Annual Report on the ERC activities and achievements in 2020

Prepared under the authority of the ERC Scientific Council
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chapter one

Foreword
This Annual Report portrays the results and achievements of the ERC in 2020, a year of loss and a year of hope, but also a year of faith in science and of trust in the researchers and in the European institutions that support them.

In 2020, the year when the Covid-19 pandemic has shaken the world and its economy, we have all lost our freedom to move around, the pleasure to travel, the joy to spend time with our dearest and the excitement of making plans.

Many have lost friends, family members, neighbours, colleagues. The ERC in particular has lost one of its most loyal and devoted members, Theodore Papazoglou, who contributed to the foundation of the organisation and has represented it with wisdom and intellectual honesty until April this year, when he succumbed to the virus.

In all this upheaval, the ERC did not lose time and managed to keep its operations under control, with the staff of the Agency adapting to the new way of working, guaranteeing the functioning of the evaluation facilities from remote and supporting their valuable evaluators connected from all-over the world.

I wish to thank the three Vice-Presidents, Janet Thornton, Fabio Zwirner and Eveline Crone, who ensured continuity in some additional difficult circumstances that the ERC had to face this year. And Jean-Pierre Bourguignon, who in July accepted to come back to the ERC as President ad interim until the next ERC President will take office.

During the final stages of Horizon 2020 and at a crucial moment of preparations for Horizon Europe, he provided the leadership necessary to ensure a proper functioning of the ERC and actively fought a battle for a higher budget for research and innovation.

Dedication and commitment have made sure that the ERC could continue to support creative top talent and trigger outstanding science and breakthroughs that matter to
society at large and that will make a difference to our future. In this year, with the pandemic, trust in science has not diminished. It has actually been strengthened, giving us all hope for a solution.

The case for supporting fundamental research has strengthened even more. In these dark months, we have been confident that one day we would beat this virus because we already knew a lot about viruses and epidemics from many years of previous research. We would have been in an incomparably worse situation in 2020 without frontier research. The knowledge acquired in years of curiosity-driven research has allowed scientists around the world to start work on vaccines in record time. And with success. That is why I will continue to passionately argue in favour of frontier research.

This Annual Report portrays some of the many examples of ERC-funded research that are contributing the response to the coronavirus epidemic, helping understand, predict and contain the outbreak. The one that probably attracted the wider attention is the case of Uğur Şahin, the co-founder of the company BioNTech that together with Pfizer produced the first Covid-19 vaccine approved by European regulatory authorities. His research has been supported by various parts of the EU Framework Programmes for Research and Innovation, including an Advanced Grant from the ERC in 2018.

The good news is that the beautiful journey leading to new discoveries, scientific breakthroughs, ground-breaking innovations and improved living conditions will continue to be supported by the EU research and innovation programme. Negotiations have not been easy and kept us all waiting with bated breath, but at the end of the year we could welcome the political agreement on Horizon Europe, our main tool to enlarge our knowledge, strengthen our scientific and technological base and so ensure a better future for everyone.

Mariya Gabriel
European Commissioner for Innovation, Research, Culture, Education and Youth
2020 will be remembered in history as a dramatic year because of the coronavirus pandemic that rapidly affected lives across the whole world. For the ERC it meant the loss of one of its most dedicated servants, Theodore Papazoglou, who fervently from the ERC’s onset defended its values and accompanied the Scientific Council in all its endeavours with a commitment over and above any expectation. His warmth and great sense of humour made him very dear to all members of the Scientific Council. His passing was a shock to all of us and his colleagues from the ERC Executive Agency (ERCEA).

The Scientific Council was also confronted with another challenge in the form of attempts by the new President, who had just taken office, to modify rather significantly the functioning of the ERC. With the core values of the ERC - a bottom-up approach to frontier research, a close relationship with the scientific community and a trustworthy association with the Agency staff - under threat, the Scientific Council expressed its opposition to the changes proposed, and soon came to the conclusion that the misunderstanding was so radical that the only option left was to put it to a vote: the Scientific Council unanimously requested the President’s resignation. This is indeed what happened in early April, a truly traumatic moment for the institution. In the end, the Scientific Council then took the decision to make its position public in order to counter the inaccurate information circulating.

The Scientific Council remained united, and the Vice-Presidents reinforced their engagement, while the ERCEA staff took all necessary measures needed to keep ERC activities running during lockdown. This meant creatively adapting the evaluation of proposals to a virtual environment. This was achieved to the satisfaction of panel members, without a single day of delay in selecting the grant winners. In a similar way, all other operations to continue running the ERC were adapted and successfully implemented. This was a truly remarkable performance that required a great level of dedication by the personnel in spite of the difficult working conditions caused by limited access to the office premises. We are immensely grateful for the impeccable delivery of duties performed - a critical element of the ERC’s reputation.

The second part of the year was dominated by the battle for a satisfactory conclusion to the negotiations establishing Horizon Europe, the 2021-2027 EU Framework Programme for Research & Innovation. At the European Summit in July, national EU leaders decided on a more than 15% cut, which reduced the budget to a level far below the EUR 120 billion requested as a minimum by the Lamy report, but also by...
the European Parliament and the European Round Table for Industry. This meant reducing the EU budget part by EUR 5 billion and leaving only EUR 5 billion of support coming from the Next Generation EU Fund. This enhanced the mobilisation of the scientific community that had gathered support earlier on for a petition to defend a higher budget for the ERC. Thanks to close collaboration with a number of members of the European Parliament, in particular many from the ITRE Committee in charge of Research and the Committee on Budgets, Horizon Europe remained high on the Parliament's priority list of programmes to get an improved support. The main angle taken stressed the discrepancy between the European Commission’s political priorities, all requiring a high level of research and innovation, and the means devoted to these activities. In the final ‘trilogues’, Parliamentarians were able to successfully improve the Horizon Europe budget by EUR 4 billion with EUR 1 billion going to the ERC. Thanks to all the efforts, the ERC budget for Horizon Europe ended up being EUR 16 billion.

Two other issues of great importance for the ERC were: the breakdown of financial contributions from Associated Countries between the sub-programmes of Horizon Europe and the outcome of the Brexit deal. The final formulation of the Horizon Europe legislation states that the breakdown will fully follow the ‘pay-as-you-go principle’ – whereby the performance of a given Associated Country in a programme will determine the amount of contribution going to that programme. This is excellent news for the ERC. If the interest in the ERC from researchers based inAssociated Countries remains at the level it was under Horizon 2020, this will entail a significant top up to the ERC budget - and help address the challenge in terms of ERCEA staff numbers posed by the objective to improve productivity by 15% over the 7-year Horizon Europe period, an objective which has been set irrespective of the activities to be performed. The second good piece of news has to do with the inclusion of the UK association to Horizon Europe in the Brexit deal. This makes the above point even more relevant in view of the high number of ERC grants won by UK-based scientists.

Thanks to the devotion of Council members to defend the ERC values and to the professionalism of the ERCEA staff who in spite of challenging working conditions delivered all services flawlessly, the ERC was able to successfully overcome all hurdles 2020 brought with it. More than 1,000 grants were put in place to support ambitious research projects with about two thirds led by early-career researchers.

“The ERC successfully faced the challenges brought on by this exceptional year, proving the remarkable robustness of a programme that has become an institution thanks to a strong backing by the scientific community and which remains an emblematic success story of the European Union.”
This makes us very hopeful that, in the future, the ERC will be able to continue its mission to make European research ever more dynamic and more competitive and to enable researchers, in particular younger ones, to pursue their most radical ideas. The way frontier research made crucial contributions to help the world out of the coronavirus pandemic demonstrates, quite amply, its key role in getting society move forward. The ERC successfully faced the challenges brought on by this exceptional year, proving the remarkable robustness of a programme that has become an institution thanks to a strong backing by the scientific community and which remains an emblematic success story of the European Union.

The ERC Vice-Presidents for the year 2020

Prof. Janet THORNTON
Prof. Jean-Pierre BOUGUIGNON
Prof. Fabio ZWIRNER
Prof. Eveline CRONE

The ERC President ad interim since 27 July 2020

Prof. Jean-Pierre BOUGUIGNON
chapter two
Strategy and Governance
ERC Mission

Pushing forward the frontiers of knowledge

Reinforcing the excellence, dynamism and creativity of European research. Research funded by the ERC is expected to lead to advances at the frontier of knowledge and to set a clear and inspirational target for frontier research across Europe.

ERC Strategy

Excellence

Providing attractive long-term funding, awarded on the sole criterion of excellence, to support excellent investigators and their research teams to pursue ground-breaking, high-risk/high-gain research.

The ERC operates on a “bottom-up” basis without predetermined priorities and its grants are open to individual researchers of any age, gender or nationality, and from any country in the world, working in Europe. Particular priority is given to assisting the best young researchers starting out with excellent ideas to make the transition to independence by providing adequate support at the critical stage when they are setting up or consolidating their own research team or programme.

The ERC aims to foster healthy competition across Europe based on robust, transparent and impartial evaluation procedures which address, in particular, potential gender bias.

