The European Research Council

An Introduction to the ERC

George Symeonidis

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AIDAA_Webinar_EUresearch_2021
Challenges and opportunities for aerospace frontier research offered by the ERC and MSCA

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ERC is….

European Commission → Directorate-General Research and Innovation (RTD) → European Research Council (Established by the European Commission) → The Scientific Council / The Executive Agency (ERCEA)

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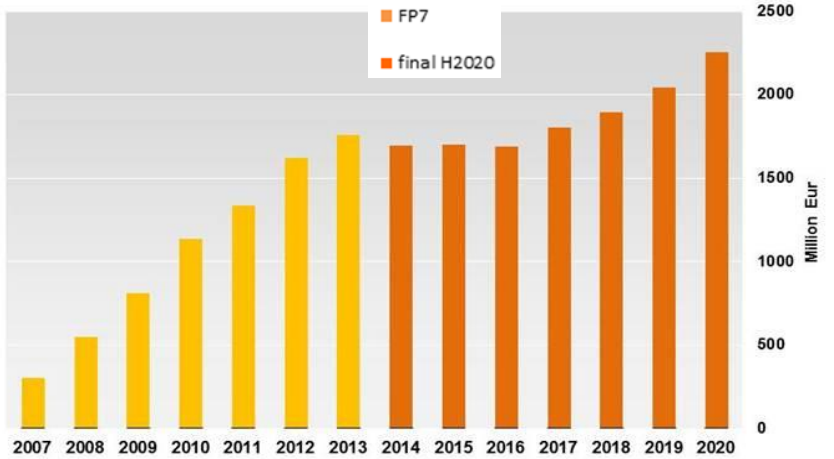
Funding: is part of Horizon Europe



EUR 16 billion
ERC budget in Horizon Europe

17%
of the entire Horizon Europe budget (EU27)

FP7 / H2020 budget evolution



HE: € 16 billion (2021-2027) – 2.3 billion €/year
H2020: € 13 billion (2014-2020) - 1.9 billion €/year
FP7: € 7.5 billion (2007-2013) - 1.1 billion €/year

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ERC offers…

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INDIVIDUAL RESEARCHERS
FROM ALL OVER THE WORLD

LONG TERM
GRANTS

TO HIGH-RISK/HIGH-GAIN PIONEERING PROJECTS
IN ANY FIELD OF FRONTIER RESEARCH

- Life Sciences
- Physical Sciences and Engineering
- Social Sciences and Humanities

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ERC in figures

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10,500+
Total projects funded by ERC

82
Nationalities (ERC grantees)

34
EU and Associated Countries hosting ERC projects

125,000+
publications reported by ERC projects

1,300+
prestigious prizes awarded to ERC grantees

75,000
researchers and other professionals hired in ERC teams

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ERC funding schemes

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Extension of eligibility window possible for StG and CoG, e.g. for maternity, paternity, military service, ...



Starting Grant

Size of the grant: €1.5 million max. std. grant amount
Duration: up to 5 years (pro rata)
2-7 years of experience since completion of their PhD



Consolidator Grant

Size of the grant: €2 million max. std. grant amount
Duration: up to 5 years (pro rata)
7-12 years of experience since completion of their PhD



Advanced Grant

Size of the grant: €2.5 million max. std. grant amount
Duration: up to 5 years (pro rata)
An excellent scientific track record of recognized achievements in the last 10 years

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ERC funding schemes

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Synergy grant

Size of the grant: €10 million max. std. grant amount
Duration: up to 6 years
Be composed of 2 to 4 researchers and their research groups (**one researcher can be based outside EU/AC)**



Proof of Concept

Size of the grant: €150 000 max.
Duration: up to 18 months
Demonstrate that the idea funded by the original ERC grant has innovation potential and significant economic or societal benefits

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Additional top-up budget

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Additional funding available to cover:

- **Start-Up costs for scientists moving to EU / Associated Countries**
- **Purchase of major equipment**
- **Access to large facilities**
- **Other major experimental and fieldwork costs, excl. personnel costs**

✓ Up to €1 Million for Starting (↑as of 2020) Consolidator (↑2020) and Advanced Grants

✓ Up to €4 Million for Synergy Grants



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Who can apply?

