European Research Council
Established by the European Commission

ideas

#3
AUTUMN 2016

Newsletter of the European Research Council

Record-breaking new budget

Impact
of ERC research revealed

ERC grantee wins Nobel Prize

Subscribe

European Commission
Horizon 2020
European Union funding for Research & Innovation

Freedom of all kinds is precious, and as a scientist heading an organisation that supports researchers and their best ideas, scientific freedom is dear to me. It is indeed one of the key conditions for scientists to thrive.

By giving bright minds the autonomy to follow their passion and scientific curiosity, the ERC does not only contribute to creating new knowledge; a wonderful "by-product" of ERC grantees' endeavours is the vital scientific breakthroughs and advances that make Europe more competitive and generate the conditions for investors of all sorts to create jobs, and benefit society at large. The ERC Scientific Council is certainly not alone in its conviction that it is crucial to back talented researchers doing "blue sky" research – without imposing priority areas to support their work and clipping their wings. It is in the interest of us all to encourage their desire to explore the unknown.

It is timely to bring this matter into the limelight these days, when calls for measuring a priori research impact and top-down approaches are the trend. It is certainly understandable that policy-makers wish to link research to gains in productivity and economic growth. However, I would like to challenge this tendency. There is an inherent tension between, on the one hand, the demand for relevance, and, on the other, the scientific community's urge to pursue purely curiosity-driven research, but, to my mind, this contradiction is by and large misleading.

We must remember that some of the most important scientific results often come about when scientists are not looking to solve any particular societal or technological problem. Many discoveries and tools that have revolutionised our world – penicillin, the laser and the World Wide Web, to name but a few – came from purely bottom-up research and with serendipity at play.

It is also timely to reiterate this message now, as a recent independent study clearly shows that research funded by the ERC with this spirit has had very positive impact. The ERC Scientific Council commissioned this pilot study to find answers to some crucial questions: How can we assess the scientific impact of frontier research supported by the ERC? Does it bring results that can be measured and categorised? And how can we give some guarantee that the ERC does a really good job in selecting projects, although they do not have fully defined goals at the start because of their level of ambition?

What came out of the study, which analysed all the first 199 concluded ERC projects, is very promising. It even goes beyond our expectations: over 70% of the analysed projects have led to a scientific breakthrough or a major scientific advancement; there is also a very low number of projects with no real impact, showing at the same time that ERC evaluators were not too risk averse. This is at the heart of the ERC's strategy, and such an attitude is needed to get real breakthroughs that lead to disruptive innovations. The assessment of the immediate and forward looking impact on the economy, society and policy making is also very heartening. Our thanks go to the 75 dedicated independent senior researchers who spent long hours examining the projects, tracing the impact of scientific publications and untangling research results to assess impact.

It is the ERC's mission to fund bottom-up "high-risk/high-gain" research, with scientific quality as sole criterion, albeit with no certainty of to what the exploration will lead. This latest study and the history of science confirm that this is the way forward. Only by letting the most ambitious researchers pursue blue sky projects can Europe remain at the scientific forefront and open the way to new solutions to global problems.

In this issue of the newsletter you can read more about the outcomes of the study and also explore some outstanding ERC projects.

Professor Jean-Pierre Bourguignon,
President of the European Research Council

For comments: erc-info@ec.europa.eu

European Research Council Executive Agency
16 Place Charles Rogier • BE-1210 Brussels • Belgium

ideas is a quarterly electronic newsletter published by the European Research Council.

What is the impact of ERC-funded research?

Over 70% scientific breakthroughs or major advances

The blue sky research funded by the European Research Council has already left its mark, as demonstrated in a recent independent pilot study that assessed the impacts of finalised ERC-funded projects. More than 70% of the projects evaluated let to major scientific advances or breakthroughs. This is an impressive number showing the importance of investing in high-risk/high-gain research, as highlighted in the ERC President's editorial.

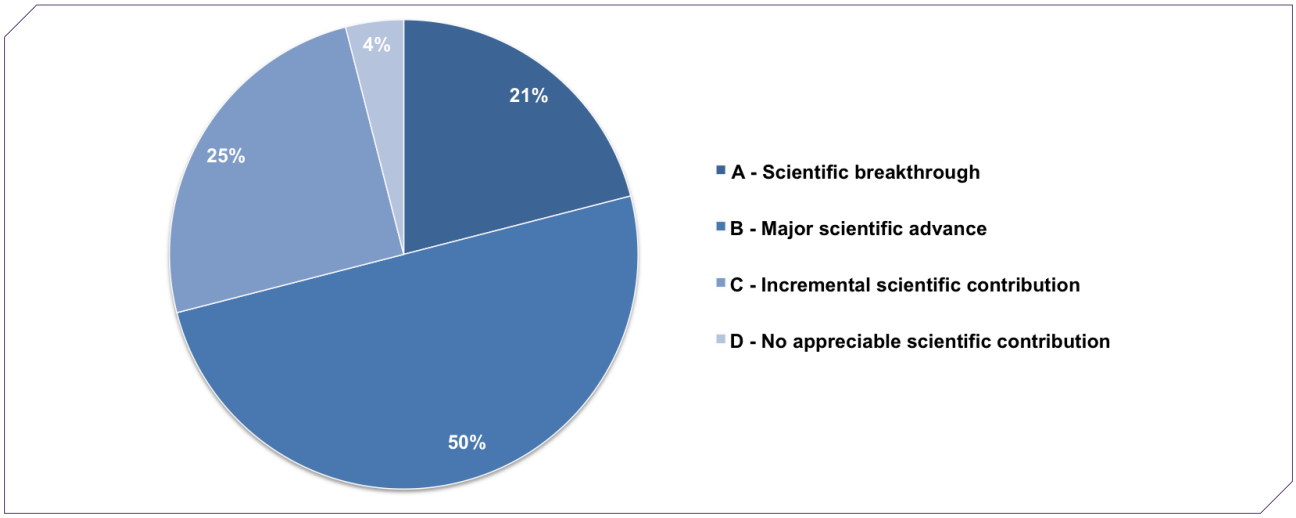
The ERC Scientific Council commissioned the independent qualitative evaluation as it wished to assess the impact of ERC-funded research. High-level peer reviewers analysed a total of 199 Starting and Advanced Grant projects finished by June 2014. (Consolidator grant projects were not included as none have come to an end yet.)

