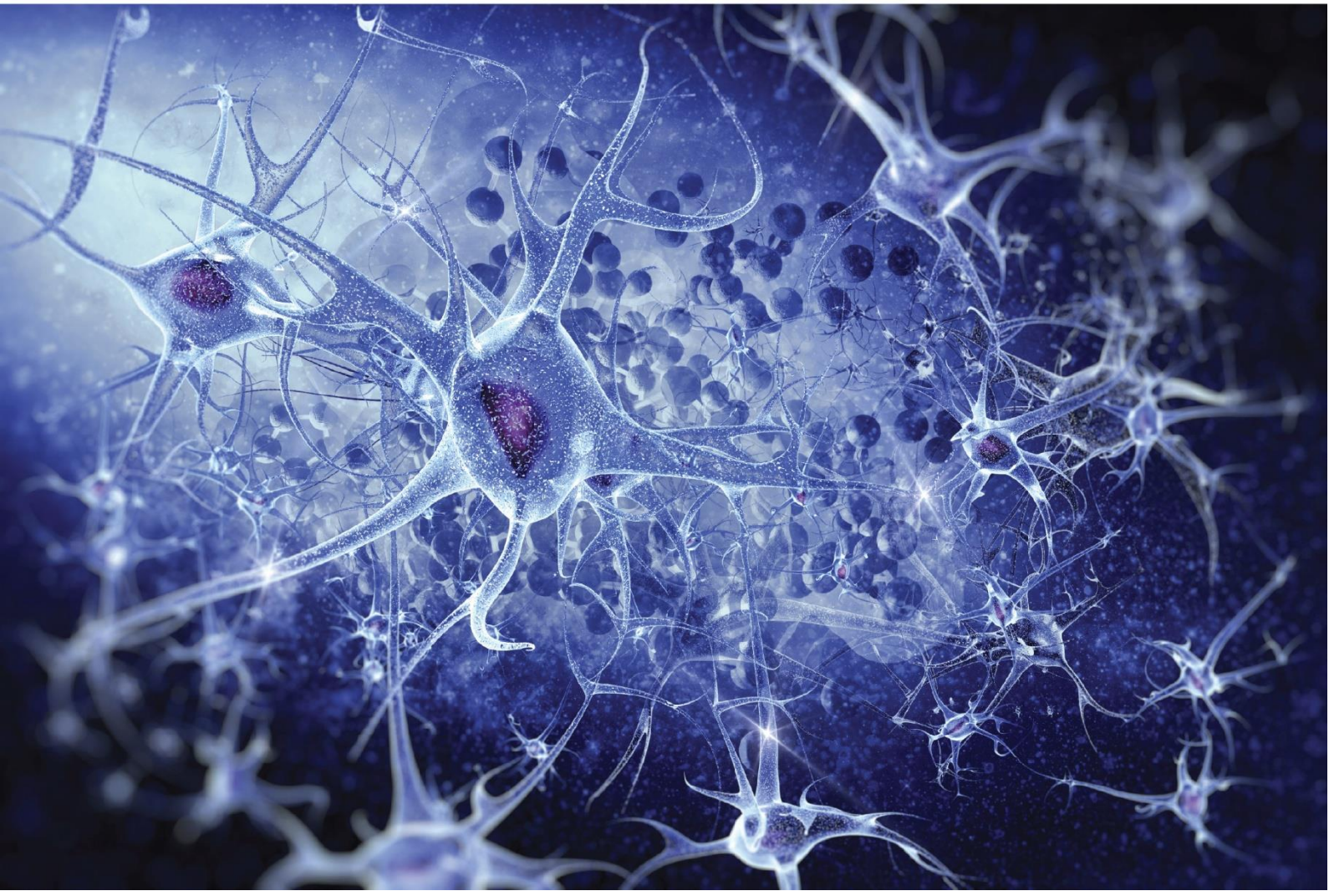
BILAT USA 4.0



ANALYZING REPORT ON CONSULTATION PROCESS WITH FUNDERS AND POLICYMAKERS

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 692468.