ERC Grants

- Starting Grants (StG) support researchers at the early stage of their careers to become independent research leaders.
- Advanced Grants (AdG) support outstanding and established research leaders to continue their work in expanding the frontiers of scientific knowledge.
- Consolidator Grants (CoG) support researchers who are at the early stage of their careers but are often already working with their own group.
- Synergy Grants (SyG) enable small groups of researchers to bring together complementary skills, knowledge and resources to address ambitious research problems.
- Proof of Concept Grants (PoC) support ERC grantees by helping them bridge the gap between their research ideas and social or commercial innovation.
**ERC Scientific Council**

The Scientific Council has the responsibility to establish the ERC’s overall scientific strategy, the Work Programme and, from a scientific perspective, positions on the implementation and management of calls for proposals, evaluation criteria, peer-review processes and proposal evaluation.

It is made up of members of the scientific community at the highest level, knowledgeable about the European scene, acting in their personal capacity and independently of political or other interests.

The Scientific Council’s composition allows it to be independent, combining wisdom and experience with vision and imagination and reflecting the broad disciplinary scope of research.

The 22 individual members are selected, based on their undisputed reputation as leaders and for their independence and commitment to research, following a transparent procedure by an independent committee of seven highly respected personalities in European research.

They are appointed by the European Commission for a term of office limited to four years, renewable once, on the basis of a rotating system which shall ensure the continuity of the work of the Scientific Council.
**ERC President**

The role of the President is to chair the Scientific Council and ensure its leadership, to work closely with the ERC Executive Agency (ERCEA) and to act as an ambassador for the ERC in the world of science. The President is appointed by the European Commission following a transparent recruitment process based on the recommendations of an independent, dedicated search committee and with the approval of the Scientific Council.

Jean-Pierre Bourguignon, an internationally respected mathematician, took office as President of the ERC on 1 January 2014 for a four-year term, renewed until the end of 2019. He was replaced on 1 January 2020 by Mauro Ferrari, a distinguished academic with many years of career in the United States, during which he contributed to multiple areas of research and helped pioneer the field of nanomedicine. Mauro Ferrari resigned from his position in April at the request of the ERC Scientific Council and in July the European Commission appointed Jean-Pierre Bourguignon as President on an interim basis from 27 July until the next ERC President is selected and takes up duties.

**Appointment of the next ERC President**

On 9 October 2020, the European Commission appointed an independent Search Committee and invited nominations and applications to fill the post of the next President of the ERC.

The Search Committee consisted of seven highly respected personalities in European research: Professors Helga Nowotny (Chair), Pearl Dykstra, Tamás Freund, Jiří Friml, Serge Haroche, Viola Vogel and Fabio Zwirner.

Organisations and bodies’ representatives of the scientific and research community were invited to nominate outstanding candidates for ERC President. Individual applications for the position were also welcomed.

The ERC President, expected to be appointed in the first half of 2021, should be an internationally renowned and respected scientist or scholar and is expected to be a prominent advocate of frontier research and an ambassador of European science within and beyond Europe.

This will be the fifth ERC President since the launch of the organisation. The founding President was Fotis Kafatos (until 2010), after which Professor Helga Nowotny took office (until the end of 2013), succeeded by Jean-Pierre Bourguignon and Mauro Ferrari.

**Steering Committee**

The ERCEA Steering Committee is the body that oversees the operation of the Agency. It also adopts decisions necessary for the functioning of the ERCEA. These encompass among others the annual work programme of the Agency, its annual activity report as well as decisions related to the staff regulations, organisational structure, administrative budget and annual accounts.

The ERCEA Steering Committee in office in 2020 was chaired by the Director-General of the Directorate General for Research and Innovation, Jean-Éric Paquet. The other members of the committee were the Deputy Director-General of DG Research and Innovation Wolfgang Burtscher (Vice-Chair), the Acting Director for Talent Management and Diversity – Executive Staff in the Directorate-General for Human Resources, Henk Post, and two members of the ERC Scientific Council, Professor Margaret Buckingham and Professor Tomas Jungwirth. Further to the appointment of Wolfgang Burtscher as Director-General of DG Agriculture and rural development in April 2020, the ERCEA Steering Committee has been reduced to four members from that period until the end of 2020. The ERC President also attends the meetings as an observer.
ERC Executive Agency

The ERCEA is the dedicated implementation structure that supports the Scientific Council in the conduct of all of its tasks.

It operates on the basis of the powers delegated to it by the European Commission, which has the ultimate political responsibility for the specific programme, implementing the framework programme Horizon 2020.

The organisational structure of the Agency follows its operational and horizontal objectives. The organisational structure of the Agency follows its operational and horizontal objectives.

It consists of two operational departments (the Scientific Management Department and the Grant Management Department) and a Resources and Support Department. The Accounting Officer, the Communication Unit and the Support to the Scientific Council Unit report directly to Waldemar Kütt, the ERCEA Director.

ERCEA management team

From left to right:

First row: Bruno Wastin, Anthony Lockett, Martin Penny, Philippe Cupers;
Second row: Laurence Moreau, Michel Vanbiervliet, Anisoara Ulceluse-Pirvan, Alejandro Martin Hobdey, Angela Liberatore;
Third row: Nikola Car, Katja Meinke, Mila Bas Sanchez, Dirk Costens, Komninos Diamantaras;
Fourth row: Niki Atzoulatou, Athanasia Papathanasiou, Waldemar Kütt, Jose Labastida, Claire Levacher.
Absent: Thierry Prost.
In memory of Theodore Papazoglou, member of the ERCEA management team
(† 12 April 2020)

Theo was one of the rocks upon which the ERC was built. It is hard to imagine this organisation without him.

He helped to set up the ERC and had served it ever since with loyalty, devotion and wisdom.

Theo had an unrivalled knowledge of the ERC’s history and mandate. He worked with all the personalities and took part in all the big debates that have shaped the ERC over the years. He had a profound knowledge of the underlying legal documents, and had helped to write many of them. He was our institutional memory and one of the most committed defenders of the ERC’s founding principles.

Theo had led a full and varied life both in Europe and in the United States. He understood people. A distinguished scientist himself in his earlier career, he knew the value of frontier research. But he also understood what it takes to do it. The hard work and late hours. The compromises and disappointments as well as the successes and accolades.

All this gave Theo a firm grounding from which to see beyond the latest turn of events. He always tried to give advice that was measured and objective. He tried to set aside the normal occupational rivalries and interests. He was a professional who earned the respect and trust of all those he dealt with.

Theo embodied the ERC, its spirit and history like no one else. Whenever we deliberate in future, the first thought of many will be, “what would Theo have said?”

But above all, to many of us, Theo was first and foremost a friend and a confidante. He would be the first to roll his eyes and smile at the idea that he was a paragon. He always had time for those around him. His door was always open. He was always quick to respond to a mail, a question or a problem. He was always eager to go for coffee or lunch or to organise a social event, often at his own house. He was generous, supportive and kind through good times and bad. He could be relied upon.

A friend who should now be planning his next return to the country and the sea that he loved so much was taken too soon. Our hearts break for his wife and his beautiful children of whom he was so proud.

He will always be remembered.
ERCEA Staff

Number of staff

Staff nationalities

Staff by age category (average = 46.3 years)
Staff by gender and category

<table>
<thead>
<tr>
<th>Category</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
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<tr>
<td>Temporary Agent - Seconded</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>Temporary Agent - External</td>
<td>42</td>
<td>69</td>
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<tr>
<td>Seconded National Expert</td>
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<td>7</td>
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<tr>
<td>Contract Agent</td>
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<td>122</td>
</tr>
</tbody>
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Distribution of staff by category

- Contract Agent: 22%
- Temporary Agent - External: 72%
- Temporary Agent - Seconded: 3%
- Seconded National Expert: 3%
ERC in figures

EUR 13 billion
ERC budget in Horizon 2020

17%
of the entire Horizon 2020 budget

EUR 2.22 billion
ERC 2019 budget, fully committed

EUR 2.01 billion
payment credits fully executed in 2020
(EUR 60 million for FP7
and EUR 1.952 billion for Horizon 2020)

> 12,000
projects of all types funded
by the ERC since 2007

85
nationalities
(ERC grantees)

35
EU and Associated Countries
hosting ERC projects

> 150,000
publications reported
by ERC projects

> 80,000
researchers and other professionals
hired in ERC teams
Statistics of ERC project teams in Horizon 2020
(1,994 reporting projects; about 12,500 team members)

Team composition (excluding Principal Investigator)

Nationality of team members

ERA* nationalities (~10,000 team members)

Non-ERA nationalities (~2,300 team members)

* EU Member States and the countries associated to Horizon 2020
Gender by staff category
(overall 40% female and 60% male)

Nationality by staff category
(overall 50% nationals, 32% ERA non-nationals and 18% non-nationals from outside ERA)
## Top organisations hosting ERC Principal Investigators