The ERC set up 25 panels consisting of three senior scientists each to carry out this qualitative analysis of the projects. Two with experience as an ERC panel member, and one without any previous experience on an ERC panel. Their specific task was to assess the importance of research results derived from the projects and mark them as follows: "scientific breakthrough" (grade A), "major scientific advance" (grade B), "incremental scientific advance" (grade C) or "no appreciable scientific contribution" (grade D). For this purpose, the panels carefully carried out the analysis, which included an examination of the project proposals, final reports, scientific publications, patents and – in some cases - spin-off companies.

From this evaluation comes that 21% of the samples have led to a scientific breakthrough and another 50 % were classified as leading to major scientific advancements. Around 25% of the sample delivered an incremental scientific contribution, and only 4% had no appreciable scientific output, according to the panels. One of the main conclusions is therefore that the ERC funds high-risk/high-gain projects, in line with its mission set in 2007.

The evaluation also pointed to other kinds of impacts. Firstly, it showed that ERC funding contributed strongly to

Overall grade attributed to projects in this study



creating and consolidating research teams. Additionally, the panels concluded that being awarded ERC funding has a positive impact on researchers' career.

Another finding was the strong interdisciplinarity of the projects, also in accordance with the ERC's mission. Over 80% of them have brought results that are applicable, to some extent, to areas of research other than the one in their main focus.

The study also looked at the projects' impact on the economy, society and on policy making, and found that this curiosity-driven research, free from any thematic constraints, benefits society at large. Close to 50% of the projects have already made an impact on these spheres, and close to another 10% have had a major impact to date. The experts also estimated that at least three quarters of the research outputs are expected to have an impact on the economy or on society in the medium or long term.

The results are, however, only preliminary, as the study was performed on a relatively small sample. A similar report, to be conducted on a different sample of finalised ERC-funded projects, is foreseen for next year.

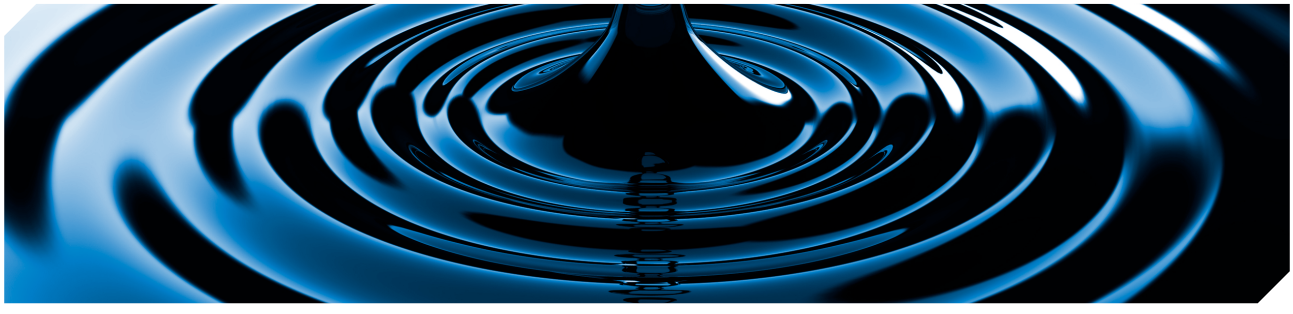
Read the study "Qualitative Evaluation of ERC Completed Projects".

For more insights, see *Nature* article "*Europe's premier funding agency measures its impact*" and an editorial - '*Agencies must show that basic research is worth the investment*' - which e.g. said that "*The European Research Council has begun to evaluate the impact of its grants; others should do the same*".

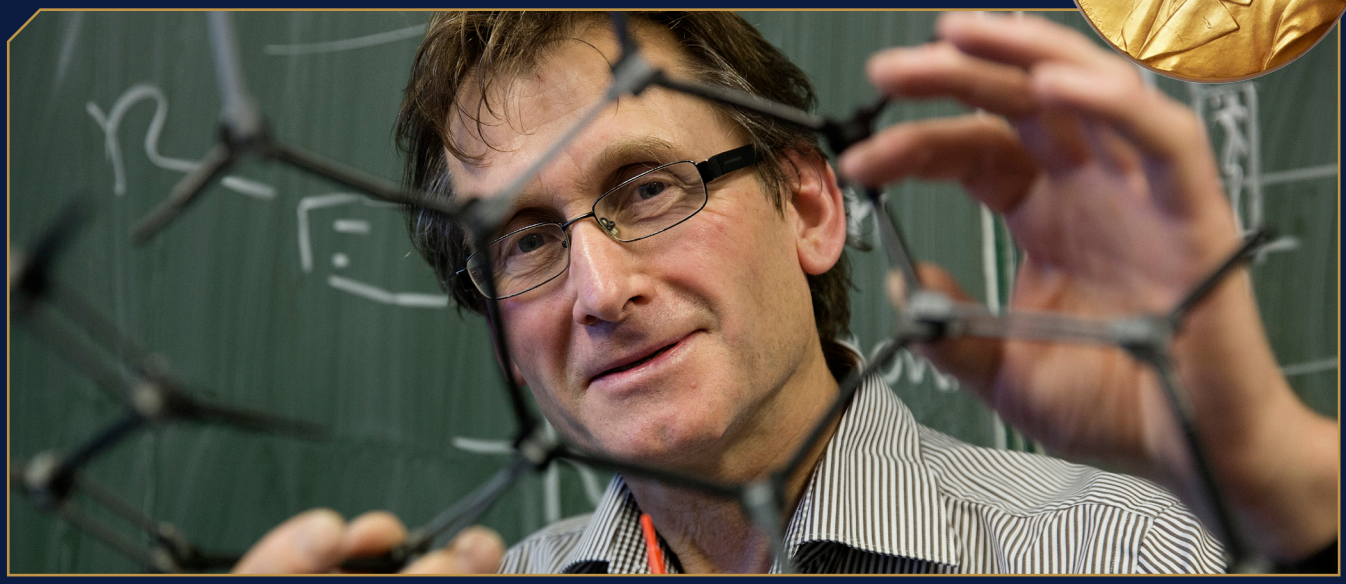
"The award of an ERC grant has rapidly become a prestigious mark on the CVs of researchers. The new report highlights that this identification of excellence is well-founded. It also concludes that the ERC grants help consolidate research teams of grantees. The team environment then becomes an excellent training ground for the top researchers of the future, securing the talent pipeline for EU science."