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EXECUTIVE SUMMARY

The Project BILAT USA 4.0 continues activities started by the predecessor project BILAT USA 2.0, with the overall aim to enhance, support and further develop the research and innovation cooperation between the European Union and the United States of America. One focus of the BILAT Project is strategic priority setting for EU-US cooperation through identifying emerging STI fields with a high benefit and added value from cooperation. By analyzing a consultation with funders and policy-makers through 51 interviews and surveys, this report aims to identify new thematic areas for expanded EU-US STI cooperation. These areas will be further explored and vetted first through a follow-up consultation with top researchers, and then through a series of thematic workshops bringing together researchers, funders, and policy-makers.

There was broad consensus regarding a number of new potential STI cooperation areas:

1. **Information and communication technologies (ICT)** was the single most predominant area targeted for future cooperation. Perhaps the most promising topics within ICT are **big data**, **smart cities**, the **Internet of Things (IoT)/cyber physical systems**, and **data management** and **open data**. Additional topics of interest include **5G**, or **next generation networks and services**; **future of the Internet**; **artificial intelligence**; **robotics**; and, **cyber security**.
2. EU and US representatives agree that understanding and supporting the environment generally, and addressing **climate change** specifically, is a shared priority. This will be achieved in part through enhanced systems for **earth and ocean observation**. Even more so than with other application areas, new developments in ICT were considered enablers of environmental research and support.
3. While not yet a formally established area of cooperation, there is interest from EU and US partners in advancing existing collaborations around **energy**. Collaborative research and development to support **clean energy**, including green energy and different forms of renewable energy, is vital.
4. Despite linguistic differences, there is clear consensus that the **life sciences** and **biology** are prominent areas of mutual interest. **Biotechnology** may be particularly promising.
5. Participants also expressed interest in cooperating on a range of topics in the **social sciences**. These include **culture and identity studies**, especially to understand global issues like migration; **science education**, covering both formal and informal STEM learning; and, understanding and supporting **creative industries**.

In addition to topical areas, participants in the consultation expressed interest in working together to improve the framework conditions for cooperation. Understanding different laws related to intellectual property is imperative for successful cooperation, though establishing shared ethical codes of conduct, including procedures for informed consent, are important as well.

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ABBREVIATIONS

Acronym	Full Name
AC	Associated Countries to Horizon 2020
AISL	Advancing Informal Stem Learning (NSF, US)
BIO	The Directorate for Biological Sciences (NSF, US)
CDTI	Centre for the Development of Industrial Technology (Spain)
CISE	The Directorate for Computer & Information Science & Engineering (NSF, US)
CSA	Coordination and Support Action (H2020)
DARPA	Defense Advanced Research Projects Agency (US)
DGs	Directorate-Generals (EC)
DASTI	Denmark Agency of Science and Technology Innovation (Denmark)
DOE	Department of Energy (US)
DOS	Department of State (US)
EC	European Commission
EHC	Environmental Health and Safety
HER	The Directorate for Education & Human Resources (NSF)
EPA	Environmental Protection Agency (US)
ERAs	European Research Areas
EU	European Union
FDA	Food and Drug Administration (US)
FOAs	Funding Opportunity Announcements (DOE, US)
GEO	The Directorate for Geosciences (NSF, US)
H2020	Horizon 2020 – the EU's 8th Framework Programme for Research and Innovation
HIRO	Heads of International Research Organization
ICT	Information and Communications Technology
JRC	European Commission Joint Research Centre
JPIs	Joint Programming Initiatives
MAR	Multiannual Roadmap
MCSA	Marie Sklodowska-Curie Actions (H2020)
MGI	Materials Genome Initiative
MINECO	Ministry of Economy and Competitiveness (Spain)
MIT	Massachusetts Institute of Technology (US)
MOU	Memorandum of Understanding