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<th>Horizon 2020 Calls</th>
<th>SyG Pls</th>
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<tr>
<td></td>
<td></td>
<td>StG</td>
<td>CoG</td>
<td>AdG</td>
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<tr>
<td>National Centre for Scientific Research</td>
<td>FR</td>
<td>130</td>
<td>15</td>
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<tr>
<td>University of Oxford</td>
<td>UK</td>
<td>55</td>
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<tr>
<td>University of Cambridge</td>
<td>UK</td>
<td>61</td>
<td>8</td>
<td>57</td>
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<tr>
<td>Max Planck Society</td>
<td>DE</td>
<td>41</td>
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<tr>
<td>Swiss Federal Institute of Technology Zurich</td>
<td>CH</td>
<td>30</td>
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<tr>
<td>University College London</td>
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<td>Weizmann Institute</td>
<td>IL</td>
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<tr>
<td>Swiss Federal Institute of Technology Lausanne</td>
<td>CH</td>
<td>44</td>
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<tr>
<td>Helmholtz Association of German Research Centres</td>
<td>DE</td>
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<tr>
<td>Hebrew University of Jerusalem</td>
<td>IL</td>
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<td>Imperial College</td>
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<td>National Institute of Health and Medical Research</td>
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<td>University of Copenhagen</td>
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<td>University of Zurich</td>
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<td>Utrecht University</td>
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<td>Delft University of Technology</td>
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<td>Spanish National Research Council (CSIC)</td>
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<td>Technion - Israel Institute of Technology</td>
<td>IL</td>
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<tr>
<td>French Alternative Energies and Atomic Energy Commission</td>
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Data as of December 2020

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Closing the gap between research and innovation
ERC and EIC: synergies and complementarities

2020 has seen the intensification of the relationships between the ERC and the European Innovation Council (EIC).

The EIC, introduced as a pilot by the European Commission in Horizon 2020 to support the commercialisation of high-risk, high-impact technologies in the EU, will be fully implemented from 2021 under Horizon Europe.

A joint working group comprising members of the ERC Scientific Council and of the EIC Advisory Board was established with the aim to identify potential synergies and complementarities between the two organisations and explore opportunities for collaboration and joint activities.

Since its first meeting in June 2020 the group has gathered three times during the year. In addition, a joint session was organised as part of the R&I Days in September to discuss the pathway from ground-breaking frontier science to breakthrough innovation.

Among the issues that the joint working group identified for in-depth consideration there are the EIC Transition activities, which were seen as a possible follow up to the ERC Proof of Concept grants.

The EIC will mainly offer three funding schemes: Pathfinder grants will fund early stage research and technology development up to proof of concept; the Transition activities will fund the maturation of technologies and development of business cases for specific applications; and the Accelerator programme will support innovative companies (start-ups, spinouts, SMEs) to bring to market and scale up their ideas.

Originally foreseen as a mechanism to further develop EIC Pathfinder results into eligible EIC Accelerator proposals, the future EIC Transition programme will as well help to bridge the gap between ERC PoCs and EIC existing instruments, not only through mono-beneficiary grants, but also through access to the EIC Business Acceleration Services.

Another aspect of synergy between the two organisations concerns the role of the EIC Programme Managers (PMs), a new management concept introduced under Horizon Europe legislation to allow for a more hands-on approach. Their role is to set visions for technological or innovation breakthroughs, and manage portfolios of projects to achieve these visions through synergies and complementarities among projects. The joint working group saw a potential role of EIC PMs to identify trends in ERC-funded research in areas that are considered as top priorities in industry and to assess innovation potential arising from ERC.

Roles and goals of ERC and EIC funding can be seen as complementing each other and possible joint events and initiatives will be organised in the near future, but the two organisations remain focused on their respective objectives: excellent frontier research vs excellent innovation.
chapter four

2020 in Review
ERC Annual Workshop

Sex and Gender dimension in frontier research

An online conference on “Sex and Gender Dimensions in Frontier Research” was organised by the ERC on 16 November 2020.

The conference aimed at creating a platform to discuss innovative approaches for gender unbiased research, as a way to promote equality. The event generated wide interest among scientific communities, policy-makers and administrators. More than 800 people attended the virtual event. Three quarters of them were researchers, 15% administrators and policy makers, and 10% were coming from companies or other organisations. Although the bulk of attendees were from Europe, there were connections from every part of the world.

European Commissioner Mariya Gabriel opened the workshop emphasising that research can only be truly excellent as long as it incorporates relevant sex and gender dimensions. While there are areas of science, such as astronomical observations and pure mathematics for example, where gender aspects are not relevant, integrating sex/gender awareness into research designs is essential in most other areas of research. As the Commissioner underlined, in many cases, such integration is critical for the robustness and validity of the knowledge produced in as different fields as health, transport, labour, migration or even the development of algorithms. Research that is sex and gender sensitive is more representative and therefore more scientifically and societally relevant. In other words, sex and gender sensitive research is part and parcel of ensuring excellence.

Mariya Gabriel,
European Commissioner for Innovation,
Research, Culture, Education and Youth
The scientific sessions covered a wide range of topics, presented by high-level researchers, the large majority ERC grantees.

The ERC-supported research presented in the session on “Gender in medicine and medical care” showcased that sex-differences account for biological variation both in vitro and in vivo, both in humans and in other animal species such as Drosophila, and at all levels, from the cellular up to the organ level. In addition, analysing sex-differences is key for a better understanding of their biological basis, as well as for better, fairer and equalitarian healthcare research and treatments.

The “Gender, demographics and behaviour” session discussed the importance of integrating gender dimensions in the social sciences as well as in epidemiology to ensure robustness, representation and validity of the questions addressed and results obtained. Gender-blind analysis can lead to devastating results in terms of biased evidence for economic, educational or epidemiological policies.

The final session, “Gender and fairness in the digital society”, provided a clear and thought provoking insight into how bias from “wild” or partial data sets need to be addressed in Artificial Intelligence, with examples in translation, searches, auto-completion, image analysis. The presenters highlighted the need for an interdisciplinary approach involving social sciences to understand and potentially correct algorithmic bias that originates from data. Besides, they demonstrated how engaging with digital technology helps mitigate the isolation of migrants, through new forms of sociality, conviviality and emotional belonging by looking at diasporic digitality.

The talks in this workshop showed that sex and gender dimensions are essential in all research that deals in any way with humans. Reflecting on the research presented by ERC grantees during this workshop, ERCEA Director observed that this crucial element of excellence is naturally contemplated in projects. The ERC will maintain its position that excellence in research is to be judged by peer scientists and scholars (note that these three words are gender neutral), not attempted to be measured by administrative requirements.

Policy makers also have a role to play in change-making, as discussed during the policy dialogue at the end of the day. European Commissioner Helena Dalli emphasised in her opening speech that gender equality is essential for innovation and scientific advancement. She further mentioned the new Gender Equality Strategy, which places gender equality at the core of EU policy development. As a measure to promote full participation of women in science, for instance, the Commission will require a gender equality plan from institutions hosting researchers funded under Horizon Europe.

Dame Athene Donald led a discussion with two Members of the European Parliament: Marc Angel (Luxembourg) and Lina Gálvez Muñoz (Spain). Collecting data of adequate quality is the basis for robust data policy-driven initiatives across European Member States. Gender disaggregated data in academia by scientific field is scarce and non-harmonised in Europe. Answering questions like women’s representation in academia by scientific discipline remains essential for motivating and directing action. In contrast, the ERC has set a sterling example of how to collect data and to publish gender statistics in their grant funding.

A brilliant reflection and conclusion of this event was written by Prof Donald in her blog: “Policy-makers and funders, as well as individual researchers, all have their own part to play in ensuring that sex and gender are appropriately fed into the design of cutting-edge research programmes, and that fairness in the award of such grants is maintained, with constant vigilance over each stage of any process.”
Joint ERC / REA Seminar on Science Diplomacy

The ERCEA organised a 2-hour science diplomacy seminar together with colleagues from the Research Executive Agency (REA) on 16 January 2020.

Around 90 participants attended the event, which brought together high-level ERC- and REA-supported researchers working on science diplomacy and related subjects. The gathering provided a lively forum for exchanges between EC-funded researchers, interested stakeholders and EU staff on the role of science in and for diplomacy. In addition, the seminar also highlighted the complementarity of “bottom-up” and “top-down” funding approaches in Horizon 2020.

In their joint introduction to the seminar, Angela Liberatore from ERCEA and Corinna Amting from REA emphasised the importance of science diplomacy at the EU level and the need to better understand its mechanisms in order to tackle global challenges such as climate change. This theme was taken up by Maria Cristina Russo, Director for International Cooperation at the DG for Research and Innovation, who elaborated on insights gained from the European Commission's ongoing policy activities on science diplomacy.

In the first scientific intervention of the seminar, Claire Mays from the REA-funded project InsSciDE provided the audience with conceptual background and described the development of science diplomacy over time. She was followed by Eystein Jansen who is one of the PIs of the ERC Synergy Grant “Arctic Sea Ice and Greenland Ice Sheet Sensitivity”. Jansen, a marine geologist by training and by now also an ERC Scientific Council member, outlined to the audience how science diplomacy can be utilised in the climate area. Another ERC grantee, Halvard Buhaug, PI of the project CLIMSEC, addressed the relation of climate, food insecurity and political violence. Seminar participants got a clear sense of how closely science and the international political sphere can be related. Tim Flink of the REA-funded project S4D4C then tied the previous interventions together by explaining how to communicate science diplomacy into EU policies. Questions from the audience and a dynamic dialogue on science diplomacy concluded the seminar.