ERC Scientific Council member
Dame Athene Donald

Looking for examples of ERC-funded projects? Explore the many research stories available online and create your own booklet.



ERC grantee wins Nobel Prize



As the tradition, all eyes turned to Stockholm in the beginning of October when the Royal Swedish Academy of Sciences announced the winners of the highest scientific honour, the Nobel Prize.

5 October proved to be a special day for Europe. The Nobel Prize in Chemistry for 2016 was awarded to Professors Jean-Pierre Sauvage, Sir J. Fraser Stoddart and Bernard L. Feringa "for the design and synthesis of molecular machines". All three laureates have participated in EU-funded research projects, and Bernard Feringa is also a recipient of two ERC grants. He is the sixth grantee to be awarded a Nobel Prize to date.

Professor Feringa, based at the University of Groningen in the Netherlands, received ERC Advanced Grants in 2008 and 2015 for his projects exploring nanomachines and molecular motors.

In his ERC-funded projects, Professor Feringa has moved on from studying and developing the structure of the motors towards dynamically controlling their actual function and integrating them into entire molecular structures. This will enable the development of molecular nanomachines such as nanorobots. These can respond to stimuli from their environment, be employed in the self-assembly of nanostructures or regulate DNA transcription. In the future, this could be used in the medical field for instance to find tumour cells, and remove them, or precisely administer drugs to tackle the problems associated with antibiotic resistance.

President Bourguignon congratulated the laureates and called it a "happy day for Europe". The award ceremony will take place in Stockholm on 10 December, the anniversary of Alfred Nobel's death.

Together with Oliver Hart, Bengt Holmström was awarded the 2016 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel. Professor Holmström chaired ERC Advanced Grant evaluation panels in 2009 and 2011.

Five other ERC grantees have been bestowed with the Nobel Prize:

Prof. Konstantin Novoselov was the first ERC grantee to receive a Nobel Prize in Physics 2010 for his work on graphene. He held a Starting Grant and was amongst the youngest Nobel prize winners in history.

Prof. Serge Haroche, ERC Advanced Grant holder, was awarded the Nobel Prize in Physics 2012 for ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems.

Professor Edvard I. Moser and Professor May-Britt Moser, both ERC Advanced Grant holders, received the 2014 Nobel Prize in Physiology or Medicine for their discoveries of cells that constitute a positioning system in the brain.

Prof. Jean Tirole, ERC Advanced Grant holder, received the 2014 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel for his work on examining competition, and analysing how large companies should be regulated to prevent monopoly behaviour and protect consumers.

Record-breaking budget in 2017

It is all set for 2017. The ERC Work Programme, established by the Scientific Council, was adopted on 26 July. With around €1.8 billion for grants, it is the biggest ever annual ERC investment in frontier research. The programme also contains a record amount for early-career researchers. The Starting Grant competition, opened in July, has a budget of €605 million to support some 415 grants for researchers with 2 to 7 years of experience after PhD.

In total, around 1,070 new grantees are estimated to benefit from ERC funding next year across all schemes. They are expected to employ another 6,500 post-docs, PhD students and other members as part of their research teams.

Proof of Concept grants will also be available for ERC grant holders to bring the results of their ERC-funded projects closer to market.

Apart from the record amount of funding, there are other novelties:

> **Open data:** ERC grantees must take appropriate measures to ensure open access to the data generated by their project, unless they specifically decide to opt-out.

> **Gender balance:** Firstly, the obligation of ERC grantees to take all measures to promote equal opportunities between men and women, and aim for gender balance of personnel assigned to their project, is emphasised. Secondly, the current eligibility window for applicants can be further extended for maternity leaves if appropriately documented.

> **Evaluation of ERC-funded research:** The ERC will continue the work to qualitatively analyse the scientific output of its funded projects with a particular focus on any potential breakthroughs and discoveries.

"One of the best success stories for Europe"

"The ERC is one of the best success stories for Europe, in terms of scientific impact, researchers' career and innovation. This is why the EU has decided to invest growing resources into this very successful programme that is highly praised by scientists around the world. With this record budget, the ERC grant competitions can provide even more researchers with the opportunity to pursue their careers and ambitions in Europe."

Carlos Moedas, Commissioner for Research, Science and Innovation
25/07/2016

"Mid-term perspective for early-career researchers"

"The ERC Scientific Council consistently gives a high priority to supporting young researchers by awarding them more than two thirds of its annual budget through its Starting and Consolidator grants. Giving early independence to ambitious researchers contributes significantly to making their creativity flourish. The 2017 ERC budget is the highest ever for 'Starters'. Thanks to these five-year grants, more early-career researchers across Europe will have a mid-term perspective. This is one more step forward to back young researchers."

Professor Jean-Pierre Bourguignon, President of the ERC

Science as Revolution: The ERC at ESOF 2016

Manchester, the birthplace of the Industrial Revolution, the cradle of several scientific advances and home to the discovery of graphene, hosted the seventh edition of the Euro Science Open Forum (ESOF) in July. "Science as Revolution" was the overarching theme.

ERC leaders and over 40 grantees participated in scientific, policy and career sessions for this year's edition of ESOF. The delegation included members of the Scientific Council Dame Athene Donald, Tomas Jungwirth and Klaus Bock. Among the keynote speakers were also Nobel laureates and ERC Grant holders Sir Andre Geim and Sir Konstantin Novoselov who, in 2004, first isolated graphene at the University of Manchester. A highlight of the event was the press conference in which ERC President Jean Pierre Bourguignon and Dame Athene Donald announced the results of the new study "Qualitative Evaluation of ERC-funded completed projects" (see p. 4). With over 70% of analysed projects having led to breakthroughs or major advances, ESOF was a great moment to bring this news.