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MS	Member State
NCURA	National Council of University Research Administrators (US)
NGOs	Non Government Organizations
NIEHS	National Institute of Environmental Health Sciences (US)
NIH	National Institute of Health (US)
NIST	National Institute of Standards and Technology (US)
NMP	Nano Materials for Production
NSF	National Science Foundation (US)
OAR	Office of Oceanic and Atmospheric Research (US)
OCED	Organisation for Economic Co-operation and Development
OSTP	Office of Science and Technology Policy (US)
PO	Program Officer
RCN	Research Council of Norway (Norway)
RFAs	Requests for Applications
RFPs	Requests for Proposals
R&I	Research and Innovation
R&D	Research and Development
RIA	Research and Innovation Action (H2020)
SBE	The Directorate for Social, Behavioral, and Economic Sciences (NSF, US)
SET-Plan	Strategic Energy Technology Plan
STEM	Science, Technology, Engineering, and Math
STI	Science and Technology Innovation
UNESCO IOC	United Nations Educational, Scientific and Cultural Organization (Intergovernmental Oceanographic Commission)
US	United States of America
WOC	World Ocean Council

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INTRODUCTION

While bilateral cooperation in Science and Technology Innovation (STI) is already established between the European Union (EU) and the United States (US) in many areas, researchers, funders and policymakers on both sides of the Atlantic are continually searching for new areas of mutual interest. Identifying potential new areas for enhanced STI cooperation is the objective of this report.

Background

Where research and innovation are concerned, the European Union's relationship with the United States is stronger than with any other partner outside Europe. The EU-US relationship is supported and underpinned by the adoption of the Transatlantic Declaration, which was signed in 1990.1 Drawing on a history of shared heritage and historical, political, and economic ties, the Transatlantic Declaration suggests that the EU and US will engage in economic, educational, scientific, and cultural cooperation in a number of fields. In addition, the Transatlantic Declaration outlines a consultation framework between entities including the President of the European Commission (EC) and the President of the United States.

More recently, the EU and US signed a joint Agreement for Scientific and Technological Cooperation in 1998, which has been renewed four times and is currently valid until October 2018.2 As a key instrument and roadmap in expanding transatlantic scientific cooperation, this agreement offers a broad framework for collaboration in various areas of scientific research, recently including environmental science, information and communication technologies, cleaner energy sources, biotechnology, and nanoscience. This accord is often complemented with more focused, theme-specific arrangements. Four thematic areas that are already established cooperation targets include the following.

Ocean/Arctic

Because the Oceans and Arctic are global resources, it is unsurprising that EU-US cooperation is established in these areas. Early efforts were spurred by the publication of the EC's Blue Growth Strategy3 and its Atlantic Action Plan4, which led to a high-level meeting and the eventual signing of the Galway Statement in 2013. The US government has concurrently established Oceans as a national priority, developing the National Ocean Policy Implementation Plan5 to set priorities for scientific research.

Health

In health, EU and US cooperation begins through joint membership in the Heads of International Research Organization (HIRO), an organization that supports health policy coordination by supporting discussion of medical research and other issues. The EU and the US also work together on initiatives including the International Epigenome Consortium Project and the International Cancer Genome Consortium.

[1] "Transatlantic Declaration on EC-US Relations, 1990," European Commission and United States, http://eeas.europa.eu/us/docs/trans_declaration_90_en.pdf
[2] One sample Agreement may be found at https://ec.europa.eu/research/iscp/pdf/policy/usa_roadmap_2009.pdf
[3] "Blue Growth – opportunities for marine and maritime sustainable growth," European Commission, http://ec.europa.eu/maritimeaffairs/documentation/publications/documents/blue-growth_en.pdf
[4] "Action Plan for a Maritime Strategy in the Atlantic area – Delivering smart, sustainable and inclusive growth," European Commission, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52013DC0279
[5] "National Ocean Policy Implementation Plan," National Ocean Council, https://www.whitehouse.gov/administration/eop/oceans/policy

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Transport

EU-US collaboration is very advanced in transport Research and Innovation (R&I). An implementation agreement6 was signed to boost cooperative activities in the field of research, technology and innovation for all modes of transport. Key areas include freight transport and logistics; sustainability; safe and seamless mobility; waterway transport; operations safety; road traffic management; cross-cutting research; and, human factors.