Before the actual event, the two ERC grantees had used their presence in Brussels already to discuss specifically on science diplomacy and climate change. The conversation is available on YouTube.
Joint ERC/REA Seminar on Social Innovation
Concept, frontier research and societal impact

A second 2-hour joint ERC/REA seminar was organised on 23 January 2020 on social innovation. Around 120 participants attended the seminar that saw presentations from two ERC PoC grantees and two projects funded under Horizon 2020 Societal Challenge 6: Europe in a changing world – Inclusive, innovative and reflective societies (SC6). They demonstrated the different ways research can engage with social innovation and how it translates into societal impact. Furthermore, they revealed the complementarity of “bottom-up” and “top-down” funding approaches.

In a joint introduction, Corinna Amting from REA spoke about how social innovations help identify problems and deliver solutions by engaging various actors such as citizens, academia, public authorities, businesses, and entrepreneurs. Angela Liberatore from ERCEA highlighted how ERC-funded frontier research brings about new and unpredictable scientific and technological discoveries that can form the basis of social innovations with high impact.

Presenting the SC6 funded project SI-DRIVE, Christoph Kaletka gave an informative overview of theoretical developments of the concept of social innovation. Lucie Cluver, who joined via videoconference from South Africa, presented her work based on research results from her ERC StG project PACCASA, further developed in her PoC project CAPITA, on developing a free, effective child abuse prevention parenting programme for low and middle-income countries. Prof Cluver is also among the winners of the first 2019 Horizon Impact Award given for research with societal impact in Europe and beyond. Sandra Schön presented the SC6 funded project DOIT, which developed holistic entrepreneurial learning approaches for children and youth. In particular she raised awareness of the potential of “makerspaces” as environments for practice-based development of digital, social and entrepreneurial skills. Lastly, Danie Meyer presented the ERC funded AdG project MemoTV, which analysed how the way stress and violence is experienced determine and organise memories.

Building on this, with the PoC grant, POPP, the project team designed a training curriculum for mental health care tailored specifically to the needs of traumatised young migrants arriving in the EU. Click [here](#) to see more.

The scientific presentations were followed by questions from the audience and a lively discussion of the potential of social innovations. With the participation of ERC PoC evaluators and Scientific Council member Kurt Mehlhorn, the event also inspired future discussions in the Working Group on Innovation.
ERC support to Open Science initiatives
The year 2020 saw the preparation and/or launch of three new Coordination and Support Actions to boost the implementation of Open Science in the context of ERC projects. Through a new five-year grant, the ERC reconfirms its commitment to support the further development of the Europe PMC platform\(^1\), joining forces with some 30 other funders. The ERC Scientific Council recommends Europe PMC as the repository of choice for publications in the life sciences. To facilitate open access to long-text publications, the ERC also renewed its support to the OAPEN Open Books Library\(^2\). Although the Scientific Council recommends this repository for long-text publications from any discipline, it is of particular importance for grantees from the Social Sciences and Humanities. A new initiative supported by the ERC is SciPost\(^3\), an innovative open access publishing platform that does not charge any fees. Originally restricted to publications in Physics, it has recently started to expand also to other areas.

\(^1\)https://europepmc.org/
\(^2\)https://www.oapen.org/
\(^3\)https://scipost.org/

ERC at WEF’s Davos meeting
At the 50th edition of the World Economic Forum WEF’s Davos summit, the ERC brought pioneering research and the latest scientific insights to the discussions with seven stellar grantees. The ERC speakers took part in ten sessions during the summit. The highlight was a dedicated Ideas Lab entitled “The origin and destiny of our solar system”. The European Commissioner for Innovation, Research, Culture, Education and Youth Mariya Gabriel and the ERC President Mauro Ferrari gave a press conference addressing the topic “Europe – leading the response to the climate emergency”. What’s more, the ERC delegation took part in numerous press interviews and one-to-one meetings.
In February, a delegation from the ERC left for Seattle, USA, where the annual meeting of the American Association for the Advancement of Science took place and joined forces with the EU R&I team to showcase European science at the conference, attended by more than 4,000 people. ERC grantee Liesbet Geris talked about the future of artificial limbs and organs while art met science, as the artists from ERCcOMICS live drew during the EU-organised scientific sessions and delighted participants at the EU booth with works inspired by ERC grantees.

Photo: ERCcOMICS artist Francesco Guarnaccia at the EU stand

Statement of Support for the Global Biodata Coalition

Biodata resources are crucial for most areas of life sciences research. With the exponential growth in data production and ever more research funders adopting policies for responsible research data management and sharing, their importance is further increasing. However, in the absence of a coordinated approach to their funding, their sustainability is of increasing concern. The Global Biodata Coalition (GBC)\(^4\), which brings together research funders from around the globe, addresses this issue by providing a forum for better coordination between funders, allowing them to share approaches for the efficient management and growth of biodata resources worldwide. Recognising the importance of these resources for the ERC’s life sciences researchers, the ERC Scientific Council issued a statement of support for the GBC\(^5\), encouraging both researchers and funders to support and engage with the development of an integrated, robust global biodata infrastructure.

\(^4\) https://globalbiodata.org/
Winners of the ERC Public Engagement with Research Award announced

In 2020, the ERC launched a new initiative to put the spotlight on how its grantees inspire the public with their research. Anna Davies from Trinity College Dublin, Konstantinos Nikolopoulos from the University of Birmingham, and Erik Van Sebille from the University of Utrecht won the first ERC Public Engagement with Research Award.

In July, the names of the winners were unveiled during a live virtual ceremony with the participation of the European Commissioner for Innovation, Research, Culture, Education and Youth, Mariya Gabriel, and ERC Vice-President Fabio Zwirner, who chaired the jury.

International agreements signed

In October, a new EU-India initiative has been launched to enhance cooperation in frontier science. It aims to encourage top scholars funded by the Indian Council of Social Science Research (ICSSR) to join temporarily ERC research teams in Europe. The initiative is the second of its kind for the ERC with an Indian funding body.

A similar deal was signed in November to encourage collaboration between top Japanese researchers in the medical field and Europe-based teams, funded by the ERC. This joint scheme with the Japan Agency for Medical Research and Development (AMED) is the third of its kind for the ERC with a Japanese funding body and it is the sixteenth of similar international agreements. It forms part of the ERC’s global outreach strategy, which aims to make Europe a hub for research talent.

Euro Science Open Forum (ESOF)

ESOF held once every two years, is the largest interdisciplinary science conference in Europe. In September, the event took place in Trieste, in a hybrid format. The ERC organised 11 online scientific sessions, including one on the hot topic of vaccines, featuring 35 grantees. A policy session with former and current ERC leaders and grantees highlighted the achievements of the ERC, called for the support of frontier research, and emphasised its importance in tackling future global challenges. In cooperation with the Research Executive Agency (REA), the ERC organised also a joint research career session.

ESOF 2020’s hybrid format was a huge hit: online participants came from 52 countries across five continents.
European Research and Innovation Days (R&I Days)

In September, the second and virtual edition of the European Research and Innovation Days took place bringing ministers, policy-makers, scientists, stakeholders and decision-makers together for three days of policy talks, debates and high-level meetings to shape the future research and innovation landscape. ERC sessions focused on “frontier research to fight COVID-19” and on the “challenges and best practices of public engagement with research” with the three laureates of the first ERC Public Engagement with Research Award.

The ERC also joined forces with the Kavli Foundation for a plenary session with 3 ERC grantees - Nobel laureates Sir Christopher Pissarides and Sir Peter Ratcliffe and Kavli Prize winner Edwine van Dishoek - together with Kavli Prize winner Jennifer Doudna. Moderated by Robbert Dijkgraaf, they discussed how curiosity-driven science can help address major challenges and prepare for an uncertain future in a post-COVID-19 world. In the virtual exhibition, ERC grantees immersed students and the public in different battery technologies via interactive virtual reality games and in novel gut ecology-based therapeutic approaches, which are opening up a new era of individualised preventive care.

The winners of the second Horizon Impact Award, announced at the R&I Days, included two ERC-funded scientists: Elvira Fortunato and Henri Weimerskirch.

Finally, Kurt Mehlhorn, Scientific Council member, and Filippo Bosco, CEO of Blusense Diagnostics, a company created by ERC grantee Anja Boisen, joined a session organised by the European Innovation Council on how to address the gap between research and deeptech-driven innovation at a pan-European level.