With seven scientific sessions, some 20 ERC grantees shared the results of their frontier research. They engaged with the audience on topics that ranged from personalised medicine, deep earth dynamics and the evolution of species, to antibiotic resistance, artificial intelligence, 2D materials, and preventive healthcare. Participants were compelled to stop by the European Commission's booth, which hosted the ERC, alongside other Research and Innovation directorates. There, grantee Giulio di Toro, from the University of Manchester, was passionately explaining his research on earthquakes, also catching the attention of Commissioner for Research, Science and Innovation Carlos Moedas who spoke at the opening.

The ERC also addressed the question of the gender gap, more specifically the obstacles surrounding women's under-representation in top position and low application to competitive calls. The session "*Women in Science: How to Reboot the System*" saw the participation of President Bourguignon, Dame Athene Donald, ERC Panel Chair Daniel Conley, and ERC grantees Conny Aerts and Virginie Orgogozo. "*On top of conscious and unconscious discrimination and insufficient support from institutions, women also face a lack of self-confidence. Just as girls are reluctant to take up STEM subjects, women are often too hard on themselves and thus tend to apply to less competitive schemes. This is why role models are so crucial*", said Prof. Aerts, who is actively engaged in worldwide mentoring programmes.

The importance of multidisciplinary research in addressing today's biggest challenges was discussed during the session "*What drives interdisciplinary excellence?*". President Bourguignon emphasised that, while interdisciplinary research is driven by the quest for breakthrough discoveries, these kinds of results often stem from randomness. He explained that the ERC has the highest consideration for the freedom of scientists to determine their research, and supports them through cross panel evaluation and interdisciplinary panels.

ERC grantee Giulio di Toro explains his research to Commissioner Carlos Moedas

During the informal session "*Pi with the Prof*", young researchers met President Bourguignon to discuss their careers and ideas. Input from young scientists is vital for the ERC, as Prof. Bourguignon remarked during the press conference, when he shared a powerful anecdote from his days as panellist: "*A talented young researchers exposed a very ambitious math project. Some of us were reluctant to give him the grant as they feared he was not experienced enough for such a bold challenge. In the end though, the young researcher was selected. Today, he is one of the greatest mathematicians of all times*". A video interview of Prof. Bourguignon is available here.

An opportunity to discuss the most crucial matters for science, as well as to connect with talented scientists, the seventh edition of ESOF was very fruitful for the ERC.

The Euro Science Open Forum is a pan-European conference dedicated to scientific research and innovation, gathering thousands of academics, policy makers, journalists and innovators from around the globe. The European Commission is one of the conference's sponsors. ESOF is held every two years in a different city and its next edition will take place in Toulouse, in 2018.

The European Commission stand at ESOF 2016.

ERC=Science²: engaging new audiences

ERC=Science² stand in Pilsen, Czech Republic

How can the wonders of the world of discovery be brought closer to people? How can we show the extraordinary impact of research on citizens' daily life?

Making people more involved and fascinated by science funded by the ERC and reaching out beyond the science community - that's what the ERC had in mind when it launched a call for proposals for a Europe-wide communication campaign, ERC=Science², now moving into its second year. By using themes such as 'cities' and 'robots', the campaign is set to reach a wide audience in Europe. The latest topic under the spotlight concerns us all – food and nutrition!

The various activities of the 42-month campaign are focused on one theme that changes every six months. By means of videos, articles, talks, open-lab events, ERC-funded science will come to life. What's more, 'augmented reality' presentations and 'pop-up' displays will be featured in a wide range of countries and languages, across science and natural history museums, science festivals, universities and public places all over Europe.

From the urban planet to nutrition

ERC=Science² launched its first theme - "Wanted: the Human City" - in February 2016. Focusing on urban research, the campaign highlighted some ERC grantees that are investigating in this field: how algorithms are upending city management? Why coastlines are failing to protect us from tsunamis? To what extent traffic noise - in addition to being a source of annoyance - damages our health?

ERC=Science² engaging shoppers in a mall in Tartu, Estonia

Tackling questions around 'Food and nutrition', a few weeks ago, the second theme was promoted under the engaging question: 'The taste tests: Can science help us eat better?'. Eating is a complicated, necessary human function that involves topics such as body and brain, social and psychological pressures, wealth and age, 'Big Food' manufacturing and marketing. The campaign features ERC-funded sociologists, chemists, psychologists and biologists focusing on these issues: for instance, one has created an 'app' to monitor your own eating behaviour; another has employed citizen-science to get Madrid residents to study their own local food policy; a third is looking for biomarkers to track what you eat.

Coming up across Europe

ERC=Science² will continue to engage with audiences around Europe on these topics, mainly the general public, but also decision-makers through a few high-level policy gatherings. For this autumn and winter, over 15 public events are planned in Belgium, Bulgaria, Croatia, Czech Republic, Estonia, France, Poland and Slovenia. For all these happenings, ERC=Science² relies on grantees who are the best ambassadors for the ERC, sharing their inspiring bottom-up research widely.

Sign-up for the ERC=Science² newsletter to receive updates on the campaign.

ERC grantee Ülo Niinemets explains his research on plant physiology at an ERC = Science² event in Tartu, Estonia.

Discovery in Cambodia
Frontiers of archeology

© Damian Evans

The Angkor-period temple of Banteay Top, within the Banteay Chhmar acquisition block. Lidar revealed details of a large earthen enclosure and additional temple sites and occupation areas in the vicinity of this large stone temple.

Flying a helicopter at 100 km per hour some 800 meters above the jungle in Cambodia is not what you normally associate with an archeological expedition. Yet this is what Dr Damian Evans from the École française d'Extrême-Orient and his team did in 2015. This resulted in one of the most important archeological discoveries in recent years.

Dr Evans received an ERC Starting Grant for his Cambodian Archaeological Lidar Initiative, or CALI, in 2014, and thanks to this funding moved his research from Australia to France. His idea was to use airborne laser scanning to uncover, map and compare archaeological landscapes around all the major temple complexes of Angkor in Cambodia. In 2015 the team carried out the most extensive airborne study ever undertaken by archaeologists. They scanned an area comparable in size to Greater London (1,901km^2) and discovered what now appears to have been one of the most sophisticated and highly-developed empires on earth in the 12th century.