NMP

The EU and the US are global leaders in nanotechnology for production, materials and processing (NMP). As key enabling technology, nanotechnology is recognized as a potentially huge source of innovation, leading to growth and jobs. The EU and the US meet regularly to discuss NMP research and policy, for example through the dialogue "Bridging Nano Environmental Health and Safety (Nano EHS) research."7

The United States' Participation in H2020

Cooperation between the EU and the US may be supported through a number of mechanisms, but the main operational tool for funding STI EU-US cooperation is the European Union's Framework Programme for Research and Innovation, as of 2014-2020 labeled as Horizon 2020. Some US researchers are submitting applications to Horizon 2020, most commonly in areas of excellent science and societal challenges, and of action types including Marie Sklodowska-Curie Actions (MCSAs) and Research and Innovation Actions (RIAs). Please see the table on the following page for more information on US participation in Horizon 2020.

[6] "Implementing Arrangement for Cooperative Activities in the Field of Research, Development, Technology, and Innovation Applied to all Modes of Transport," DGR RTD and RITA, http://ec.europa.eu/research/transport/pdf/20140128_implementing_arrangement_en.pdf

[7] "2016 U.S.-EU: Bridging Nano EHS Research Efforts," Nano.gov, http://www.nano.gov/node/1576

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US applications for H2020 grants (Spring 2014-2015)

The EC received 977 applicants, including 911 eligible proposals, with a total requested EU contribution of about 143.96 million euros.

Top priority areas in terms of US application

Excellent Science (all topics)
765 applications; 103.39 million Euros of requested EU contribution

Societal Challenges (all topics)
161 applications; 35.28 million Euros of requested EU contribution

Industrial Leadership (all topics)
37 applications; 2.38 million Euros of requested EU contribution

Information and Communications Technology (ICT)
17 applications; 0.85 million of requested EU contribution

Space
11 applications; 0.72 million of requested EU contribution

Top action types in terms of US application

Marie Skłodowska-Curie Action (MSCA)
716 applications; 98.36 million Euros of requested EU contribution

Research and Innovation Action (RIA)
206 applications; 39.95 million Euros of requested EU contribution

Coordination and Support Action (CSA)
24 applications; 2.04 million Euros of requested EU contribution

Objectives of this report

This report is one deliverable of the Horizon 2020-funded project BILAT USA 4.0.8 BILAT USA 4.0 continues activities started by the predecessor project BILAT USA 2.0 with the aim to enhance, support and further develop research and innovation cooperation between the European Union and the United States. One focus of the BILAT project is strategic priority setting for EU-US cooperation through identifying emerging STI fields with a high benefit and added value from cooperation. For example, based on the findings of BILAT 2.0, thematic areas of mutual interest where EU-US collaboration could be better coordinated may include:

[8] "BILAT 4.0," BILAT Project, http://www.euussciencetechnology.eu/

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Information and communications technology (ICT): Advances in ICT would support an innovative, dynamic, research-intensive economy sector9 with huge potential for solving global challenges through transatlantic cooperation.

Biotechnology: The EU-US Biotechnology Task Force is the longest running thematic forum between the EU and the USA, with joint activities expected to expand in the coming years. 10

Energy: EU-US Energy Council supports cooperation with the SET-Plan (Strategic Energy Technology Plan) as a high-level policy dialogue.

Climate change: Key policy and funding levers include the Climate Action Plan in the USA11, as well as cross-cutting initiatives within the European Research Areas (ERAs).

By reporting on and analyzing a consultation process including interviews and surveys, this report aims to identify a longer and more comprehensive list of new thematic areas for expanded EU-US STI cooperation.12 Following this initial point of departure, research will continue through consultation with top researchers in the EU and the US to vet new areas of mutual interest. Workshops convening funders, policy-makers, and researchers will further clarify and assess collaboration potential within these thematic areas. One workshop may also focus on understanding the framework conditions13 that enable and/or constrain cooperation.