Falling Walls

At the annual Falling Walls conference, which was fully remote this year, the ERC organised a Falling Walls Circle session on the understanding of the scientific method in the 21st century featuring ERC President ad interim Jean-Pierre Bourguignon and three ERC-funded top scientists Fosca Gianotti, Sabina Leonelli and Edith Heard. The ERC President also participated in another session “Una Europa talk” with universities from across Europe on the digital agenda, opened by the Berlin State Secretary for Science. The Falling Walls Foundation also honoured three ERC grantees among ten Falling Walls Science Breakthroughs of the year 2020: Mikhail Eremets for breaking the wall to room-temperature superconductivity; Jacob Friies Sherson for breaking the wall of hybrid intelligence; and Metin Sitti for breaking the wall to wireless medical robots inside our body.
ERC Mentoring Initiative

Over the years, the ERC has implemented a number of initiatives to encourage quality applications from researchers in countries where performance in ERC calls has been traditionally low. The ERC Visiting Fellowship programme, for instance, provides the opportunity for applicants to arrange a few months visits to ERC grantees who would show them the research environment of a successful ERC team, a great help when preparing their application. Launched in December 2020, the ERC Mentoring Initiative will target the problem from a new angle. It will corroborate the action of existing national offices in low performing countries that provide support to potential ERC applicants. The challenge of these offices is finding enough local experts that could help researchers review their proposal at the pre-submission stage. The ERC initiative will assist the offices putting them in contact with a pool of mentors selected among ERC grantees and former ERC evaluators. The Scientific Council will select a number of eligible offices and ERCEA will identify interested Principal Investigators and former panel members and chairs through yearly calls. ERC will closely monitor the initiative and assess whether the success of ERC applicants who received mentoring is higher than the one at country level.
European Parliament and Council reach a political agreement on Horizon Europe

In June 2018, the European Commission proposed a total budget allocation of €100 billion to finance science, research and innovation projects during the 2021 - 2027 period, of which €94 billion in current prices, would be allocated to the Horizon Europe framework programme. Horizon Europe would introduce new features such as the European Innovation Council, missions to promote research results, and new forms of partnerships. The European Research Council, which was seen as a great success of the previous two framework programmes, would continue in its current form under the leadership of an independent Scientific Council with a budget of €16.6 billion. This compares to €13 billion for 2014 - 2020.

In March 2019, after several trilogue meetings, Parliament and Council reached a partial agreement on the content of Horizon Europe, but not on issues related to the budget as the EU’s 2021 - 2027 long-term budget had not at that stage been agreed.

In response to the ongoing pandemic the European Commission introduced in May 2020 a new proposal for the EU’s long term budget with an additional Recovery Instrument. The budget for Horizon Europe would be €91 billion plus €15 billion from the recovery funds.

In July 2020, the European Council reached agreement on a proposal with €86 billion for Horizon Europe plus €5 billion from the recovery funds. The Scientific Council and others across the research community expressed their dismay at these reductions.

A final agreement on the EU’s long term budget was reached in November 2020 with an additional €4 billion for Horizon Europe at the insistence of the European Parliament. The Scientific Council made a statement following this result advocating that a large part of this extra funding should go to Pillar I of Horizon Europe. MEPs reached a deal with the Council on the Horizon Europe programme on 11 December 2020 which included an extra €1 billion for the ERC, making its final budget for 2021 - 27 at €16 billion in current prices. The association of the UK and other non-EU countries to Horizon Europe on a “pay as you go” basis is likely to increase this budget significantly. The formal steps to ratify this agreement will happen in 2021.

Training the next generation of leading researchers

ERC funding offers ERC Principal Investigators the possibility to set up, consolidate or enlarge their own research teams by recruiting talent at various career stages from all over the world. This creates a highly competitive and international environment around each ERC project, where the more junior team members are given the opportunity to acquire valuable knowledge and various career-enabling skills helping them to develop as autonomous researchers and, eventually, become leading researchers themselves. At the same time, those leaving academia can bring their knowledge and skills to industry and other professional areas.

Evidence from almost 2,000 ERC projects funded in Horizon 2020, which provided information on the composition and the demographics of their teams, indicates that the average team size at project mid-term is eight team members (excluding the PI) with some difference between the three types of main grants: 6.4 for StG, 8.4 for CoG and 9.7 for AdG. Around 70% of these team members were already employed 18 months after the start of the project. Only 15% of the staff mentioned in the first report left the project by the mid-term report. The shares of male and female team members are equal in Life Sciences as well as in the Social Sciences and Humanities in all three funding schemas, but the proportion of female team members is smaller (around 25%) in Physical Sciences and Engineering.
The team composition is similar to that observed in ERC FP7 projects: about 25% of the team members are PhD students, 30% postdoctoral researchers, between 5 and 9% undergraduate students and up to 8% senior researchers, depending on the type of grant (see page 21).

Based on the headcount of ERC team members reported so far and on the “age” of the projects, a linear forecast would indicate that by the end of Horizon 2020, with over 6,500 funded projects, the ERC would have supported over 60,000 team members, among which nearly 15,000 PhD students and 20,000 postdocs. After the projects submit their final reports, we would also be able to report on the final destination of these junior researchers.

On average, half of the team members are non-nationals of the country where the project is based. In Switzerland and Luxembour, the percentage of foreign team members is over 80% and in Ireland, Sweden and UK almost 70%. Projects based in Italy, Israel, Serbia, Estonia, Iceland and Croatia seem to have smaller shares of foreign team members (below 25%).

Like in FP7, about 18% of the team members are non-ERA10 nationals coming from almost 90 countries worldwide, a proof of the global character of the ERC. The list of top non-ERA countries at the origin of ERC team members did not change compared to FP7, but some significant changes can be observed regarding the share of US team members, which decreased from 16% to 12%, and the share of Indian team members, which increased from 13% to 18% (see page 21).

ERC team members are also very mobile people. On average, 44% of the scientific and technical staff obtained their last degree in a country different from the hosting, most of them being non-nationals. The proportion of staff with the last degree obtained abroad is bigger than the average in 15 host countries, from all geographical areas, including four newer EU Member States (Cyprus, Slovenia, Romania and Poland). Compared to FP7, there is more diversity in terms of last-degree country in almost all top host countries. A third of all scientific and technical staff who obtained their last academic degree outside the host country obtained it in a non-ERA country:

> 21% of the PhD students in this category obtained their last degree, usually Master, in India, 14% in US and 11% in China;
> 30% of the postdoctoral researchers in this category obtained their PhD degree in the US, 14% in China and 11% in India.

Another demonstration of mobility is shown in the fact that 40% of the scientific and technical staff changed country when started working on the ERC grant. The percentage of scientific and technical staff coming from abroad is not much different in the newer Member States (36%), in the older ones (40%) and in the Associated Countries (44%). Almost 60% of the scientific and technical staff changing country originate from the older Member States and 33% from non-ERA countries. The ERC grants attracted staff from over 50 countries from all over the world, in similar percentages, in all these three geographical areas. Less than 4% of the team members moving to older Member States and less than 2% of those moving to Associated Countries are from newer Member States.

This brief analysis confirms the global attractiveness of the ERC projects to researchers, the diversity of the ERC teams and the high mobility between countries characteristic to European research.

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8 Of which almost half reported at mid-term (36 months after the start of the project) and slightly over half after 18 months into the project. The total number represents 70% of the projects asked to respond (voluntarily).
9 The size variation by domain is small, with the SH teams slightly bigger on average in StG and CoG and the LS teams slightly bigger in AdG.
10 Countries other than the EU Member States and the countries associated to Horizon 2020.
This year this section showcases ERC-funded research related to the response to the Coronavirus pandemic.

When a person has virus antibodies, it means that they already had the disease - information which could be very useful in containing the spread of diseases such as coronavirus, as well as monitoring vaccination efficacy. Maarten Merkx developed a new type of rapid diagnostic test that allows detection of specific antibodies directly in the blood. The test uses sensor proteins that produce light by performing the same chemical reaction that is used by fireflies. In the presence of the target antibody, the sensor protein changes its structure, which changes the colour of the light that is emitted from green to blue. The power of this approach is that the test can be done directly in blood, and the signal can be detected with the camera of a smartphone. Prof Merkx and his team have now successfully adapted their approach to detect SARS-CoV-2 specific antibodies. The advantage of their technology is that the tests can be done quickly and don’t require expensive equipment. Read more.

SwitchProteinSwitch, AbSens and LUMABS, Maarten Merkx, Eindhoven University of Technology, The Netherlands.
Anomalies in sounds produced by the human body, like heartbeats, sighs, breathing, the voice, are indicators of disease. Prof. Cecilia Mascolo works on optimising audio technologies in mobile phones, tablets and smart watches, to capture the sounds of the body and allow early diagnosis of various diseases. Since dry cough and shortness of breath are specific symptoms of COVID-19, Prof. Mascolo launched a mobile phone app to collect sounds of the voice, breathing and coughing of people who may be suffering from the disease. With the data collected, she will develop audio-based analytics for an automatic assessment of the infection mainly through sounds. Devices to detect the onset and follow the progression of a number of respiratory and cardiovascular diseases have an enormous potential for large-scale and cost-effective diagnostics. Read more.