© Francisco Goncalves

The helicopter during the 2015 flight operations, with the lidar instrument mounted within a pod on the right-hand skid.

When you started your ERC project, did you expect to make such a big discovery?

When we began the project we strongly suspected that there would be some major findings, but did not know exactly where those would be. There was a remote but real possibility that we would find nothing. Of course, for an archaeologist, finding nothing in an area where you expect there to be something is by itself an important research outcome, and is not by definition a failure. However, projects with significant potential for negative results like that are difficult to find funding for, and it would still be pretty disappointing, and difficult to get published. To me, one of the most appealing things about the ERC, is that it explicitly recognizes the potential for negative results and allows researchers the latitude and the funding to pursue 'blue-sky' research that may not fit within conventional models of 'success'. Happily, we were able to uncover quite striking results which have completely changed our picture of what early cities looked like in various parts of Cambodia, not just Angkor. In very few areas did we find nothing at all, and even those research results raise interesting questions.

Lidar, geoinformatics, big data - is it the future of archeology?

It is definitely the future in certain areas of archaeology, for example in the study of archaeological landscapes. It has created a whole range of potential for interdisciplinary work by combining different fields to find and research patterns within data. Lidar, geoinformatics, and 'big data' are changing the face of archaeology in quite specific areas, but not necessarily in others. Using lidar to uncover things beneath the forest is something that gets a lot of people excited, but note that archaeology is an extremely broad church. We have to be careful not to undervalue the work of archaeologists who are addressing different questions or working in geographic areas, subdisciplines, or scales of space and time in which technologies like these are not necessarily transformative at all. Thus, new technologies are just one small part of a great mosaic of different approaches to the past.

Can this project provide us with hints about our present urbanism, sustainability of our contemporary megacities?

Angkor is comparable in some ways to contemporary megacities. We can begin to envisage it as a kind of laboratory for understanding how, in the past, such cities have succeeded – and ultimately failed. Of course, it is difficult to draw precise analogies between past and present, given the different suite of technologies and in some case quite radically different socio-cultural contexts. However, one of the major recent trends in archaeology has been comparative archaeology, for example, the comparative study of early tropical forest civilisations like the Khmer and the Maya is a flourishing field. In order to achieve these kinds of studies it is important to move beyond the specificity of the societies in question and abstract them to a certain degree – by considering the vast water management of Angkor, for example, as a kind of system – a critically-important network with rules and constraints about how, where and when things will flow. With this kind of abstraction you can reach generalized conclusions which resonate into the contemporary world.

Did you first become interested in archeology or technology?

I went to university twenty years ago to get a law degree – so much for that! I started doing a few courses in Arts and got inspired by my Professor's interest in Angkor, particularly his enthusiasm for using remote sensing technologies. Like now, it was an exciting time in landscape archaeology: in the late 1990s and early 2000s high-resolution satellite imagery and high-resolution datasets, including on Angkor, started to come online. Combined with advances in geographic information systems and computing power it opened up a lot of possibilities. At that time, not many people were using these kinds of remote sensing technologies for archaeology, so I volunteered at the Archaeological Computing Lab, did some project work for them and would spend time in the lab teaching myself how to use the technologies and developing new archaeological applications using radar and so on.

What brought you to Europe? Why did you choose Paris Ecole française d'Extreme-Orient?

For more than a century, the École française d'Extrême-Orient (EFEO) has been the premier institution for the archaeology of the area. It has always been at the forefront of archaeological mapping. When the University of Sydney began work in Cambodia in the 1990s, it was no coincidence that this partnership – the Greater Angkor Project – was a collaboration with the EFEO and the Cambodian authorities. The impetus for me to jump across from Sydney to Paris was the scale and ambition of ERC calls. There is no equivalent scheme in Australia that has an explicit mandate to fund early-career researchers on sole-investigator projects with seven-figure sums. Lidar is extremely cost-effective but also very expensive. The only way that this research could have been achieved was by moving to a European institution, which has been very beneficial to both the EFEO and my work.

What are your plans now?

The lidar data collection phase of our project is finished, and currently a team of Cambodian and international researchers are verifying findings on the ground. This will take about a year to complete. Around this time next year we will focus on data analysis and on publishing for the remaining two and a half years of the project. Beyond that, we are keeping a keen eye on developments in technologies like UAVs, lightweight lidar instruments, and satellite-based lidar technologies. There is enormous untapped potential for these technologies in tropical forest environments, not just for archaeology but also for other disciplines. The longer-term agenda is to create an ever-more comprehensive archive of lidar data to facilitate the kind of comparative studies I was mentioning earlier, which is something we hope the ERC would like to remain a part of.

Researcher: Damian Evans
Project: Cambodian Archaeological Lidar Initiative (CALI)
Host institution: École française d'Extrême-Orient (France)
ERC call: Starting Grant 2014
ERC funding: EUR 1.5 million for five years
Research area: Study of the Human Past - Archaeology

Is digital mapping the new media?

Over the past months, a sudden influx of 'Pokémon Go' players could be observed across the globe. Youngsters, people of all ages scrutinise their surroundings silently, using their smartphones to catch those digital creatures with unlikely names. How could such a phenomenon take over the world so fast? Part of the answer may be the game's strong interaction with the real-world and its impressive mapping, offering a whole new virtual experience of spaces that seem to be familiar and yet so different.

Based at the University of Warwick (UK), Sybille Lammes' ERC-funded research focuses on digital mapping practices - including those related to play. She sees them as new media cultures that influence and alter our way of being and moving through spatial environments. She is also the first to combine New Media Studies, Science and Technology Studies and Human Geography and thereby to tackle an original and mostly unexplored research field.

"Digital maps can be simultaneously understood as new media, technologies and cartographies" explains Lammes, nourishing the conception of new media as "material cultures" that are physically embedded in daily life and technologies.