Figure 1: three step consultation process

The ultimate goal of this process is to identify at least three validated future thematic cooperation areas, out of which at least one may be taken-up in a forthcoming call for proposals (H2020 or at MS level), thus broadening the scope of

[9] Important developments in ICT asking for academia-industry cooperation are Internet of Things, Industry 4.0, 5G, Big Data, application programming interfaces, etc.
[10] "We also expect a revitalization of the EU-US Task Force on Biotechnology which would be translated in opportunities in the calls 2016-2017," MAR 2014, European Commission, http://ec.europa.eu/dgs/home-affairs/e-library/documents/basic-documents/docs/an_open_and_secure_europe_-_making_it_happen_en.pdf
[11] "Fact Sheet: President Obama's Climate Action Plan," White House office of the Press Secretary, https://www.whitehouse.gov/the-press-office/2013/06/25/fact-sheet-president-obama-s-climate-action-plan
[12] In this case, we are considering specific thematic areas and more specific research areas together as new priority areas for EU-US STI cooperation
[13] In this case, we are considering "processes and practices" (e.g. open data, open science, ethical, biosafety, biosecurity safeguards, intellectual property) that are enabling EU-US STI collaboration across thematic areas

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EU-US STI cooperation. This deliverable is thus a focused input for further consultations and does not provide prescriptive conclusions.

METHODOLOGY

A consultation process was launched by partners of the BILAT consortium on both sides of the Atlantic, in order to address funders' and policy-makers' scientific and technological expectations of the future and interests regarding cooperation between the EU and the US. On the EU side, the consultation targeted the European Commission (through the project's Program Officer; Directorate-Generals (DGs) in Research and Innovation; and, through the EU delegation in Washington, DC) as well as funders and policy-makers from EU Member States (MS) and Associated Countries (AC). On the US side, federal funders and policymakers were primary targets for the consultation, though outreach extended to private foundations as well. Feedback was also solicited from members of the BILAT Advisory Board.

While a wide range of leading funders and policy-makers in the EU and the US were invited to participate in this project, a number of organizations were unable to provide a response over a three-month period. This report therefore includes the opinions of 51 individuals from the European Commission, MS, and the United States. Eight EC representatives and 21 policy makers, funders and universities, 20 of whom represented the interests of the MS from Denmark, Finland, Germany, Greece, Italy, Latvia, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden and Switzerland completed an online survey.[14] In addition seven European funding agencies from MS—including Austria, Denmark, France, Norway, Spain, Sweden, and the United Kingdom—shared their opinions through in person, phone, or email interviews. A total of 12 US funders and policymakers also participated in interviews, again conducted in person, over the phone, or through email exchange, according to the preferences of each individual. A complete list of participants and affiliations may be found in the annexes of this report.