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Researchers (PIs)

- of any nationality
- of any age (>2 yrs. from Ph.D.)
- from any current working place in the world
- on any topic (bottom-up)
- requirement - letter of support from a Host Institution (HI), which must be based in EU or associated countries (exc. 1 PI in SyG)



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Evaluation criteria

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Overall success rate around 12%
→ “flat” across stages of professional seniority and topics

Excellence

is the sole evaluation criterion

Excellence of the Research Project

- Ground breaking nature
- Potential (scientific) impact
- Scientific approach

Excellence of the Principal Investigator

- Intellectual capacity
- Creativity
- Commitment

The Host Institution is not an evaluation criterion

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Some rumours

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Rumour 1: You can only apply for an ERC grant if you are a highly accomplished scientist.

✘ NOT true: Accomplishments are appreciated in relation to your stage/seniority as giving some evidence of your capacity to conduct the research you propose and of creativity in your recent career (within past max.10-12 yrs).

Rumour 2: To be successful, you need to continue on an established research line, to prove continuity and credibility

✘ NOT true: Generally, the opposite is true – show feasibility but groundbreaking nature is sought.

Rumour 3: If you have already obtained an ERC grant you are less/more likely to get another one.

✘ NOT true: Panels look at each proposal on its own merit, irrespectively of whether you have or have not obtained an ERC grant in the past. (this does not apply for applications to a Proof of Concept grant.)

Rumour 4: The more socially or medically relevant a grant proposal is, the higher the chances of it getting funded.

✘ NOT true: ERC funds frontier research, not research that promises to be only an incremental advancement of knowledge. This is irrespective of the field and whether it has societal, medical or clinical applications.

Evaluation process

For individuals calls: a single submission but a two-step evaluation

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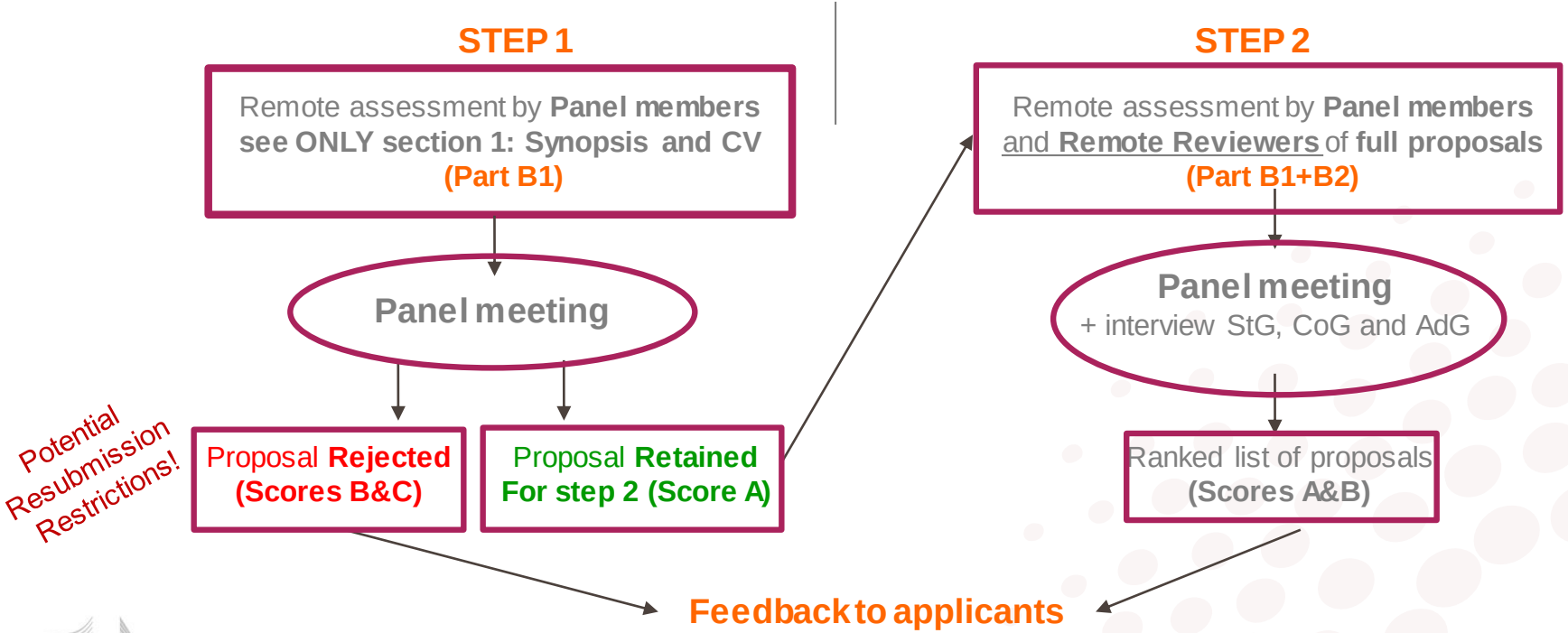