EAR, Cecilia Mascolo, University of Cambridge, United Kingdom

The COVID-19 pandemic has disrupted the world. However, could it also be an opportunity to make necessary social and environmental changes for fairer and more sustainable societies? To help the transformation, Prof. Caspar Chorus and his team are investigating how people’s values translate into concrete actions. They are studying how to turn difficult moral choices into mathematical models that combine behavioural science and philosophy into a format that policymakers can use to make better-informed decisions. The technique they developed asks participants to make dozens of morally difficult choices and, after being analysed, they provide insights into the public preference. Some of their findings showed how people’s deep-seated moral values can be quite different from their moral actions. Understanding how we make these tricky choices could help governments navigate the transformation of our economies and societies for the better. Read more.

BEHAVE, Caspar Chorus, Delft University of Technology, The Netherlands
Mathematical and statistical methods can provide important insight into the spread of infectious diseases such as COVID-19. Prof. Niel Hens and his team developed methods to predict the course of an epidemic from blood tests and social contact data. Their original focus was on diseases such as pertussis, cytomegalovirus and measles. However, they are now prioritising the application of their methods to SARS-CoV-2. Their focus on collecting and analysing social contact data is especially relevant for this outbreak. They have collected social contact data from different studies worldwide and made an interactive tool to help others assess the efficacy of different COVID-19 mitigation measures. Moreover, by studying cases in Tianjin, China and Singapore, Prof. Hens and several colleagues were among the first to confirm that coronavirus can be transmitted to others before the onset of symptoms. When it comes to coronavirus contact tracing, Prof. Hens and his team discovered that it performs better when combined with testing as long as the test is able to detect infections during the incubation period. Read more.

TransMID and DEFOG, Niel Hens, University of Antwerp and Hasselt University, Belgium
A free parenting programme created by Prof. Lucie Cluver won a 2019 Horizon Impact Award for its success in helping families to avoid child abuse in low- and middle-income countries. The open-access programme was developed in partnership with the World Health Organisation and UNICEF. It has reached over 600,000 families in 25 countries in Africa, Asia, the Caribbean and Eastern Europe. Prof. Cluver’s ERC-funded research and the parenting programme it helped to develop have also provided much needed support for parents and children who have been struggling with lockdown life due to the COVID-19 pandemic. Prof. Cluver and her partners produced six simple printouts covering one-on-one time, positive parenting, structure, bad behaviour, managing stress, and talking about COVID-19. Since April 2020, these parenting resources have reached 137.5 million people in 204 countries, and have been used by 29 governments in their national COVID-19 responses. Read more.

PACCASA, CAPITA, HEY BABY, Lucie Cluver, University of Oxford, United Kingdom

Kidney organoids can be derived in the laboratory from human pluripotent stem cells. At day twenty of differentiation these three-dimensional cultures show morphological features resembling the developing native organ. The image represents a confocal microscopy image of a kidney organoid with prominent tubular-like structures labelled in green together with glomerular-like structures detected in yellow and red. All cell nuclei are labelled in blue.

Kidneys are among the main organs affected by COVID-19. Prof. Nuria Montserrat, who creates kidney organoids to investigate kidney disease, has carried out experiments to observe the damage caused by SARS-CoV-2 to kidneys and find effective treatments. With other scientists, she identified an experimental drug (APN01) that in the organoid cultures blocks the replication of the virus at the early stages of infection. Clinical trials on patients with severe COVID-19 are currently under way. Their approach targets the ACE2 receptor, the gate the virus takes to infect cells. The use of human organoids allows agile testing of treatments already used for other diseases or close to validation, dramatically reducing the time researchers would spend trying a new drug on humans. Read more.

REGMAMKID, Nuria Montserrat, Institute for Bioengineering of Catalonia, Spain

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How can network science help us control epidemics? Viruses spread through the social network and via the travel network – therefore, the most comprehensive models currently used to predict the spread of the SARS-CoV-2 virus, as well as to test effective interventions, are based on network science. Scientists use network tools to develop strategies to control it. The main topic of the DYNASNET project is the dynamics of networks, and currently it is focusing on diffusion through networks, in particular the spread of the coronavirus. The tools they are developing are expected to find their way into the toolset of network scientists tasked with modelling the next wave of COVID-19 or the next epidemic outbreak. Furthermore, as COVID-19 acts by perturbing the sub-cellular network of our cells, we need another application of network science, and in particular the tools of network medicine, to find drugs that can be effective against it. Read more.

DYNASNET, Laszlo Lovasz & Albert-László Barabási,
Alfred Renyi Institute of Mathematics, Hungary

Dr Charlotte Uetrecht’s team aims to understand what happens when a coronavirus infects a human cell. They look at the viral proteins that are responsible for reprogramming our cells and replicating the viral genome, as these define the virus production and potential severity for patients’ health.

Funded by the ERC since 2018, Dr Uetrecht works on new methods and instruments to look in more detail at viral structures and how they change over time. In early 2020, her team started producing the proteins of the new SARS-CoV-2 in the lab. Using mass spectrometry, they could observe some of the protein dynamics and compare their behaviour with six other coronaviruses that they were already studying. Even small changes in the proteins can influence how they interact with each other, which affects the replication of the virus. Understanding these processes could lead to the development of drugs that would stop the virus machineries. These new treatments could also have a broader antiviral capacity against different viral strains, the researchers hope.

SPOCk’S MS, Charlotte Uetrecht, Heinrich Pette Institute
Leibniz Institute for Experimental Virology in Hamburg, Germany

How coronaviruses spread: understanding the role of viral proteins

Network medicine and the social network of the epidemic
One of the ten major breakthroughs of 2020 in the journal *Science* builds on decades of scientific advancement in climate science and addresses the question: by how much Earth will warm because of human activity. Generating precise temperature predictions has been challenging due to the complexity of our ecosystem, and in particular, an improved understanding of the way clouds can amplify or suppress heat. In a joint effort with 25 fellow scientists, Consolidator grantee Thorsten Mauritsen (Project ID: highECS) used the latest modelling and historic records to narrow the boundaries of the initial predictions of 1.5°C - 4.5°C from 1978 to 2.6°C - 3.9°C. This study now claims the very worst-case scenarios for climate change unlikely, but, on the other hand, guarantees an impending climate change, displacing millions of people and forthcoming extreme heat waves.

**ERC-funded research: Outstanding publications**

2020 has shown an explosion of research around COVID-19, but there were also other major scientific milestones that were achieved this year. Here is a selection of outstanding publications linked to ERC funded projects:

In the journal *Physics World*, one of the most important discoveries of 2020 is linked to two ERC projects in the domain of quantum physics (Project IDs: GEDENTQOPT and TempoQ). In their publication, the scientists investigated the inner world of individual atoms, describing a new measurement process to capture the orbit of an electron. By producing several pictures at different times, they could show the gradual changes happening in an atom during the measurement, thereby arguing against the prevailing idea of quantum jumps.
The journal Nature cites three publications with ERC grantees among the most important papers of 2020:

How many trees are there on Earth? Until now, we only had aggregated estimations, but Starting grantee Laura Vang Rasmussen (Project ID: FORESTDIET) together with a large team of scientists analysed high-resolution satellite images, thereby mapping the location and size of 1.8 billion individual trees in the western Sahara and Sahel regions of West Africa. They could show a surprisingly high tree density in this region, challenging narratives about dryland desertification. This study will certainly advance current modelling and monitoring systems of the global ecosystem.

One of the key assumptions to explain the existence of planets, stars and ourselves in the Universe is the domination of matter over antimatter. Until now, this asymmetry had been observed for (anti-)quarks only, but that was not enough to explain the creation of our Universe. By analysing data from 2009 and 2018, the T2K collaboration addressed this fundamental question of particle physics, searching for further violations of the matter-antimatter symmetry.

Several ERC grants (e.g., Project IDs: T2KQMUL, ENUBET, NuMass, neutrinoSNO+, ARIADNE) contributed to the advancement of this endeavour in their recent publication, using (anti-)neutrino oscillation experiments at unprecedented precision. These findings provide the first indications of such a matter-antimatter asymmetry for neutrinos, supporting their important role for the creation of our Universe.
When looking into the scientific papers of 2020 that have attracted most attention from the public sphere, the company Altmetric lists seven articles with ERC funding in their top 100:

The most debated scientific article of last year focuses on the origin of the SARS-CoV-2 virus. Consolidator grantee Philippe Lemey (Project ID: ReservoirDOCS) contributed to research describing the genomic features of the virus and their evolution. By comparing available genome sequences, the scientists concluded that SARS-CoV-2 originated through natural processes and was unlikely to be engineered in a laboratory.

By combining genetic tools like CRISPR-Cas9 with their knowledge about evolutionary neuroscience, triple grantee Richard Benton and double grantee Gregory Jefferis tested some long-standing hypothesis on animal evolution in a recent publication (Project IDs: NEUROFLIES, EVONEURO and OlfSwitch). By directly manipulating the activity of olfactory neurons, they showed why one type of Drosophila fly in the Seychelles is preferably eating from a toxic local fruit, while the other related fly types elsewhere reject this food option. The researchers thus showed that the dietary preferences of the island flies are due to neural and genetic changes that resulted from adaptation to their ecological niche over time. Establishing the link between an organism's genetics, its sensory activity and the resulting behaviour is a powerful new way forward to understand evolution.