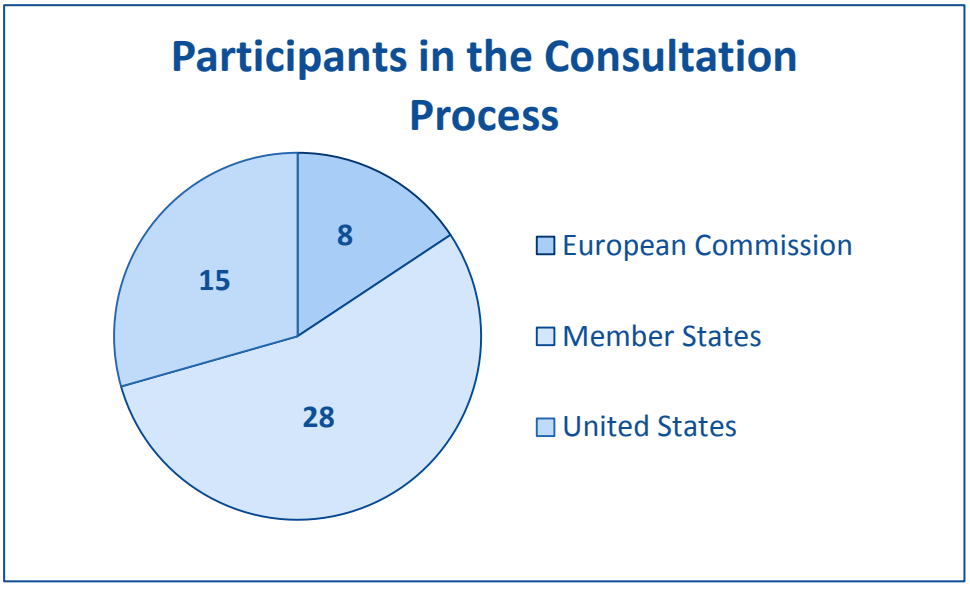

Figure 2: Participants in the Consultation Process

[14] The remaining participant was a BILAT consortium partner not directly involved in this work package.

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All participants were recruited through the networks of the authors and BILAT partners, and contacts identified through the previous BILAT USA projects, and other INCO projects. Regardless of consultation methodology, all participants answered similar questions.

These included:

1) Strategic fora between the EU and the US have determined the areas health, marine and arctic, new materials and processes (NMP), and transport research as established priority areas for EU-US cooperation. Outside of these broad thematic fields, what are the next priorities for bilateral STI research cooperation?
2) Within each of the broad thematic areas you listed, what are more specific topics for bilateral STI research cooperation?
3) What priority areas are not feasible for the EU and the US to work jointly on, for strategic, legal, or other reasons? Please indicate why.

Participants were also invited to list specific institutions they would enjoy collaborating with, and share their home department, institution, and email address. Many participants also commented on the current successes and limitations of EU-US cooperation during the discussions. This consultation was supplemented with desk research, which was conducted to provide the necessary context for EU and US audiences to understand the funding and policy levers of the numerous organizations included in this report.

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VIEWS OF BILATERAL STI COOPERATION—US FEDERAL GOVERNMENT

Introduction

Prior to World War II, US government funding for science and technology research was relatively rare. Funding primarily fell to private individuals, philanthropic organizations, and universities. Fears surrounding new technology introduced during the second World War catalyzed the creation of the National Defense Research Committee under the Roosevelt administration. President Harry Truman continued Roosevelt's legacy by founding the National Science Foundation (NSF), which today offers funding through competitive grants and cooperative agreements to colleges, businesses, and research institutes. It is important to note that, while the President's budget contains provisions for federally funded R&D, there is no "R&D budget," but rather allowances for research within the budgets of more than 25 separate US agencies and departments.[15]

Federal funding for STI research most commonly takes the form of a grant or a contract. Federal grants assist researchers in developing projects for the common good, rather "acquiring property or services for the direct benefit or use of the United States Government."[16] Grants are generally flexible means of achieving a particular aim. Conversely, contracts are specific *quid pro quo* agreements, whereas grants are based on broader terms and support public purposes.

The Obama Administration has made science and technology innovation a core priority, investing billions in research and development, STEM educational initiatives, and public-private partnerships. The Office of Science and Technology Policy (OSTP) in the Executive Office of the President is primarily responsible for identifying and shaping priorities across federal agencies that engage with STI. Taking their lead from OSTP, US federal agencies tackle specific and relevant issues within their unique missions and jurisdiction.[17]

National Science Foundation (NSF)

Background and Perception of Bilateral Cooperation

The National Science Foundation is a government agency whose mission is to advance the progress of science through funding proposals for research and education made by scientists and engineers. NSF exclusively funds basic research. With an annual budget of $7.5 billion in FY 2016, NSF supports approximately 24% of all federally supported basic research at US colleges and universities.[18] NSF is organized around directorates, who write and release individual grant solicitations. All NSF proposals are evaluated through a merit review process. This process may include individual review, panel review, or a combination of both.