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Priority to Early-Career Scientists

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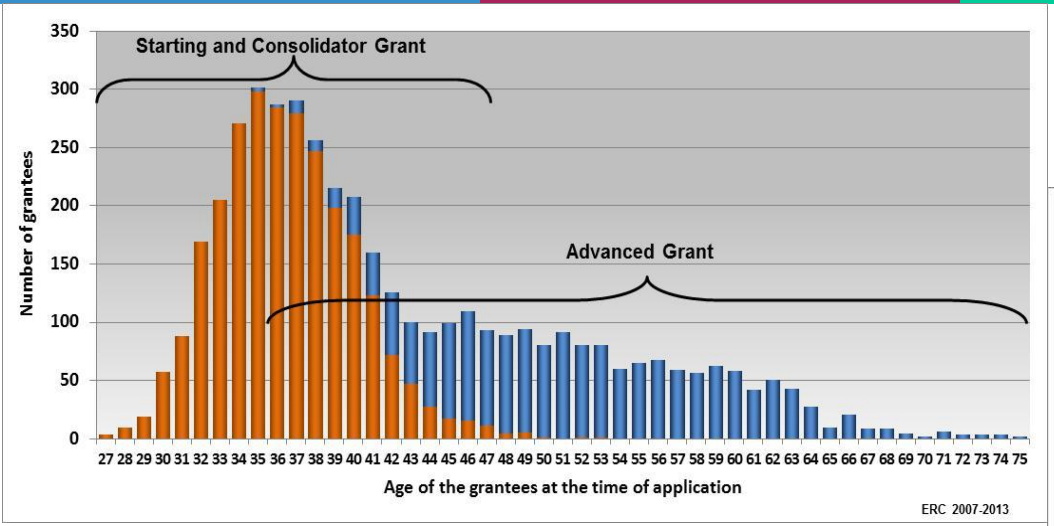
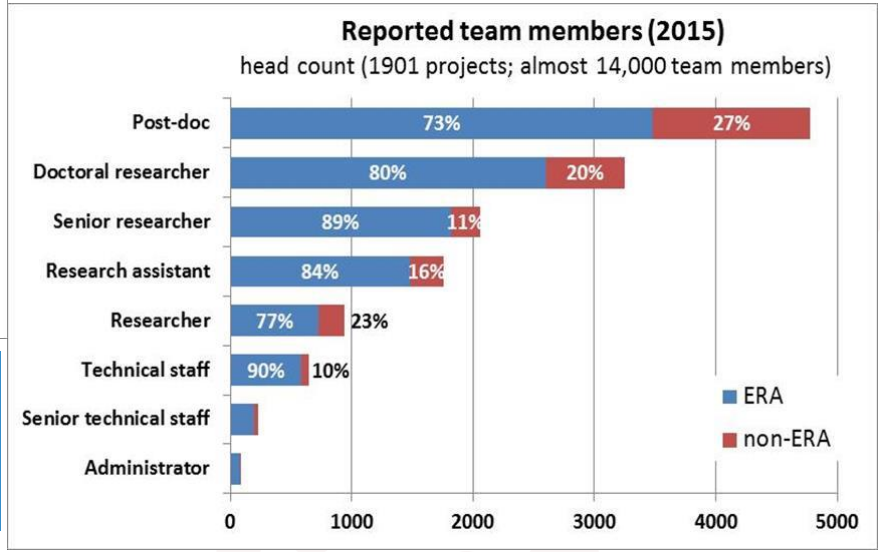


+ 75 000 project team members



Two-thirds of ERC grants go to early-career Principal Investigators.
Success rate flat across (scientific) age groups.

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Open to the world

Researchers of any nationality, also if (at the time of application) based outside Europe, can apply to the ERC – but the HI must be in the EU or an Associated Country

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- Additional funding is available to cover 'start-up' costs for scientists moving to Europe
- Dual affiliation is possible: ERC grantees are required to spend 50% of their time in Europe (EU member state or Associated Country)
- SyG as of 2019: possible for one PI to be based outside the EU or AC
- 45 non-EU/Associated Country PI nationalities ~8% of ERC grants to third country PIs (U.S., Canada, Russia, India, Australia, China, Japan, New Zealand, Argentina, …)
- ~17% of project team members from third countries (China, U.S., India, Russia, …)

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Visiting ERC projects

https://erc.europa.eu/funding/additional-opportunities#IA:

