Briefing

Perspectives on transatlantic cooperation
September 2016

European Parliament

Science and research

Upgrading EU-US cooperation

SUMMARY

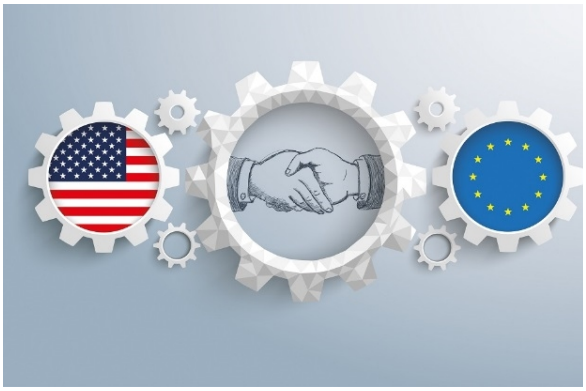
The EU-US axis for science cooperation has for decades been the world's strongest, given that the USA and Europe were the two main research powerhouses. However, the situation has been evolving in the last decade with emerging research powers – specifically China – entering the scene and creating a new multipolar context.

While the US research system is organised on a thematic basis, European research efforts are fragmented between the EU, national and regional levels. This creates a complex but dense network of interactions between Europe and the USA. The EU has been trying to coordinate better its efforts since 2000 by integrating the international dimension of science into the European Research Area. The cooperation agreement between the EU and the USA, signed in 1998, was renewed in 2014, while the Commission adopted a roadmap for EU-US scientific cooperation.

In order to strengthen the EU-US axis in science cooperation, initiatives could be taken regarding: mutual opening of research programmes, development of transatlantic joint programming initiatives, access to and co-funding of research infrastructure, open access to research and data, and the framework for researchers' mobility.

Cooperation between the EU and USA has been instrumental in maintaining both regions at the edge of scientific progress. With increasing worldwide competition, the transatlantic link appears a strong asset. However, implementing new initiatives would imply better addressing the fragmentation of the EU research landscape, agreeing on common priorities and removing legal barriers on both sides of the Atlantic.

This briefing forms part of a broader research project on the perspectives on transatlantic cooperation in the US election year, requested by the Chair of the European Parliament's delegation for relations with the United States.



In this briefing:

EPRS | European Parliamentary Research Service
Author: Vincent Reillon
Members' Research Service

