in four countries
- ❖ Policy makers use the findings to better support migrant communities

Prof. Maurice CRUL, *Erasmus University Rotterdam*

ELITE (Elite Leadership Positions In The Emerging Second Generation) ERC Starting Grant 2011



Catalysts and Ultra-Clean Fuels



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- ❖ The ERC research team developed a technique to produce high-quality diesel fuel that uses feedstock more efficiently, generates fewer by-products and results in much lower emissions.

Prof Krijn Pieter DE JONG, Utrecht University

NanoPartCat (Supported Nanoparticles for Catalysis: Genesis and Dynamics in the Liquid Phase), ERC Advanced Grant 2013



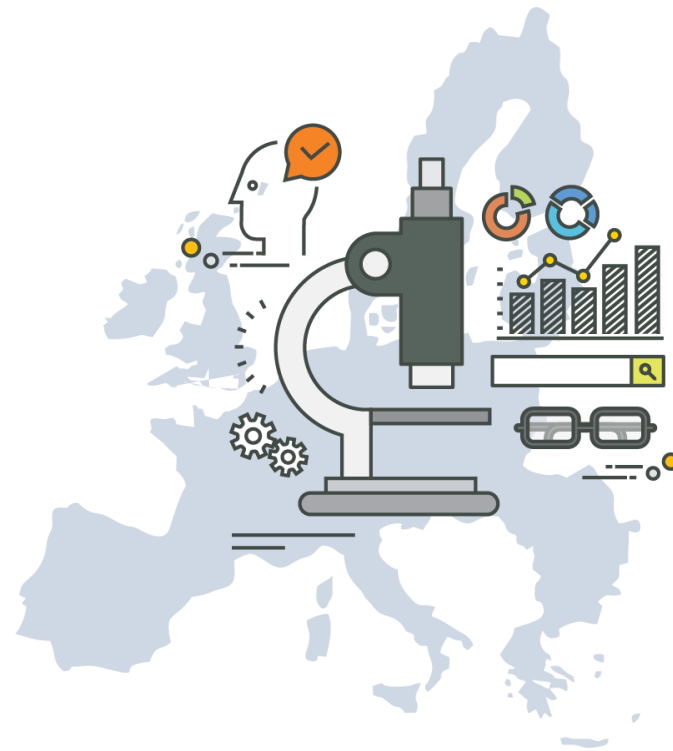
ERC story:
Controlled Catalysis for ultra-clean fuels

7. Inspiring Reforms in Europe



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- The ERC has set the benchmark of competitive funding of basic research
- New scientific councils and funding schemes launched in EU Member States
- 17 countries have introduced initiatives to finance their best unfunded applicants



8. Leading the Scientific Community



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- ✓ Research integrity
- ✓ Open access
- ✓ Gender balance
- ✓ Widening European participation



10. Engaging with Audiences around the World



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Wide media coverage



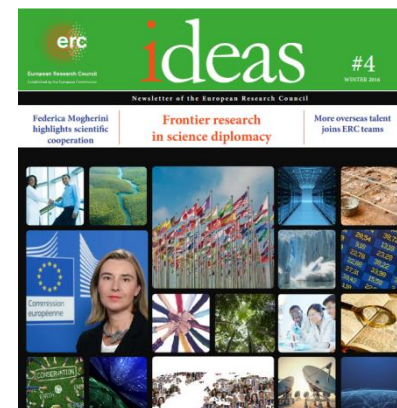
10.000 articles in the media every year



Events around the world



> 500.000 visitors of the ERC website per year



Earth-like Exoplanets Discovered



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Credit: ESO/N. Bartmann/spaceengine.org



"Without the EU funding it would not have been possible to arrive at this discovery. I'm grateful that the European Research Council invested in our idea and believed in our intuition back in 2013."

Method: A network of telescopes to detect exoplanets orbiting dwarf stars.