A new culture

Digital cartographies have changed the century-old conception of maps, traditionally perceived as something tangible representing a space. In the numerical world, on the other hand, we constantly interact with navigation and geolocation gadgets that are built in most applications and devices.

The maps of today are versatile real-time maps. Connected to online technologies – such as traffic sensors and GPS – they keep transforming before our eyes. Current navigation systems propose new routes when we miss a turn and adapt their suggestions to the way we play with them. We look for restaurants and shops through digital maps and some even date with the help of geolocation apps. Such daily tools influence our behaviour and thinking, the way we sense space and relate to it:

"The ambition of "Charting the Digital" is to define what digital mapping is about and what it culturally entails, and to explore, as a new techno-cultural phenomenon, its impact on our spatial relations", says Lammes.

With her team, she has undertaken an extensive critical comparison of digital mapping practices, also in relation to traditional cartography and other related media forms. The research also encompasses the analysis of mapping interfaces, which act as technological mediators and induce users' specific behaviour.

Sybille Lammes: *"Our own research team members have become part of the study, by "going native", i.e. becoming engaged and interacting with the material they study. They keep a journal about their experiences with the mapping interface and how they become acquainted with it".*

Digital mapping for playful learning

On the commercial side, Lammes' team noted that highly successful and profitable digital mapping applications make use of a combination of gamification, connectivity and interactivity in their design. On this basis, they have developed a prototype of a location-based game: a mobile app named 'Playfields' that can be used to teach fieldwork to university students in a 'hands on' entertaining way.

Researcher: Sybille Lammes
Host Institution: University of Warwick (United Kingdom)
Project: Charting the Digital: Digital Mapping Practices as New Media Cultures
ERC call: Starting Grant 2011
ERC funding: EUR 1.2 million for five years
Research area: Cultures and cultural production

Discover more ERC-funded projects studying urban spaces in ERC=Science² feature "Wanted: the Human City"

Fellowships to visit ERC-funded research teams

Interested in applying for an ERC grant? Fellowship programmes have been set up for potential ERC applicants to visit ERC teams from three to six months. Five countries - Czech Republic, Estonia, Hungary, Poland and Slovenia - as well as the Belgian region of Flanders have launced such programmes.

Researchers from all disciplines are welcome to participate, with scientific excellence being the main criterion in the selection of fellows. All costs, such as salary and travel, will be covered by the organisers of the programmes. It is open to those who will apply for an ERC grant within a specified time after the end of the visit.

The ERC Scientific Council encourages participation in the programmes as it believes that increasing the international exposure of researchers can help them develop their potential before applying for an ERC grant. Professor Éva Kondorosi, Chair of the ERC Scientific Council's Working Group on Widening European Participation, said: "*The initiative follows the ERC Scientific Council's drive to enhance the full potential for frontier research across all of Europe. I hope more programmes like these will be set up around Europe, especially in regions performing less well in research, to offer as many researchers as possible this valuable first-hand experience in conducting top frontier research, and help them to prepare a competitive proposal for the ERC*".

The fellowships have been set up by the following organisations: The Czech Science Foundation (GA CR), the Estonian Research Council (ETAg), the National Research, Development and Innovation Office (NKFIH) in Hungary, the National Science Center (NCN) in Poland, the Slovenian Research Agency (ARRS), and the Research Foundation - Flanders (FWO) in Belgium. More organisations are expected to follow soon.

Once a year, the ERC launches a call for expression of interest amongst ERC grantees to ask about their interest to host potential applicants in their research teams. Afterwards, the ERC will share the details with the funding agencies after which they will make this information available to the potential fellows from their country or region and assist them in the identification of a suitable ERC project to visit. The first call for expression of interest opened on 1 September and closed on 30 September 2016. The next one is planned for June 2017.

Applying for an ERC grant and based in one of the countries/regions taking part in the fellowships? More information is available on the "Other ERC opportunities" section of the ERC website. ERC grantees interested in hosting a visit can find more information in the "Set-up and develop your team" section.

Slovakia

An emoji-based logo presents a light-hearted touch to the Slovak Presidency of the EU, held from July to December 2016. The small Central European country, population size around 5.4 million, includes a focus on research in its Presidential programme, which shows promise for the development of its research landscape.

Official figures show that research spending in Slovakia is still relatively low. Some 0.89% of the nation's GDP was spent on research in 2014. The country faces brain-drain, and has little by little been putting in place measures to further develop its research and to make it more attractive to highly-qualified researchers.

Encouraging Slovakia

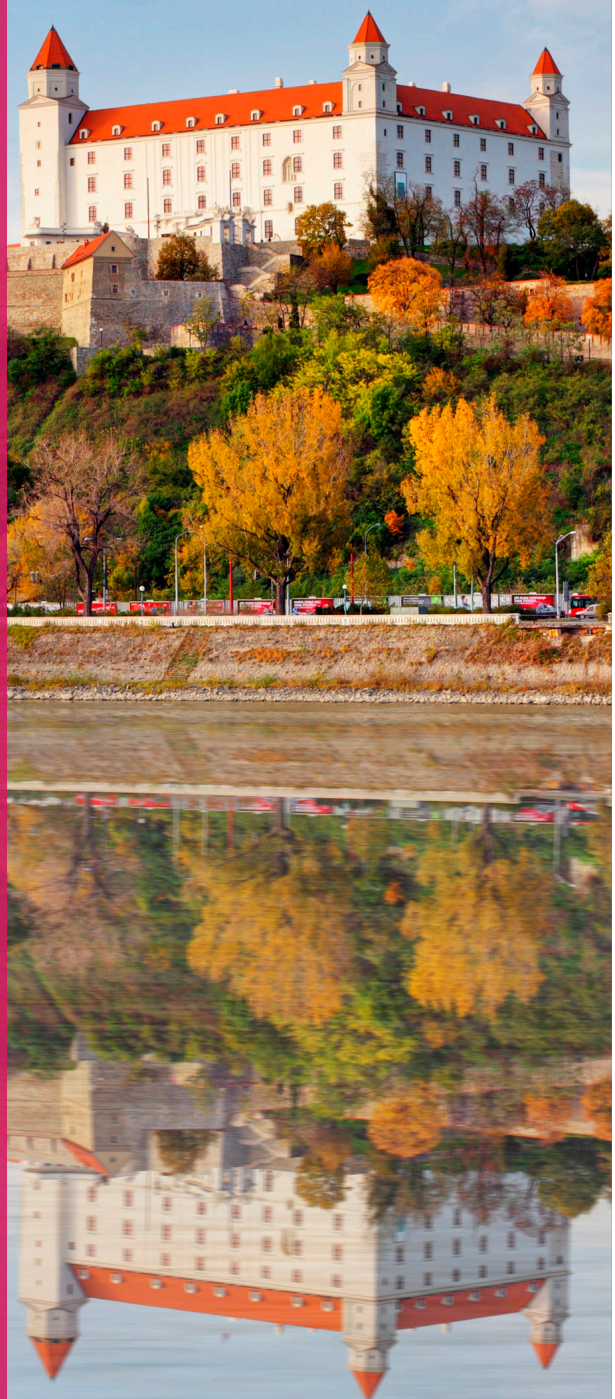
In 2015, the number of ERC grant holders from Central and Eastern Europe doubled, yet Slovakia 's number continues to remain low. ERC President Jean-Pierre Bourguignon and Scientific Council member Tomas Jungwirth visited Bratislava in June to meet Slovakian authorities, high-level persons from the scientific community and young researchers to discuss how to improve Slovakia's participation in ERC grant calls.