PE 586.645

EN

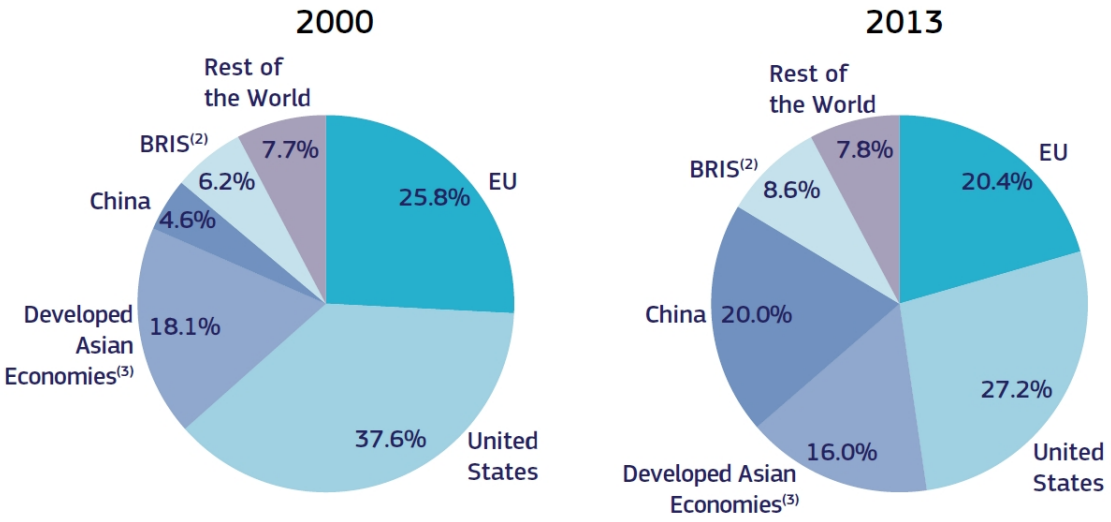
Context and state of play

A bilateral relationship in a new multipolar environment

The USA and Europe have for decades been the two leading regions in the world production of scientific research. After the Second World War, the developed Asian economies (Japan, Taiwan, Singapore and South Korea) progressively established strong capacities for research, becoming third actors on the research scene. Nevertheless, Europe-US interactions have always constituted the main axis for research cooperation worldwide.

This situation is currently challenged, however, by the emergence of new economic powerhouses which have starkly increased their investments to develop their research capacities over the last 15 years. While Brazil, India, Russia and South Africa can be cited as emerging actors in research, China is now to be considered as a major player in this field. China's share of the world gross domestic expenditure on research and development (GERD) was multiplied by more than four between 2000 and 2013 (figure 1). Its world share of highly cited publications was multiplied by 4.5 between 2000 and 2010. In this emerging multipolar environment for research, the Europe-US axis of cooperation, although still strong, is being challenged, especially by a US-China axis the importance of which is growing steadily.

Figure 1 - Distribution of world GERD in 2000 and 2013



Notes: (1)The % shares were calculated from estimated values in current PPS€. (2)BR+RU+IN+ZA. (3)JP+KR+SG+TW.

Source: European Commission.

A US system characterised by an area-based structure

In the USA, funding for research is mainly provided at the federal level. Nevertheless, there is no single Department for Research. The funding is provided by various departments and agencies supporting selected policy areas, such as the Department of Energy (DoE), the Department of Defense (DoD), the National Institute of Health (NIH) and the National Aeronautics and Space Administration (NASA). The National Science Foundation (NSF) provides funding for exploratory research in other areas.[1] Each of these departments and agencies develops its own international relations.

In 2008, the National Science Board, an advisory body to the President and the Congress under the NSF, recognised the effects of the globalisation of the scientific landscape and the need to collaborate more internationally to address global challenges such as security, climate change or health issues. It called for a coherent and integrated US

international science strategy. In 2009, the Department of State launched the 'Science Envoy Program', under which independent scientific experts travel abroad and advise the White House and the Department of State on matters related to scientific cooperation. The head of the White House Office of Science and Technology Policy also chairs Joint Commission Meetings with Brazil, China, India, Japan, Korea and Russia. A bill for an 'International Science and Technology Cooperation Act' was adopted by the House of Representatives in 2015. It aims at establishing a working group under the National Science and Technology Council (NSTC) to identify and coordinate international science and technology (S&T) cooperation opportunities. However, it has not yet been adopted by the Senate.

A fragmented European research landscape

On the European side, the research landscape is fragmented, as research mainly remains a Member State (MS) competence. About 85% of public funding for research in Europe is still spent by the Member States within their national borders. The key EU policy since 2000 has been the establishment of the European Research Area (ERA), aimed at creating a common research space in Europe allowing the interoperability of the national research systems. This initiative is supported by the framework programme for research (currently the Horizon 2020 programme), which represents about 10% of the public research spending in Europe. Joint programming initiatives that aim at pooling national research funds in order to coordinate cross-border research activities have been developed by the Member States since 2008, but involve only a fraction of the public funding for research in Europe.

In this fragmented European research landscape, both the Member States individually and the EU are active in international scientific cooperation.[2] In order to improve the coordination between the EU and the Member States, the Council of the European Union established the Strategic Forum for International Science and Technology Cooperation (SFIC) in 2008. The SFIC aims at developing the international dimension of the ERA. In 2010, the SFIC started working on developing common EU-MS strategic research and innovation agendas with selected countries: India, China, the USA, Brazil and Russia. In May 2015, the ERA Roadmap adopted by the Council included international cooperation as a sixth ERA priority.