Result: Pilot project discovered a system of 7 potentially inhabitable exoplanets

Prof Michaël GILLON, Université de Liège (Belgium)

SPECULOOS (searching for habitable planets amenable for biosignatures detection around the nearest ultra-cool stars), ERC Starting Grant 2013

Playing dirty against allergies and asthma



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Method: studied the link between environmental factors (e.g. microbial exposure) and genetic factors in allergy and asthma occurrence

Results highlighted the protective role of some bacterial and fungal chemicals

Erika Von Mutius, Ludwig-Maximilians-Universitaet Muenchen, Germany

HERA (Host-environment interactions in the protection from asthma and allergies)

ERC Advanced Grant 2009



'Mini Human Brains' to Study Neurological Diseases

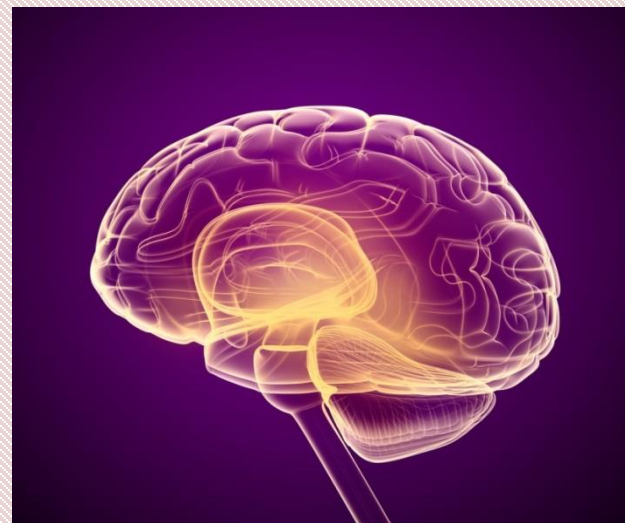
Method: Researchers used human stem cells to grow pea-sized structures that resemble the developing human brain

Use: These tissues provide a tool for modelling neurodevelopmental disorders such as microcephaly

Jürgen KNOBLICH, Institute of Molecular Biotechnology GmbH (IMBA) (Austria) & Andrew JACKSON, University of Edinburgh (UK) were part of the team

NeuroSyStem (A Systems Level Approach to Proliferation and Differentiation Control in Neural Stem Cell Lineages), ERC Advanced Grant 2009

HumGenSize (Cellular pathways determining growth and human brain size), ERC Starting grant 2011



Hidden Medieval Cities Uncovered in Cambodia



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Method: A laser radar mounted on a helicopter to scan the jungle in the Angkor region

Result: Discovery of unknown human activity dating back to prehistory

Prof Damian EVANS, École française d'Extrême-Orient (France)

CALI (Cambodian Archaeological Lidar Initiative), ERC Starting Grant 2014



Future Challenges

- Need for an enhanced budget for research in the next framework programme
- Enough room for curiosity-driven research in a bottom-up approach
- Schemes welcoming interdisciplinarity
- Need to preserve ERC main features and specificities
- Coordination with the programmes of national agencies
- Need to promote the impact of the ERC outside the scientific community

Thank you!



Key figures

7,000

top researchers funded

50,000

researchers & other professionals
hired in ERC teams

with **€12 billion**



Breakthroughs

73%

of completed projects
led to breakthroughs/major
advances



Scientific impact

> 5,500

articles among
1% most cited
scientific journals



Open to the World

9

international initiatives
for non-EU talent
to join ERC teams



Prestigious prizes, e.g.

6

Nobel
Prizes

5

Wolf
Prizes

4

Fields
Medals



ERC as model

15

EU countries set up
ERC-like structures/funding
schemes

The ERC Scientific Council



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BOURGUIGNON
Jean-Pierre



Vice
President

BOCK
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President

KONDOROSI
Eva



Vice
President

STOKHOF
Martin



BOVOLENTA
Paola



BUCKINGHAM
Margaret



CLARK
Christopher



CRONE
Eveline



DONALD
Athene



JAJSZCZYK
Andrzej



JUNGWIRTH
Tomas



KRAMER
Michael



MEHLHORN
Kurt



ROMANOWICZ
Barbara



STENSETH
Nils



SUPERTI-FURGA
Giulio



TAVERNARAKIS
Nektarios



THORNTON
Janet



VERNOS
Isabelle



VEUGELERS
Reinhilde



WIEVIORKA
Michel



ZWIRNER
Fabio