



Q&A: On Nobel Prize-quality discoveries, scientific breakthroughs and unicorns

As the world's newest Nobel Prize laureates gather for Nobel Week, EU Commissioner Mariya Gabriel speaks about the incredible advancements made by scientists and the EU's commitment to creating more tech unicorns.

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Scientific discovery is celebrated worldwide with prizes and awards. The Nobel Prize is the ultimate accolade – the most prestigious scientific award on Earth. As scientific luminaries are celebrated during this year's Nobel

Week in Stockholm and in their home countries (due to the pandemic) from 6-10 December, the spotlight is on scientific discovery and achievement.

‘If researchers are able to achieve great results it’s because they start by being curious, and ready to engage their talent and energy to uncover the scientific “mysteries”. It is the irresistible attraction to know more and to understand better the world surrounding us,’ said Mariya Gabriel, the European Commissioner for Innovation, Research, Culture, Education and Youth.

In an exclusive interview with Horizon Magazine, the Commissioner reflects on the European Union’s (EU) commitment to research and innovation (R&I). ‘The Commission has put in place several opportunities for young researchers to progress in their careers and to benefit from funding.’

For instance, the new R&I programme Horizon Europe – with an impressive budget of €100 billion for 2021-2027 – marks an important milestone for Europe’s research community. Not only will it support top researchers and innovators it will also drive excellence and help the best talent expand on their knowledge and skills.

‘That’s science working at its best. Beginning with ideas, adding perseverance, collaborations and peer review, leading to breakthroughs in our scientific understanding and opening up new insights and avenues,’ explained Commissioner Gabriel.

Excerpts of the interview follow.

All of Europe is coming alive this week with celebrations for the new Nobel laureates. There’s good reason for Europe to celebrate! Some of the winners of the 2021 Nobel Prizes for science are EU-supported scientists. How would you characterise this achievement?

Indeed, we have reasons to celebrate and let me congratulate all 2021 Nobel laureates. It is a sign of the quality and vitality of the European research community.

The EU is investing, via the European Research Council (ERC), to give our researchers the best conditions to work on cutting-edge science.

Benjamin List, winner of the Chemistry prize, has been backed with two ERC Advanced Grants of a total of €4.5 million. He won the prize “for the development of asymmetric organocatalysis” and is from the Max-Planck-Institut für Kohlenforschung, Germany. Giorgio Parisi, who won the Physics prize, has received two Advanced Grants worth €3.7 million. Based at the University of Roma I, ‘La Sapienza’, Italy, he was recognised “for ground-breaking contributions to our understanding of complex physical systems”. Both were funded for a decade. The number of grantees receiving a Nobel Prize goes up to nine since the ERC’s launch in 2007. Klaus Hasselmann, who shared the Nobel Prize for Physics, has participated in EU-funded collaborative research over the years.

We can also speak about another European flagship programme, the [Marie Skłodowska-Curie Actions](#) (MSCA). Both Chemistry laureates, Benjamin List and David MacMillan, have participated, as supervisors, in projects related to the EU’s Individual Fellowship action.

About 145,000 researchers have benefited from the Marie Skłodowska-Curie Actions. Since 2013, a total of 12 researchers directly involved in MSCA, either as fellows or supervisors, have been awarded a Nobel Prize.

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A Nobel Prize is backed by years of research; what’s your advice to young researchers and how can Horizon Europe help them?

I give a lot of importance to attracting young people into research and had the opportunity to convey this message at the 2020 R&I Days round table with Nobel laureates.

Younger generations can be the protagonists in the creation of new knowledge and use that knowledge to innovate in ways that we can all benefit from.

The Commission has put in place several opportunities for young researchers to progress in their careers and to benefit from funding. We will continue to do so!

For instance, MSCA has become the flagship and reference EU programme for researchers' training and support regarding their career development. It puts a great emphasis on young researchers, as illustrated by the fact that half of the programme budget supports high-quality, innovative doctoral programmes.

To achieve this ambition, the programme strongly encourages international, intersectoral and interdisciplinary experiences, and enables research-focused organisations both public and private to host talented researchers and to create strategic partnerships with leading institutions worldwide.

The MSCA provides a unique international exposure for young researchers to enhance their career prospects. The programme accounts for more than 50% of all participation of third-country organisations within Horizon. In addition, more than a third (37%) of all researchers involved in MSCA are nationals from non-EU countries.

The ERC is also awarding major individual grants through its funding schemes for various career stages of the researchers.