On the occasion of the visit, President Jean-Pierre Bourguignon said: "*Talent is everywhere in Europe. So, I'm glad that the programme of Slovakia's EU Presidency includes issues that are crucial for the future of research in Europe: support to young researchers, spreading excellence and widening participation in the EU's research framework programme Horizon 2020 (…)*".

A point for future discussion is the recently set up visiting fellowships programmes, which could be a fruitful next step for the country with talks about participation currently underway.

ERC grantees

Slovak Starting grant holder Ján Tkáč, based at the Institute of Chemistry in the Slovak Academy of Sciences in Bratislava, is the only ERC grantee based in the country to date. He won "Scientist of the Year 2015" in Slovakia and focuses his ERC- funded research on sugar molecules which aid human cells in fighting infections and staying healthy. Dr. Michal Juríček recently won a 2016 Starting Grant for his research, based in Switzerland, on the processes of spin-interactions in molecules. Two other researchers of Slovak nationality currently lead ERC-funded projects outside their native country: in the Czech Republic and the Netherlands.



Iveta Hermanovská

Soňa Ftáčniková

Questions to the Slovak National Contact Points, Iveta Hermanovská and Soňa Ftáčniková

How can the research landscape in Slovakia be described? And is the country stronger in any particular research field?

Research and development in the Slovak Republic are carried out in particular at universities and institutes of the Slovak Academy of Sciences. These have been established by state administration central bodies (state department research institutions) that are mostly financed by the state budget, and by private research institutions that are part of the business sector.

The strongest areas in Slovak research are material sciences, physics and chemistry, medical sciences, biochemistry and molecular biology, agricultural and environmental sciences, engineering sciences and chemical engineering, mathematics and computer sciences.

What is the general perception of the ERC amongst the Slovakian scientific community?

ERC grants are perceived as very prestigious and have become a mark of quality for scientific work. They are seen as the most renowned for frontier basic research that pushes forward the boundaries of knowledge. Unfortunately, Slovakia is one of the less successful countries in the number of projects supported by the ERC. There are many reasons for this, but key ones are insufficient funding of research and development at the national level, little experience with ERC projects and "low self-esteem" of Slovak researchers to enter a competition for such prestigious projects.

What is the way forward to boost the performance of Slovakia in ERC competitions?

Participation of researchers in Horizon 2020 and especially in ERC calls opens the doors for Slovak researchers to participate in high-quality R&D projects. The NCPs' support to Slovak researchers interested in ERC funding continues to play an important role in boosting performance. During information days, we provide both general information and interactive workshops about the ERC: its target groups, calls, and evaluation criteria. We also undertake personal consultations to advise on specific strategic issues of project proposal writing. The latest information on ERC activities is disseminated via our website to stay updated on the latest developments.

Are there any initiatives in Slovakia supporting researchers to apply for ERC grants?

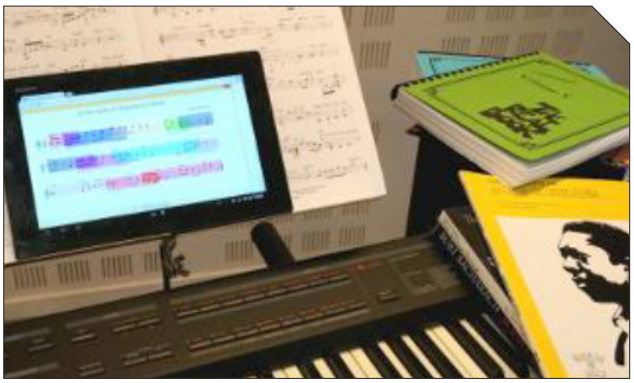
We work closely with the representative of the Slovakian authorities, who takes part in the so called Programme Committee that follows the European Research Council closely. By working together, a lot of pressure is put on the Ministry of Education, Science, Research and Sport of the Slovak Republic to implement the visiting fellowships.

ERC awards Starting Grants

On 8 September, the ERC announced the results of its 2016 Starting Grants competition. 325 early-career researchers with a record number of 42 different nationalities in 23 countries across Europe have been awarded grants of up to €1.5 million, for a total of €485 million. Funded projects include, for example, improving the effectiveness of chemotherapy, sustainable production of hydrogen fuel, establishing a new international law of citizenship and boosting the immune system of crops. The success rate of the call was around 11%.

AI creates "new" Beatles song

FlowMachines, the artificial intelligence software capable of professionally producing music and created by Advanced Grant and Proof of Concept holder François Pachet has released its first songs. They are "Daddy's car" in the style of The Beatles and "Mr Shadow" inspired by Americana which makes them the first-ever entire songs composed by artificial intelligence. A full album release is planned in 2017. The research behind FlowMachines also inspired the story of Max Order, part of ERCcOMICS, which recently published it seventh episode.