In 2012, the European Commission presented its strategy for EU international cooperation in research and innovation based on three objectives: strengthening the Union's excellence and attractiveness, tackling societal challenges, and supporting the Union's external policies. In 2014, the strategy was extended by 11 multiannual roadmaps for cooperation with industrialised countries (Canada, Korea, the USA, Japan), emerging scientific powers (Brazil, Russia, India, China and South Africa), and the countries under the European Neighbourhood Policy.

Since 1994, the EU has signed international agreements for scientific and technological cooperation with 20 countries offering a framework for scientific cooperation between the EU and these third countries. The European Commission’s Directorate-General for Research and Innovation (DG RTD) is the executive agent which implements the agreements on the EU side. Most of the agreements are concluded for an indefinite period, or for five years with tacit renewal. Only the agreements with Brazil, India, Russia, Ukraine and the USA need to be formally renewed every five years. The EU has also developed a network of 11 science counsellors and officers to strengthen scientific cooperation with third countries. Finally, the EU develops its international cooperation in

research by providing an 'associated country' status for third countries for the framework programme for research. There are currently 16 associated countries within Horizon 2020.

The Commissioner for Research and Innovation, Carlos Moedas, introduced the vision for EU cooperation in science under the concept 'Open to the world' in June 2015. Priorities now include support for research and innovation capacity; access to markets and their impact on EU competitiveness; contribution to the EU's international commitments; and improvement of the legal and administrative frameworks in place to engage in cooperation. Extending the ERA concept, the Commission suggests building a 'Global Research Area' step-by-step, interconnecting Europe with other regions of the world.

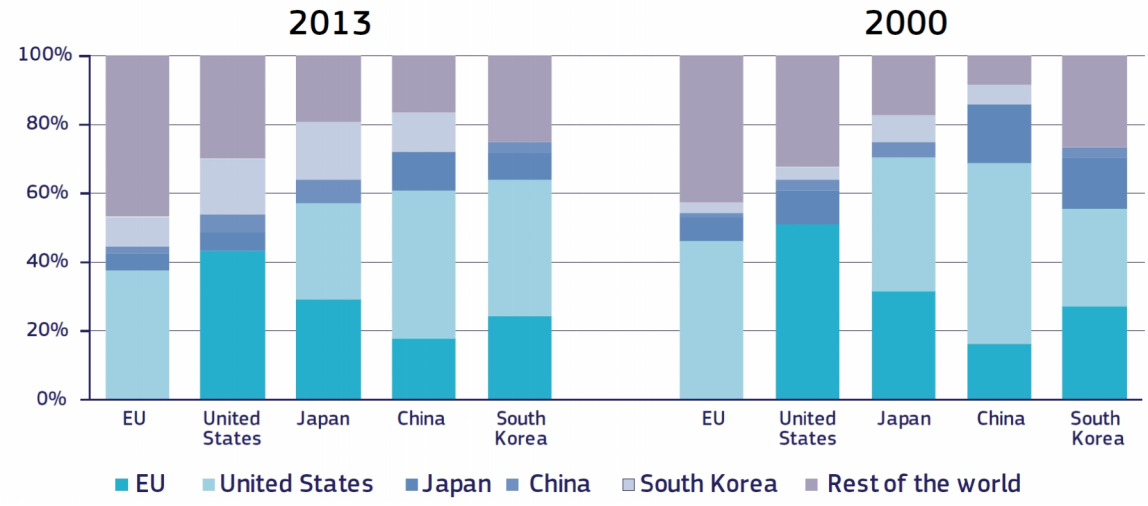
A multi-level Europe-US relationship in research

There are countless interactions and examples of cooperation in research between Europe and the USA. The difference in structure between the European and US research systems, however, means that these connections are established on multiple levels:[3]