A widely noticed publication by a research team around double grantee Ron Milo (Project ID:NOVCARBFIX) revealed that 2020 was a turning point for which human-made mass (e.g., in the form of buildings and infrastructure) is now exceeding all living biomass on Earth. This research reflects the unprecedented impact of human activity on our planet in the 21st century, and proposes to rename our current geological epoch the Anthropocene, i.e., the period where human activity has been the dominant influence on climate and environment.
Two collaborations between ERC grantees discovered new details about the surrounding life of homo sapiens:

In another large collaboration, double Advanced grantee Svante Pääbo and Starting grantee Sahra Talamo contributed to a study that identifies the first location of homo sapiens in Europe (Project IDs: 100 Archaic Genomes and Resolution). Their findings stem from a cave in Bulgaria, where they also found manufactured stone artefacts and pendants that had already been seen in other Neanderthal populations, suggesting that ancient humans in Bulgaria mingled with native Neanderthals.

In a big research study, Starting grantees Greger Larson (Project ID: UNDEAD) and Pontus Skoglund (Project ID: AGRICON) analysed a large sample of ancient dog genomes and identified five main linages from which dogs originated. The researchers also co-analysed the human genome and identified periods of similar human-dog population genetics, revealing the common ancestral history of human’s best friend.
A publication by a large consortium of 57 scientists provides the first global inventory measuring nitrous oxide, a greenhouse gas that is more potent and long-lived than carbon dioxide (contributions by Consolidator grantee Sönke Zaehle with Project ID: QUINCY and Synergy grant: IMBALANCE-P). Their research shows that nitrous oxide has risen 30% over the past four decades due to human industry and agriculture, mainly in emerging economies like Brazil, China, and India. By providing a detailed and comprehensive description of nitrous oxide occurrences, the study underlines the urgency and rises opportunities to mitigate nitrous oxide emissions worldwide to avoid the worst of climate impacts.

Until now, astronomers had never directly observed more than one planet orbiting a star similar to the Sun. A team around Starting grantee Frans Snik (Project ID: FALCONER) has now captured images of two exoplanets orbiting a sun-like star for the very first time, a discovery that they describe in last year’s publication.

Together with a large team of researchers, Consolidator grantee David Ehrenreich (Project ID: FOUR ACES) studied the climate of an ultra-hot planet, which is about 640 light-years away from Earth in the Pisces constellation. In their publication, the scientists describe one of the most extreme climates ever observed on an exoplanet, suggesting forceful winds together with heavy iron rains.

Few more ERC grants published research that have attracted the attention of the public last year:
ERC calls 2020

Starting Grant 2020 - Submitted proposals

- 29% LS (923)
- 28% PE (1409)
- 43% SH (940)

Starting Grant 2020 - Funded projects

- 29% LS (125)
- 29% PE (185)
- 42% SH (127)

EUR 677 million awarded

Consolidator Grant 2020 - Submitted proposals

- 27% LS (719)
- 29% PE (1100)
- 44% SH (687)

Consolidator Grant 2020 - Funded projects

- 27% LS (94)
- 29% PE (144)
- 44% SH (89)

EUR 670 million awarded
Advanced Grant 2020 - Submitted proposals

- LS (746)
- PE (1175)
- SH (757)

28% 28% 44%

The evaluation is still in progress

Synergy Grant 2020

- 441 submitted proposals
- 34 funded projects: EUR 352 million awarded

Proof of Concept Grant 2020 - Submitted proposals

- 1st deadline (148)
- 2nd deadline (178)
- 3rd deadline (205)

39% 28% 33%

Proof of Concept Grant 2020 - Funded projects

- 1st deadline (56)
- 2nd deadline (55)
- 3rd deadline (55)

33% 33% 34%
8,456 proposals submitted in 2020 to ERC core schemes (StG, CoG, AdG)

441 proposals submitted to SyG 2020

798 projects selected for funding in StG, CoG and SyG 2020 *

531 proposals submitted in 2020 to the PoC scheme

+ 2% increase in submissions compared to 2019

166 projects selected for funding in PoC 2020

+ 42% more AdG applicants compared to 2019

+ 69% more female AdG applicants compared to 2019

+ 5% more female StG and CoG applicants compared to 2019

> 4,000 panel members in 2014-2020 calls

60 European and non-European countries hosting ERC panel members

> 45,000 external reviewers in 2014-2020 calls

* The Advanced Grant 2020 proposals were still under evaluation at the moment of preparing this report
## ERC calls in Horizon 2020

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<th>Total number of applications</th>
<th>Evaluated*</th>
<th>Funded</th>
<th>Success rates**</th>
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* withdrawn and ineligible proposals not taken into account
** percentage of funded proposals in relation to evaluated proposals
Data as of December 2020
### Geographical distribution of grantees for each call

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### Chairs of ERC evaluation panels 2020

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<th>Panel</th>
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<th>Consolidator Grant 2020</th>
<th>Advanced Grant 2020</th>
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<td><strong>Life Sciences</strong></td>
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<td>Reinhard Jahn</td>
<td>Bert Poolman</td>
<td>Robert Tampé</td>
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<tr>
<td>LS2 Genetics, 'Omics', Bioinformatics and Systems Biology</td>
<td>Fyodor Kondrashov</td>
<td>Giacomo Cavalli</td>
<td>Frederic Berger</td>
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<tr>
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<td>Elly Tanaka</td>
<td>Karsten Weis</td>
<td>Freddy Radtke</td>
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<tr>
<td>LS4 Physiology, Pathophysiology and Endocrinology</td>
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<td>James Woodgett</td>
<td>Karin Sipido</td>
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<td>Jacques Neefjes</td>
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<td>Patrick Couvreur</td>
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<td>Bruno Chaudret</td>
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<td>PE6 Computer Science and Informatics</td>
<td>Marlon Dumas</td>
<td>Timos Sellis</td>
<td>Peter Druschel</td>
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<td>PE7 Systems and Communication Engineering</td>
<td>Adrian Ionescu</td>
<td>Karl-Henrik Johansson</td>
<td>Herve Rigneault</td>
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<td>PE8 Products and Processes Engineering</td>
<td>Jonathan Borg</td>
<td>Antonio Huerta</td>
<td>Michael Graetzel</td>
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<td>PE9 Universe Sciences</td>
<td>Rafael Bachiller</td>
<td>Heino Falcke</td>
<td>Mario Monteiro</td>
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<td>PE10 Earth System Science</td>
<td>Catherine McCammon</td>
<td>Alberto Montanari</td>
<td>Robert Stephen John Sparks</td>
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<td><strong>Social Sciences and Humanities</strong></td>
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<td>SH1 Individuals, Markets and Organizations</td>
<td>Lionel Fontagné</td>
<td>Thierry Mayer</td>
<td>Alan Kirman</td>
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<td>SH2 Institutions, Values, Environment and Space</td>
<td>Maria Attard</td>
<td>Milica Bajic-Brkovic</td>
<td>Jan Klabbers</td>
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<td>SH3 The Social World, Diversity, Population</td>
<td>Arnstein Aassve</td>
<td>Peter K. Smith</td>
<td>Elizabeth Thomson</td>
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<td>SH4 The Human Mind and Its Complexity</td>
<td>Manuela Piazza</td>
<td>Paola Merlo</td>
<td>Ruth Byrne</td>
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<td>SH5 Cultures and Cultural Production</td>
<td>Andrea Pinotti</td>
<td>Mahmut Mutman</td>
<td>Irene De Jong</td>
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<td>SH6 The Study of the Human Past</td>
<td>Julia Crick</td>
<td>Susan Pfeiffer</td>
<td>Francesca Tinti</td>
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<td><strong>Synergy Grant 2020</strong></td>
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<td>Hans-Ulrich Blaser</td>
<td>Dragan Mihailovic</td>
<td>Jean-Pierre Gorvel</td>
<td>Sharon Tooze</td>
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chapter seven

Strategy Support
Support to the Scientific Council

Strategy support consists of activities undertaken by the ERCEA to support the Scientific Council with the task of setting the scientific strategy, of establishing positions on scientific management, monitoring and quality control and of undertaking communication and dissemination efforts. These activities cover:

> policy analysis and advice
> programme design and review
> management of Standing Committees and Working Groups
> programme monitoring and evaluation
> communication and dissemination.

All ERCEA staff contribute to a greater or lesser extent to the development of the Scientific Council's strategy for the ERC, but two units in particular are dedicated to providing strategic support to the Scientific Council:

• **Support to the Scientific Council**: The unit supports the Scientific Council to establish the overall research funding and management strategy of the ERC, including the ERC annual work programme and leads on the assessment, monitoring, evaluation, reporting and statistical analysis of the ERC’s activities. In response to requests by the Scientific Council the unit continuously advises them in their activities by providing analysis and intellectual input through the drafting of various documents that reflect the Scientific Council's main orientations. Due to the specific governance model, the Scientific Council's plenary meetings are also prepared with the organisational and administrative support of this unit.