The Starting Grants (StG) support researchers in the early stage of their careers. During [Horizon 2020, the precursor to Horizon Europe](#), the ERC awarded 2,771 Starting Grants, which represented 42% of all main frontier-research grants.

Additionally, the Consolidator Grants (CoG) support researchers who are at a quite early stage of their careers but are often already working with their own group. During Horizon 2020, these grants represented 34% of all main frontier-research grants.

One inspiring example is Konstantin Novoselov who was only 36 when he won the 2010 Nobel Prize in Physics, before which he had been funded with an ERC Starting Grant (2007).

Let me conclude by stressing the importance to link research and education, in the perspective of new generations, which also have their share of responsibility. Researchers grow through many experiences since early childhood where we tend to be curious about almost everything. It is important to invest in the European system of knowledge that includes as its main components education and science.

That is a big challenge for me and for all of us, to establish these bridges to lead by example and by quality. This challenge can only be achieved if the younger generations fully embrace it as their key objective.

How can we translate Nobel Prize-winning discoveries into real-world applications, thereby creating unicorns faster?

The time it usually takes for scientific breakthroughs and Nobel Prize-quality discoveries to reach the market is definitely too long and even longer in Europe than in other regions of the world as evidenced in the last [European Innovation Scoreboard](#). This is why I have decided to engage with innovators to address this complex issue and more generally to launch a new innovation policy to create more unicorns in Europe.

Europe is a global powerhouse for science: the EU accounts for about 18% of R&D, 20% of scientific publications and patent applications, and around 19% of researchers worldwide, with less than 7% of the world's population.

However, Europe does not obtain the same positive results when it comes to innovation and startups and we need additional structural actions to improve the EU's performance.

The new wave of deep tech innovation provides an excellent opportunity for Europe to become the global leader in this new wave of innovation. Europe has three competitive advantages that will allow it to lead on this new wave.

First, in addition to digital, deep tech has a strong hardware component, and the EU is a leader in hardware industries. Second, deep tech is heavily based on science, and the EU is at the forefront of science. Third, deep tech addresses the Sustainable Development Goals, which will assist the EU in achieving the “twin transition” to green and digital technologies and an economy that works for everyone.

One of the Horizon Europe objectives is to foster excellence-based participation from all Member States and to facilitate collaborative links in the European R&I landscape. How will this be achieved?

With Horizon Europe, we achieved a substantial increase of the budget for Widening activities to more than €3 billion to reach 3.3% of the total Horizon Europe budget as compared to about 1% in Horizon 2020.

The increased budget for Widening measures will not only allow to continue and fine-tune existing actions known from Horizon 2020 (such as Teaming, Twinning, ERA Chairs or COST actions), but also support additional measures.

For instance, a good success story for Teaming measures is the InnoRenew project (‘Renewable materials and healthy environments research and Innovation Centre of Excellence’) in Slovenia funded under the Horizon 2020 programme. This project develops a new centre of excellence, InnoRenew, which conducts cutting-edge scientific research related to the use of renewable materials. It liaises with policymakers to further guide enterprises and research in the forestry sector.

Some of these novelties include improving the quality of proposals from R&I catching-up regions, boosting activities of National Contact Points, establishing matchmaking services, promoting initiatives on excellence and joining ongoing collaborative R&I projects.

We address both research and innovation excellence. We also use all available EU instruments as drivers for change for enhancing research and innovation capacities in Member States currently eligible for Widening support, supporting centres of excellence, establishing a vibrant ecosystem, and improving researchers’ skills.

Finally, we need stronger cooperation at the European, regional and national levels to create an innovation ecosystem that can benefit all regions, attract talent, as well as strengthen links between education, science and business.

How successful is the European Institute of Innovation and Technology (EIT) contributing to supporting innovation from education to market?

The EIT was created to drive innovation in Europe by supporting the innovation ecosystems and environments where business, education and research collaborate and find solutions to specific challenges from climate change and sustainable energy to healthy living and food. The EIT is triggering a change towards a more innovative and entrepreneurial mind-set in Europe through supporting projects and initiatives from lab to the market – turning ideas to products and services, and supporting students and researchers to become entrepreneurs.

The EIT InnoEnergy support of Graphmatech AB, a technology company inventing and developing graphene-based materials, is an example of how we can help translate the Nobel laureates’ work (investigation and isolation of graphene) into concrete solutions, technologies and applications in the energy, battery or electronics sectors. Graphmatech is taking graphene from a novel wonder-material in the lab to a solution for large-scale industrial applications – and all of this is happening thanks to the help of the EIT, an instrument of the Horizon Europe programme.