- Most EU Member States have signed bilateral cooperation agreements for S&T cooperation with the USA;
- national research funding organisations have developed bilateral partnerships with US federal agencies or departments, especially the NSF, NIH, DoE and NASA;
- European research centres and universities conclude bilateral agreements with their counterparts on the other side of the Atlantic. United States universities have established campuses in various EU countries;
- Programmes have been established to support the mobility of researchers and academic staff. However, these programmes support only a fraction of the exchange of researchers between Europe and the USA. Researcher mobility, especially early-stage researchers, is a consequence of the openness of the recruitment process and often follows individual cooperation networks;
- Ad-hoc cooperation takes place between researchers on an individual basis, leading to a high number of co-publications between European and US researchers (figure 2);
- Large private investments in research and innovation from US companies in Europe, and from European companies in the US, also play a strong role in EU-US science cooperation.[4]

All of these connections create a dense network of interactions that explains the predominance of the Europe-US axis of scientific cooperation.

Figure 2 – International scientific cooperation, 2013 and 2000



Source: European Commission.

EU-US cooperation in science and research

EU-US agreement for S&T cooperation

The first agreement for scientific and technological cooperation between the EU and the USA was adopted in October 1998 for a period of five years. It listed 15 sectors, such as environment, materials sciences and biotechnology, for the establishment of cooperative activities. It also set up a Joint Consultative Group (JCG) in charge of overseeing the activities under the agreement. The agreement was renewed for the first time in 2004 and again in 2009, with the addition of nanotechnology, space and security research as areas for cooperative activities.

The agreement was evaluated in March 2013 upon its third renewal. The evaluation report concluded that the agreement was a valid instrument but that many public and private stakeholders were not aware of its existence. The authors of the report proposed 12 recommendations, both on the overall strategy and the operational policies to strengthen the cooperation. They advised the Commission and the Member States to better align their own S&T strategies and to complement discipline-based priorities by a move to address grand challenges. They also recommended greater involvement of the Council in the implementation of the agreement in order to maximise Member State involvement; the development of joint cooperation instruments and co-funded schemes; and an increase in the knowledge of potential EU and US participants on the S&T opportunities available on both sides. These recommendations were not transposed as modifications to the agreement renewed in 2014.

Roadmap for EU-US cooperation

In January 2013, the SFIC presented the state of play of its initiative on 'Approaching USA', begun in 2009. It advocated enhancing the scale of Europe-US S&T cooperation by supporting the internationalisation of joint programming activities; strengthening the innovation dimension developed under the Transatlantic Economic Council; and improving framework conditions for cooperation. The SFIC also noted the need to improve information sharing and promotion of the EU S&T capacity in the USA.

These conclusions informed the adoption of the Commission roadmap for EU-US cooperation presented in September 2014. Out of the areas mentioned in the agreement, this document presents four priorities selected by the JCG: marine and arctic, health, transport, and material research. This follows the decision to design a more precise EU internationalisation strategy, with increased scope and scale for the selected areas for cooperation. Nevertheless, the roadmap stresses that cooperation in areas such as energy research under the EU-US Energy Council or e-infrastructures will be maintained. Since then, activities in the areas of marine and arctic research and health have been considerable.[5] They are also developing in the area of transport, but remain low in the materials area.

Participation in the framework programme for research

Among the third countries participating in the seventh framework programme for research, the USA ranked first in terms of number of applicants (6 269) and second in terms of requested European contribution (€369 million). A total EU contribution of almost €82 million (ranked first) was granted to 514 US participants (ranked second). Within the Horizon 2020 work programme, and following the adoption of the roadmap, the collaborative topics where US researcher participation was encouraged included marine and arctic research, health research, transport, materials research, raw materials, ICT, biotechnology, energy research and security research.

Moreover, the framework programme provided support for various projects, such as COOPEUS, in the field of environmental research infrastructures (renewed as COOP+ under Horizon 2020), and funded the BILAT scheme to improve scientific cooperation with the USA.