• **Communication Unit**: The unit assists the Scientific Council and the ERCEA in their communication strategy towards the scientific community, public authorities, media and the public at large. It also advises and assists the President in terms of communication activities, including media interviews.
**Meetings**

The Scientific Council (ScC) held regular plenary meetings in 2020, of which one in Brussels and four as virtual meetings. In addition, in 2020 members of the Scientific Council participated in other meetings and events representing the ERC, including scientific conferences.

**January**
- 16: Joint ERC - REA Seminar on Science Diplomacy
- 21-24: World Economic Forum Annual Meeting 2020 (Davos)
- 23: Joint ERC-REA Seminar on Social Innovation

**February**
- 4: Science Business Conference “Horizon 2050: Towards a greener, smarter world” (Brussels)
- 11: UN International Day of Women and Girls in Science (New York)
- 13-17: AAAS 2020 Annual Meeting (Seattle)
- 25-26: ScC Plenary (Brussels)

**March**
- 5: Joint Meeting of LERU’s Biomedicine, Natural Sciences and Social Sciences & Humanities Policy Groups (Leuven)

**April**
- 23-24: ScC Plenary (virtual meeting)

**May**
- 15: KoWi Advisory Board (videoconference)

**June**
- 19: MSCA2020.HR Video Conference
- 23-24: ScC Plenary (virtual meeting)
- 30: ISA Virtual Event “Space Research Day”
July
• 7: ERC Public Engagement with Research Award 2020 – Winners (virtual event)

August
• 17: American Chemical Society - Moving Chemistry from Bench to Market (virtual meeting)
• 26: ScC Plenary extraordinary (virtual meeting)

September
• 2-6: EuroScience Open Forum (ESOF) 2020 (Trieste, hybrid format)
• 7: Hearing of the ERC President at the EP ITRE Committee (virtual event)
• 9: EMBL Virtual Conference “COVID-19’s indirect attack on women”
• 22: Hearing of the ERC President at the EP Committee on Budgets (virtual event)
• 22-24: European Research and Innovation Days (virtual event)
• 23-25: 7th ACM International Conference on Nanoscale Computing and Communication (virtual event)

October
• 3-6: STS Forum 2020 (virtual event from Kyoto)
• 6: Inter-Academy Partnership (IAP) Stakeholder Dialogue on Predatory Practices (virtual event)
• 12: European University Association Research Policy Working Group (virtual event)
• 15-16: ScC Plenary (virtual meeting)
• 23: General Assembly of The Guild (videoconference)

November
• 4-6: Falling Walls Conference 2020 and Berlin Science Week (virtual event)
• 12: First National Junior Faculty Conference Sweden (virtual event)
• 16: ERC Virtual Event: “Sex and Gender dimension in frontier research”
• 19: Conference “United in Diversity - A Europe of Sustainability” (virtual event from Göttingen)
• 21: 38th LERU Rectors’ Assembly Meeting (virtual event from Leuven)
• 30: Conference “ERC between past and future in Europe and Italy” (virtual event from Padua)

December
• 2: ERC Information Day in Croatia (virtual event)
• 7-8: Slovenian Launching Event for Horizon Europe (videoconference)
• 10-11: ScC Plenary (virtual meeting)
• 14: OA2020 Virtual Summit of Chief Negotiators
Standing Committees

The Standing Committee on Panels deals with the selection of evaluation panellists.

The Committee met four times in 2020.

The Standing Committee on Conflict of Interest, Scientific Misconduct and Ethical Issues (CoIME) provides guidance on conflict of interest, scientific misconduct and ethical issues.

In 2020, the CoIME gave its advice on 25 cases of alleged scientific misconduct. An anonymised reporting of these cases can be found on the ERC website.

The Committee met once in 2020, besides the consultations of members on specific cases.

The Standing Committee for Programme Impact Monitoring and Evaluation (PRIME) provides guidance regarding ERC tasks to monitor the quality of operations, evaluate programme implementation and achievements and make recommendations for future actions.

It was created in February 2019 at the recommendation of the Scientific Council Working Group on Key Performance Indicators, which was active between 2013 and 2018 and was discontinued after the creation of PRIME.

The Committee met twice in 2020.
Working Groups

The members of the Scientific Council also meet in Working Groups (WGs) that carry out analyses and contribute to the ERC’s scientific strategy through proposals to be adopted by the Scientific Council in plenary in areas addressing specific issues.

There are currently five Working Groups dedicated to the following topics, which are of particular interest to the ERC:

**Innovation**, to examine the impact of ERC funded research on innovation and ERC’s relationship with the industrial/business sector.

*The WG met twice in 2020.*

**Gender issues**, to ensure that the ERC is at the forefront of best practices with regard to gender balance in research.

*The WG met three times in 2020.*

**Open access**, to develop an ERC position on issues related to open access to publications, research data management and sharing and open science more broadly.

*The WG met twice in 2020.*

**Widening European participation**, to encourage low performing countries and, in particular, Central and Eastern European countries to better nurture their scientific talent and invest more in research.

*The WG met twice in 2020.*

**Science behind the projects**, to perform an ex-ante content analysis of the ERC funded projects, using expert judgment that will enable ERC to systematically report on the research areas, topics and fields that it funds, including on funding trends.

*The WG met once in 2020.*
Communication

The ERC has a mandate to communicate to the scientific community, key stakeholders, the media and the public. In 2020, communication activities were carried out around three objectives set by the ERC Scientific Council. The pandemic was a major challenge and imposed a swift shift to an increasingly digital approach, but it also offered new communication opportunities.

Attracting the best ideas and the brightest minds

The ERC continued to promote its funding opportunities across Europe and worldwide. Aiming to assure the widest possible awareness of its grant competitions to potential applicants, it reinforced communication towards researchers in countries with lower numbers of applications and grants, as well as from outside Europe. In this respect, with the help of partners such as the ERC National Contact Points, various Host Institutions, the EU Delegations abroad and the Euraxess Worldwide Network, the ERC organised several national webinars targeting researchers from Bulgaria, Croatia and Slovenia, as well as regional webinars in North America, South America, Africa and Asia. To ensure the best possible information is available to potential applicants, these efforts were accompanied by a social media campaign promoting custom-made informational material such as testimonials, articles on best practices and videos, notably the “ERC Classes” series.

Sharing the passion for frontier science

In a year like this one, the relevance of research for our everyday lives is more apparent than ever. In 2020, the ERC continued to provide a narrative for frontier research within the context of the COVID-19 crisis and beyond, exploiting the power of its message to reach the media and public. It produced videos, podcasts, and articles showing how the work of its grantees contributed to fight the pandemic and to related societal challenges, help make societies more resilient to future crises and assist in Europe’s social and economic recovery. In 2020, the ERC increased its social media reach and engagement level substantially, collaborated with research institutions worldwide and took part in international science gatherings. Finally, it recognised the unique role of its grantees in this process through the awarding of its first “Public Engagement with Research Awards” to three grantees who distinguished themselves for their efforts to reach out to an audience beyond the scientific community.

Explain why frontier research is vital for Europe’s future

At a delicate time for the European Union and for European science, the ERC kept working with decision-makers, the research community and key influencers at EU and national level, within the discussions about the next EU budget. The ERC President and the members of the Scientific Council took part in numerous key events to promote this message, but also through media interviews. The ERC notably took part in the World Economic Forum in Davos, as well as the virtual EU Research and Innovation days, ESOF2020 and the annual AAAS meeting, to highlight the mission of the ERC and the importance of bottom-up frontier research, as well as its role in Horizon Europe, the next EU framework programme.
ERC press in figures

> 35 press announcements released by the ERC

> 14,200 media mentions of the ERC

1,700 media articles on ERC competition results/
new ERC winners

98,200 Twitter followers

75,500 Linkedin followers

32,700 Facebook followers

1.03 billion potential reach on ERC social media

69,000 ERC Magazine and news update subscribers

124,000 social media mentions
of the ERC, including retweets

947,000 website unique visitors
Getting in touch with the EU

In person
All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

On the phone or by email
Europe Direct is a service that answers your questions about the European Union. You can contact this service:
- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696 or
- by email via: https://europa.eu/european-union/contact_en

Finding information about the EU

Online
Information about the European Union in all the official languages of the EU is available on the Europa website at: https://europa.eu/european-union/index_en

EU publications
You can download or order free and priced EU publications from EU Bookshop at: https://publications.europa.eu/bookshop. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).

EU law and related documents
For access to legal information from the EU, including all EU law since 1952 in all the official language versions, go to EUR-Lex at: http://eur-lex.europa.eu

Open data from the EU
The EU Open Data Portal (http://data.europa.eu/euodp/en) provides access to datasets from the EU. Data can be downloaded and reused for free, both for commercial and non-commercial purposes.
"The European Research Council has, in a short time, achieved world-class status as a funding body for excellent curiosity-driven frontier research. With its special emphasis on allowing top young talent to thrive, the ERC Scientific Council is committed to keeping to this course. The ERC will continue to help make Europe a power house for science and a place where innovation is fuelled by a new generation.”

Jean-Pierre Bourguignon
ERC President ad interim and Chair of its Scientific Council