New Scientific Council members

Professors **Kurt Mehlhorn** and **Nektarios Tavernarakis** were appointed as new members of the ERC Scientific Council on 9 August, for a four-year mandate. Kurt Mehlhorn is Professor of Computer Science at Saarland University and Director of the Max Planck Institute for Informatics in Saarbrücken, Germany. Nektarios Tavernarakis is Professor of Molecular Systems Biology at the Medical School of the University of Crete and Director of the Institute of Molecular Biology and Biotechnology, at the Foundation for Research and Technology in Heraklion, Greece.

Proof of Concept: second round

This year's second Proof of Concept call awarded grants to 45 ERC grant holders. The grants, worth up to €150,000, support a wide array of projects. For instance, a researcher in France will carry out clinical trials of a cure for a rare cancer; a scholar in Germany will set up a phonetics laboratory service to diagnose speech impairment via the web; a scientist in Austria will develop a method to eliminate turbulence in oil pipelines; a grantee in the Netherlands will test neuroprotective therapy for stroke. Overall results of the 2016 Proof of Concept rounds will be published around January 2017.

Calendar of ERC calls

Grants open to researchers from anywhere in the world

Call for proposals*	Publication date	Deadline	Budget	Funding
ERC 2017 Starting Grant	26 July 2016	18 October 2016	EUR 605 million	Up to EUR 1.5 million per grant
ERC 2017 Proof of Concept Grant**	5 October 2016	19 January 2017 25 April 2017 5 September 2017	EUR 20 million	Up to EUR 150 000 per grant
ERC 2017 Consolidator Grant	20 October 2016	9 February 2017	EUR 575 million	Up to EUR 2 million per grant
ERC 2017 Advanced Grant	16 May 2017	31 August 2017	EUR 567 million	Up to EUR 2.5 million per grant

**Researchers who wish to apply to one of the ERC calls can do so through the Participant Portal.
**Call open to ERC grantees only.

For more information regarding ERC Proof of Concept grants, please see the ERC Work Programme 2017 see pp 36 - 42

Candidates should apply with a host institution in an EU Member State or a Horizon 2020 Associated country.

See further information on the Participant Portal.

Stay informed on the ERC website and the Participant Portal.

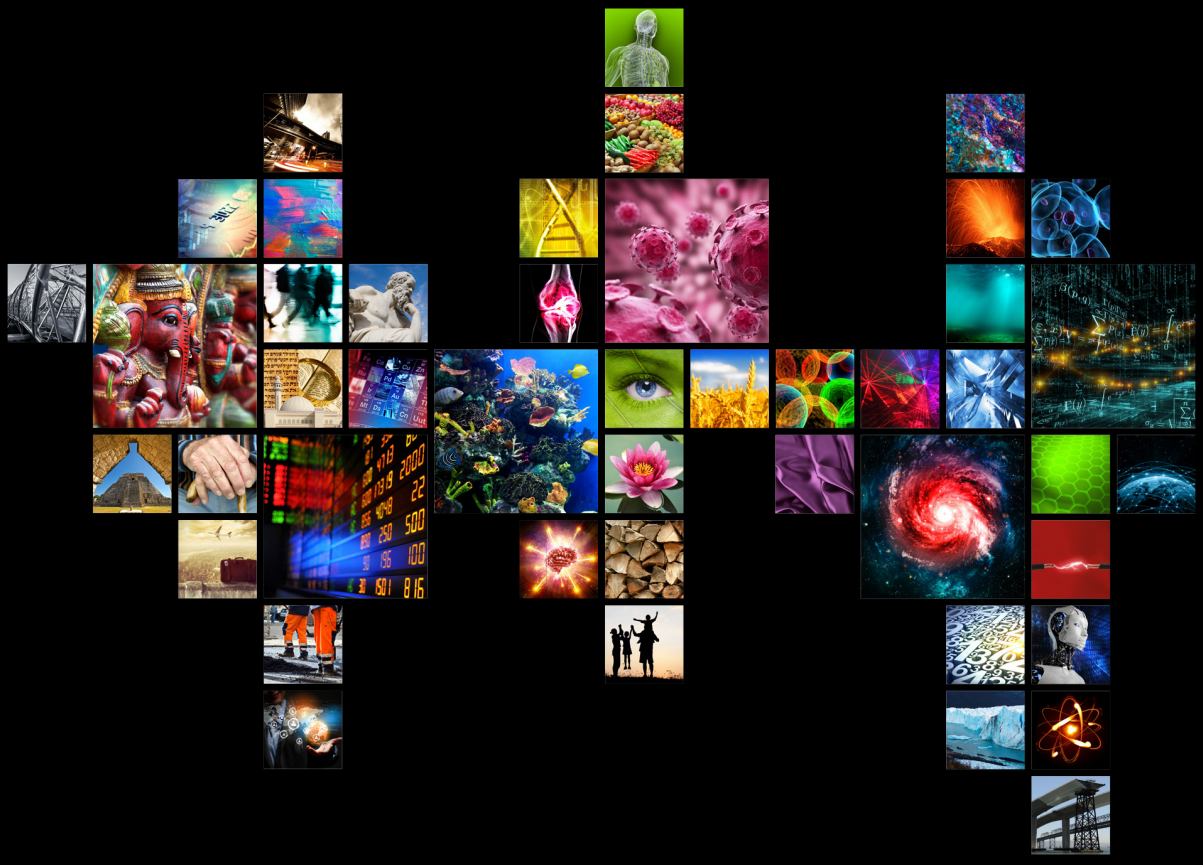
Information on the ongoing selection:

- In the 2016 ERC Advanced Grant call, 2401 applications were submitted (results to be officially communicated in March (tbc))

European Research Council

Established by the European Commission

Supporting **creative minds** from everywhere in the world



The newsletter is available in English. Subscription is free.
You can subscribe online**.**

Next issue: Winter 2016

Find ERC National Contact Point in your country

Subscribe for ERC Updates

http://erc.europa.eu

Follow us on:

European Commission

Horizon 2020
European Union funding
for Research & Innovation