Bilateral Coordination for the Enhancement and Development of S&T Partnerships between the EU and the US (BILAT)

The BILAT USA project was launched in October 2009 in order to improve the process of providing information on the framework programme; to better identify and demonstrate mutual interest and benefit from S&T cooperation between the EU and USA; and to share best practices and present the state of the art and prospects for cooperation in particular fields. The Link2US programme, initiated at the same time, aimed at providing information on US collaborative funding schemes. The BILAT project was renewed as BILAT USA 2.0 in 2012, and as BILAT 4.0 in March 2016.

Potential for convergence and/or joint action

The dense landscape of interactions, and its evolution over the last decade, offers new opportunities to strengthen EU-US cooperation in research.

Mutual opening of research programmes

Research programmes are usually closed for participation, meaning that funding is only available for researchers working in an institution that belongs to the same geographical area as the one covered by the funding body. Hence, funding under Horizon 2020 is mostly available only for researchers or institutions carrying out their activities in the EU or the associated countries. Unless their participation is deemed essential for the development of the research project, the participation of US researchers in Horizon 2020 is not funded by the programme but has to be supported with US funds.

Recently, measures have been taken to open research programmes. The calls, under the Societal Challenge 1 of Horizon 2020 on 'Health, demographic change and wellbeing', are fully open to US researchers. This follows an agreement with the NIH, signed in 2008 by the Commission, which reciprocally opened its calls on health to European researchers. The mutual opening of research programmes results in the possibility for European and US researchers to receive funding from either funding body and facilitates opportunities to establish collaborative projects.

Opening of research programmes demonstrates mutual trust between the parties. The possibility of opening research programmes in additional areas would demonstrate a strong will to increase cooperation between the EU and the USA. However, the opening of research programmes is limited by the legal requirements that the funding institutions need to meet. Derogations from the legal requirements – regarding the geographical area covered by the funding bodies – need to be introduced in the legislation governing the funding bodies or the programmes.

Transatlantic joint programming activities

Since 2008, Member States have begun implementing Joint Programming Initiatives (JPIs). Member States define a strategic research agenda on areas of common interest, agreeing on the objectives to be reached. They then fund and implement research projects in order to reach these objectives. This coordination of national research agendas allows pooling of national resources provided in an area, and increases the overall impact of the research conducted. As Member States each implement one part of the overall research agenda, there are no limitations regarding the use of funds. There

are currently ten active JPIs. Joint programming has also been supported at EU level by the establishment of ERA-NETS, funded under the framework programme.

As Member State led platforms implemented at Member State level, JPIs can easily be internationalised by the introduction of third countries in the overall process. Hence five of the ten JPIs have at least one third country as member. Canada, for example, is participating in four JPIs. However, the USA is not a member of any JPI. In 2012, the JPI on Neurodegenerative Disease Research held a conference in Washington DC with the American Association for the Advancement of Science (AAAS) to explore the possibility for the USA to join the JPI. However, this has not happened as yet. Nevertheless, US participation in some ERA-NETs, such as on the bio-economy or safety of nanotechnologies, suggests an interest in joint programming activities.

The development of transatlantic joint programing activities is seen as a preferred option to strengthen EU-US cooperation in research. Because JPIs are managed by the Member States, they allow for more flexibility and greater coherence, while at the same time not suffering from the legal barriers mentioned for opening research programmes. Transatlantic JPIs would allow the development of strategic research agendas on selected areas that would ease cooperation.

Access and co-funding of large research infrastructures

Research activities often rely on infrastructures the cost and maintenance of which require financial contributions going beyond national capabilities. In Europe, collaboration for the coordinated funding of large research infrastructures is organised within the European Strategy Forum on Research Infrastructures (ESFRI). There is also a need to ensure that research infrastructures are accessible and open to researchers.

The Group of Senior Officials (GSO) on Global Research Infrastructures was established by the Carnegie Group of Science Ministers from leading countries to discuss the planning, design and construction of global infrastructures. The Progress Report of 2015 lists national infrastructures that could be used as global infrastructures. The USA listed two infrastructures in the field of marine and arctic research. Since 2012, and based on an EU initiative, the International Conference on Research Infrastructures (ICRI) offers a platform to discuss global cooperation in research infrastructures with third countries.