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- **Visiting Research Fellowship programmes**
  - ✓ **Bucharest (Romania), Politehnica University of Bucharest (UPB)**
  - ✓ **Croatia, with the Croatian Science Foundation (HRZZ)**
  - ✓ **Czech Republic, with the Czech Science Foundation (GA CR)**
  - ✓ **Estonia, with the Estonia Research Council (ETag)**
  - ✓ **Flanders (Belgium), with the Research Foundation Flanders (FWO)**
  - ✓ **Georgia, with the Shota Rustaveli National Science Foundation (SRNSFG)**
  - ✓ **Republic of Serbia, Ministry of Education, Science and Technological Development of the Republic of Serbia (MoESTD)**
  - ✓ **Slovak Republic, with the Slovak Academy of Sciences (SAS) & Pavol Jozef Safarik University in Kosice (UPJS)**
  - ✓ **Slovenia, with the Slovenian Research Agency (ARRS)**

- **International Arrangement Funding**
  - ✓ Argentina, with the Ministry of Science, Technology and Productive Innovation
  - ✓ Australia, with the National Health and Medical Research Council (NHMRC) and the Australian Research Council (ARC)
  - ✓ Brazil, with the Brazilian National Council of the State funding agencies (CONFAP)
  - ✓ Canada, with the Tri-agency Institutional Programs Secretariat
  - ✓ China, with the National Natural Science Foundation (NSFC)
  - ✓ India, with the Scientific Engineering Research Board (SERB)
  - ✓ Japan, with the Society for the Promotion of Science (JSPS) and the Japan Science and Technology Agency (JST)
  - ✓ Korea, with the Ministry of Science, ICT and Future Planning
  - ✓ Mexico, with the Mexican National Council of Science and Technology (Conacyt)
  - ✓ Singapore with the National Research Foundation Singapore (NRF)
  - ✓ South Africa, with the National Research Foundation (NRF)
  - ✓ United States, signed in July 2012 with the National Science Foundation (NSF)

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ERC Panel structure

- representing **the three main scientific domains**
- serving the purposes of proposal evaluation
- **panel structure (and descriptors) do <u>not</u> represent specific scientific priorities**
- budget distributed among the scientific panels as a function of demand

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Life Sciences (LS)

- LS1 Molecules of Life: Biological Mechanisms, Structures and Functions
- LS2 Integrative Biology: from Genes and Genomes to Systems
- LS3 Cellular, Developmental and Regenerative Biology
- LS4 Physiology in Health, Disease and Aging
- LS5 Neuroscience and Disorders of the Nervous System
- LS6 Immunity, Infection and Immunotherapy
- LS7 Prevention, Diagnosis and Treatment of Human Diseases
- LS8 Environmental Biology, Ecology and Evolution
- LS9 Biotechnology and Biosystems Engineering

3 Domains / 27 Panels



3,500+
Panel members



56
Countries hosting ERC panel members



35,000+
External reviewers

Social Sciences and Humanities (SSH)

- SH1 Individuals, Markets and Organisations
- SH2 Institutions, Governance and Legal Systems
- SH3 The Social World and Its Diversity
- SH4 The Human Mind and Its Complexity
- SH5 Cultures and Cultural Production
- SH6 The Study of the Human Past
- SH7 Human Mobility, Environment, and Space

Physical Sciences & Engineering (PSE)

- PE1 Mathematics
- PE2 Fundamental Constituents of Matter
- PE3 Condensed Matter Physics
- PE4 Physical & Analytical Chemical Sciences
- PE5 Synthetic Chemistry and Materials
- PE6 Computer Science and Informatics
- PE7 Systems and Communication Engineering
- PE8 Products and Processes Engineering
- PE9 Universe Sciences
- PE10 Earth System Science
- PE11 Materials Engineering

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ERC Panel structure – PE domain

https://erc.europa.eu/news/new-erc-panel-structure-2021-and-2022

(ERC funds "frontier research", including applied research)

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Physical Sciences & Engineering

Math
- PE1 Mathematics

Physics
- PE2 Fundamental Constituents of Matter
- PE3 Condensed Matter Physics

Chemistry
- PE4 Physical & Analytical Chemical Sciences
- PE5 Synthetic Chemistry and Materials

Engineering
- PE6 Computer Science and Informatics
- PE7 Systems and Communication Engineering
- PE8 Products and Processes Engineering (incl. Aerospace Engineering)
- PE9 Universe Sciences
- PE10 Earth System Science (incl. Space Exploration & Earth Observation)
- PE11 Materials Engineering

PE8 Products and Processes Engineering

(Product and process design, chemical, civil, environmental, mechanical, vehicle engineering, energy processes and relevant computational methods)