A strong, competitive and integrated financial system is the backbone of a robust and vibrant innovation ecosystem. It not only raises capital for already well-established European companies but is also indispensable for nurturing the companies of tomorrow – EU unicorns and startups active in areas of key strategic interest

for the EU.

In recent years much more venture capital has become available in Europe, but still we lag behind the US and Asian competitors. Horizon Europe has made additional progress in the field with the [European Innovation Council](#) (EIC) programme and the EIC Accelerator calls in particular. However, we do not stop here. Let me mention the EIC Transition instrument, targeted at some of our best ideas and discoveries in Europe.

If the ERC is for our brightest and best, where we have already funded Nobel Prize winners, Europe is also pushing towards more innovation to turn revolutionary ideas into products and solutions for the market.

The Gender Gap in STEM fields

None of the science Nobel Prizes this year were awarded to women. What is the EU doing to improve women's representation in the STEM fields?

Women's representation in STEM is not a new situation. There are clear advancements and outstanding female scientists.

Many discoveries made the Covid-19 vaccine possible, and one of these was that of Hungarian born Katalin Karikó. Her idea that mRNA could be used to fight disease was seen as too radical and too financially risky to fund. She applied for grant after grant but kept getting rejected.

Nevertheless, she persisted and eventually, she and her former colleague developed a method of utilising synthetic mRNA to fight disease. That discovery is now the basis of the Covid-19 vaccine.

What does this tell us? Institutional support is vital. Allow me to touch briefly on the statistics.

Our newly published Gender in Research and Innovation Statistics and Indicators SHE Figures 2021 show the continuing under-representation of women in the STEM fields.

Women account for only 29% of PhD graduates in engineering, manufacturing and construction across the EU. They represent only 25% of self-employed professionals in technical professions such as science, engineering, or information and communication technologies. They are significantly under-represented among inventors, with only 10% of patent applications coming from women.

We need to work across the entire "value chain", from early education and higher education to research and innovation. As Commissioner for Innovation, Research, Culture, Education and Youth, this is what we try to do.

What initiatives are you taking to increase women's representation in STEM?

Allow me to point out three examples.

First, under the European Innovation Council (EIC), this year, I launched the Women Tech EU call to support 50 women-led tech startups with a budget of €3.8 million. The call has just closed, and we have 391 applications from 37 countries. For the next iteration, the budget will be increased to €10 million. But that is not all; the European Innovation Council will ensure that at least 40% of the startups they fund are women-led. Since 2020, the percentage of women-led companies receiving EIC funding has increased from 8% to 29% in just one year. So, yes, we can reach 40%. The talent is out there.

Second, we use wisely Horizon Europe. We have introduced a new eligibility criterion which means that research organisations applying for funding must have an actionable Gender Equality Plan. We have also introduced a target for a gender balance of 50% in all Horizon Europe related decision-making bodies and evaluators. One recent example is the EIC Board, where gender parity and better representation of Member States are now.

Since its creation, the MSCA has placed a strong emphasis on promoting gender and equal opportunities for their fellows and their projects. The MSCA grants permit part-time work and provide specific incentives for maternity leave. As a result, the share of female researchers involved in MSCA is 42%, much higher than the actual share of women (around a third) employed as researchers in the EU. That is not all, our excellent MSCA fellows will also start visiting schools to talk about their research and inspire children to follow a similar path.

Third, with the European Institute of Innovation and Technology (EIT), we are focusing our efforts on early education.

When it comes to education, the Girls Go Circular initiative, led by the EIT, has trained 2,300 girls in 329 schools across 8 countries since last year.

As the EIT represents a community of 2,000 partners in Europe and beyond, it will constitute a driving force for gender equality and for all innovation actors in Europe.

The EU is continually seeking to support the emergence of more women innovators and entrepreneurs and create role models for women and girls everywhere.

It is important to close the gender gap if Europe wants to be a fair and inclusive continent. Our ambition is to create a pan-European Innovation Ecosystem to offer the right environment to everyone – women and men, as well as to all regions to develop their competitive edge in research and innovation.

Only by ensuring a strong innovation performance across all regions will Europe achieve its objective to remain globally competitive. That is why we are building synergies across funding programmes, as well as assisting Member States to prioritise R&I investments and adopt the necessary reforms through the Resilience and Recovery Facility.

More info