Despite these initiatives, EU-US cooperation in research infrastructures remains at a low level. The USA contributes to the European Council for Nuclear Research (CERN), as an observer. However, the USA does not directly participate in large EU research infrastructures, even though a memorandum of understanding exists for some, introducing a certain degree of cooperation in fields such as cultural heritage, nanotechnologies or biobanks. Besides its participation in the global ITER project on nuclear fusion, the USA is not directly involved with the EU in the building of major research infrastructures.

Access to EU research infrastructures is promoted with funding under Horizon 2020. Large US research infrastructures are usually open for proposals from researchers worldwide. Stronger cooperation in research infrastructures could contribute to the establishment of stronger ties between the EU and the USA. Another important question is the interoperability of research infrastructures and the management, sharing and accessibility of the data produced.

Open access to research and data

The digital revolution has opened new opportunities in the capacity to harvest, save, share and reuse research data sets. It also led to a revolution in access to scientific research, promoting open access – direct access without fees – to scientific publications.

As far as data are concerned, there is a global movement regarding the development of connected e-infrastructures that supports the management, curation and sharing of research data. In April 2016, the EU launched a project to establish a European Open Science Cloud (EOSC), the development of which will be monitored by an Open Science Policy Platform. The EOSC will be designed to support the distribution of and access to research data in Europe. Under Horizon 2020, the project leaders are requested to establish Data Management Plans in order to promote the establishment of open data. Open access to publication has also been made a requirement for the projects funded under Horizon 2020. The Council of the European Union adopted conclusions on 27 May 2016, stating that immediate open access should be the default policy for scientific publications by 2020.

The US position on open access to publications is similar to that of the EU, with the objective to make all publications open after an embargo period of one year. The Fair Access to Science and Technology Research Act of 2015 was introduced in the Senate to make open access of publicly funded scientific publications a legal requirement. However, it has not yet been adopted. The US government has also developed infrastructures to support open access to research data.

In order to be effective, open access to research data must be supported by e-infrastructures, but additionally requires interoperability and standardisation of the data. To reach their maximum potential for reuse, data must be formatted and accessible in an agreed format. The Research Data Alliance is a third party supported by the EU, the USA and Australia, which addresses these issues. Intellectual property rights are also an important consideration when dealing with open access to publications and data at international level.

Increased mobility

The flow of researchers between the EU and the USA is strong, but unbalanced, with a larger flux from the EU to the USA. This is due to the structure of the US research system that has for decades promoted grant based funding, opening numerous temporary positions for researchers at the beginning of their careers. Bottom-up connections between research teams allow for direct contacts and exchange of information about opening positions. Hence, mobility is mostly performed outside established schemes, even though these schemes are numerous at Member State and at EU level.

The Marie Sklodowska-Curie Actions (MSCA) programme is the main tool supporting mobility under Horizon 2020. Individual fellowships are open to nationals from third countries to work in the EU. The grants provided by the European Research Council (ERC) are open to any nationals, provided that they work in an EU Member State or associated country. The ERC has also established implementing arrangements to promote third country researcher mobility for ERC teams. On the US side, the Fulbright Program, begun in 1946, is the best known programme in support of researcher mobility. The NSF also launched Graduate Research Opportunities Worldwide (GROW) to promote the mobility of early-stage US researchers.

Researcher mobility results in establishing solid and long term cooperation between research teams and institutions. Promoting balanced mobility between the EU and the USA, and increasing the transatlantic flows of researchers, can be seen as an important tool to strengthen EU-US cooperation in research. An important aspect to consider regarding mobility is the openness of the recruitment process in research institutions, and the information concerning vacant positions. On the EU side, the EURAXESS portal includes a section for open positions in North America.