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Panel descriptors do not represent ERC scientific priorities

PE8_1 Aerospace engineering → ~ 5% of PE8 funded projects (10% success rate)

PE8_2 Chemical engineering, technical chemistry

PE8_3 Civil engineering, architecture, offshore construction, lightweight construction, geotechnics

PE8_4 Computational engineering

PE8_5 Fluid mechanics → 10% of PE8 funded projects

PE8_6 Energy processes engineering

PE8_7 Mechanical engineering

PE8_8 Propulsion engineering, e.g. hydraulic, turbo, piston, hybrid engines

PE8_9 Production technology, process engineering

PE8_10 Manufacturing engineering and industrial design

PE8_11 Environmental engineering, e.g. sustainable design, waste and water treatment, recycling, regeneration or recovery of compounds, carbon capture & storage

PE8_12 Naval/marine engineering

PE8_13 Industrial bioengineering

PE8_14 Automotive and rail engineering; multi-/inter-modal transport engineering

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PE7 Systems and Communication Engineering

(Electrical, electronic, communication, optical and systems engineering)

PE6 Computer Science and Informatics (selection)

(Informatics and information systems, computer science, scientific computing, intelligent systems)

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PE7_1 Control engineering

PE7_2 Electrical engineering: power components and/or systems

PE7_3 Simulation engineering and modelling

PE7_4 (Micro- and nano-) systems engineering

PE7_5 (Micro- and nano-) electronic, optoelectronic and photonic components

PE7_6 Communication technology, high-frequency technology

PE7_7 Signal processing

PE7_8 Networks (communication networks, sensor networks, networks of robots, etc.)

PE7_9 Man-machine interfaces

PE7_10 Robotics

PE7_11 Components and systems for applications (in e.g. medicine, biology, environment)

PE7_12 Electrical energy production, distribution, application

……

PE6_6 Algorithms, distributed, parallel and network algorithms, algorithmic game theory

PE6_7 Artificial intelligence, intelligent systems, natural language processing

PE6_8 Computer graphics, computer vision, multi media, computer games

PE6_9 Human computer interaction and interface, visualisation

PE6_10 Web and information systems, data management systems, information retrieval and digital libraries, data fusion

PE6_11 Machine learning, statistical data processing and applications using signal processing (e.g. speech, image, video)

PE6_12 Scientific computing, simulation and modelling tools

……

Panel descriptors do not represent ERC scientific priorities

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ERC & Aerospace

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All ERC projects featured in CORDIS https://cordis.europa.eu/ and the ERC website https://erc.europa.eu/projects-figures/erc-funded-projects/ & https://erc.europa.eu/projects-figures/stories

The 2019 ERC Aerospace brochure features ERC projects on:



- Bird and formation flight
- Combustion instability
- Material mechanics
- Cubesat clusters
- Space orbit perturbations
- Aerospace communications

https://publications.europa.eu/en/publication-detail/-/publication/933fdca2-88cd-11e9-9369-01aa75ed71a1/language-en/format-PDF/source-99740073

but ERC-funded projects also cover areas like:

- Structures & materials: fatigue, fracture, morphing
- Flow physics: instabilities & transition, turbulence, flow separation
- Alternative (bio)fuel combustion
- Fluid-structure interactions
- Aerial robotics, control, bioinspired systems
- Battery technologies
- Hydrogen production and storage
- Fuel Cells
- Hydrogen-enriched combustion

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2021 Call Calendar

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ERC calls	Call Opening	Submission Deadline
Starting Grants ERC-2021-StG	25/02/2021 (TBC)	08/04/2021 (TBC)
Consolidator Grants ERC-2021-CoG	11/03/2021 (TBC)	20/04/2021 (TBC)
Advanced Grants ERC-2021-AdG	20/05/2021 (TBC)	31/08/2021 (TBC)
Proof of Concept ERC-2021-PoC	No Proof of Concept call in 2021	
Synergy Grants ERC-2021-SyG	No Synergy Grant call in 2021	

Where can you find more information?

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Videos - ERC Classes

- What to consider before applying
- How to fill-in the application (Parts B1 and B2)
- The interview
- How the evaluation works

https://www.youtube.com/watch?v=xbFbzkVWgCU&list=PLtv6FnsXqnXAYRk6HCErwMxwML0ZKoMcy

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Where can you find more information?

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Our website:

erc.europa.eu

Our social media channels:

National Contact Points (NCP):

https://erc.europa.eu/funding/national-contact-points

Funding & Tender Opportunities:

https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home

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Thank you !

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