Potential projects

Based on the potential areas for action mentioned in the previous section, the following proposals could be explored to bring EU-US cooperation to another level. The proposed measures aim at deepening the interactions at the macro-scale, building on the existing individual and bottom-up interactions, and placing the EU-US cooperation axis on a higher level of integration when compared to the other axes of research cooperation worldwide.

- The conclusion of agreements to open research programmes in areas other than health: reciprocal opening of research programmes in the priority areas identified by the JCG would demonstrate a deeper commitment for cooperation between the EU and the USA.
- Making the USA a member of existing JPIs or creating new JPIs based on common EU-US interests: the JPI framework allows the development of a shared strategic agenda for research between the partners in a defined area. This is a strong tool to align research activities with common objectives, provide a better allocation of resources to reach them and support cooperation.
- Improving EU-US coordination on the implementation and use of research infrastructures, including discussion about the standardisation of data sets and interoperability of e-infrastructures; sharing and reusing research data constitutes an important aspect of scientific cooperation in the 21st century. Making sure that transatlantic cooperation on that aspect is at the forefront of this revolution would place EU-US cooperation in research in the lead worldwide, and would be beneficial for research activities on both side of the Atlantic.
- Facilitating transatlantic researcher mobility: making sure that no barriers exist to transatlantic researcher mobility would be a strong asset in improving the EU-US cooperation axis in research. Initiatives could be implemented to provide better information on vacant positions or on mobility schemes at national and EU level.

Challenges to be addressed

In the last 15 years, the globalisation of research activities has changed the research landscape worldwide. New axes of scientific cooperation are being established between the traditional research powerhouses – the EU and the USA – and the emerging actors. In this context, there is a risk that the strong EU-US axis of cooperation in research could be neglected, while new ties are established with China, Russia, India, Brazil or South Africa.

The EU-US axis has been a key factor in maintaining both European and US research at the leading edge of science. Maintaining the current level of EU-US cooperation in research will not be enough. Strengthening cooperation and intensifying interactions are a likely factor for the success of both regions in the global competition that the emergence of new scientific powers is creating. In order to foster EU-US cooperation in research, several issues need to be addressed.

Firstly, the EU and the Member States need to better integrate their international research policies, define their common priorities, and pool their resources to leverage their potential. A similar integration would be welcomed between the different US departments and agencies. Secondly, discussions need to be intensified between the EU and the USA, aiming to define common research agendas on identified priorities, especially regarding global challenges in fields such as health, climate change, security or energy. The implementation of joint programming activities would demonstrate a high level of commitment by both parties to the best use of existing resources to tackle these issues. Thirdly, removing the remaining legal barriers to open research programmes and researcher mobility would deepen mutual trust and give a strong signal to research communities for the development of greater collaboration. Finally, implementing the opportunities offered by big data jointly and in a coordinated way, would provide a clear advantage to the EU and the USA in reaping the fruits of the research activities conducted on both sides of the Atlantic.

The renewal of the EU-US agreement for scientific and technological cooperation expected in 2019 could provide an opportunity to integrate these aspects and give a new impetus and a new framework to EU-US collaboration in science.

Main references

EU scientific cooperation with third countries, V. Reillon, EPRS, European Parliament, July 2015.

Open Innovation, Open Science, Open to the World - a vision for Europe, European Commission, 2016.

Endnotes

[1] The 2016 budgets for each agency can be found on the AAAS website.

[2] More information can be found in EU scientific cooperation with third countries, V. Reillon, EPRS, European Parliament, July 2015.

[3] A November 2010 study by the Joint Research Centre provides a vivid image of the S&T cooperation between Europe and the USA.

[4] In 2012, almost 10% of EU GERD was financed by non-EU funds while 4% of US GERD was financed by non-US funds.

[5] See for example the Atlantic Ocean Research Alliance and the Transatlantic eHealth cooperation roadmap.

Disclaimer and Copyright

eprs@ep.europa.eu
http://www.eprs.ep.parl.union.eu (intranet)
http://www.europarl.europa.eu/thinktank (internet)
http://epthinktank.eu (blog)