[15] "Federal R&D in the FY 2016 Budget: An Overview," American Association for the Advancement of Science, 2016.
[16] "Federal Grants vs. Federal Contracts," University of Pittsburg, http://www.research.pitt.edu/sites/default/files/u24/Grants_vs_Contracts.pdf
[17] "R&D Budgets," White House Office of Science and Technology Policy, https://www.whitehouse.gov/administration/eop/ostp/rdbudgets
[18] "About NSF," NSF, http://www.nsf.gov/about/

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NSF has explored different cooperation areas with the EU in the past. One particularly successful area of cooperation has been environmental health and safety technology. For example, in 2015 NSF partnered with on an ERA-NET for the safe implementation of innovative nanoscience and nanotechnology.[19]

NSF cooperates with a range of Member States (MS), and is happy with these relationships. At the same time, cooperation with the EC brings an added value when new geographies can be reached, for example when the EC supports activities in countries that are not located in the northwest of Europe.

Despite existing successes, various factors limit the extent of transatlantic cooperation. The first is a question of outreach and awareness; it may be difficult for US researchers to realize that programs like Destination Europe exist if they are not already looking for such programs. NSF also believes that researchers do not understand the European Commission funding system, and the relationship between the EU and the MS. This information gap may lead to a missed opportunity for US alignment with H2020-supported clusters of excellence.

Researcher mobility is an additional concern. From NSF's perspective, mobility should be supported from graduate students, to postdocs, to faculty. Unfortunately, many Americans aren't used to traveling, and may take an egocentric view of the world. US graduate student mobility is also hampered by advisors and faculty who see little incentive in allowing their students to travel abroad.

According to NSF, the best mechanisms to promote cooperation are workshops and compatible or mirrored calls. In both cases, pre-existing relationships between researchers and funders are a necessary pre-condition for cooperation between the EU and the US. Joint calls with the EC are not a possibility for a number of reasons. First, there are important linguistic differences between the EU and the US. Stated priority areas, and thus funded activities, may not align; for example, while EU funding often aligns with grand challenges, NSF funding does not. Legal issues also make cooperation difficult. Finally, it would be prohibitively difficult to manage the peer review process in a joint call, for example when traditions of peer review differ between EU and US funders, or when a single review panel must be convened.

New Areas for Bilateral STI Cooperation

Committed individuals are crucial to any successful cooperation. Many NSF Program Officers (POs) are rotating, serving three- or four-year appointments; these individuals and the research they support would not be good candidates for strategic cooperation. Any matchmaking between EU and US funders should therefore target permanent POs, or ideally directorate leadership. Partnerships could arise with a number of directorates, where permanent leadership is invested in building partnerships with Europe.

The Directorate for **Biological Sciences** (BIO) supports research on life across systems that encompass biological molecules, cells, tissues, organs, organisms, populations, communities, and ecosystems up to and including the global biosphere. There is already a precedent for successful cooperation between NSF and the EC through a joint technology taskforce around biotechnology. BIO would like to expand this cooperation in any number of topics in **biology** and **life science**.

The Directorate for **Computer & Information Science & Engineering** (CISE) aims to help the US uphold a position of leadership in computing, communication, information science, and engineering; to promote understanding and use of

[19] "Dear Colleague Letter: Safe Implementation of Innovative Nanoscience and Nanotechnology (SINN)," NSF, http://www.nsf.gov/pubs/2015/nsf15022/nsf15022.pdf

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advanced computing systems; to support cyberinfrastructure to enable and accelerate discovery; and, to contribute to useful, transparent, and affordable participation in an information-based society. Topics funded by CISE include the **Internet of Things**, the **Future of the Internet**, and **5G**. Some ERC clusters of excellence match with NSF centers of excellence. This alignment could promote successful partnerships between EU and US researchers.

The Directorate for **Geosciences** (GEO) supports basic research and technological innovation around the many processes that affect the global environment, including the role of the atmosphere and oceans in **climate** and **climate change**; the planetary water cycle; and, the role of ocean acidification. From NSF's perspective, there is some overlap between GEO-funded activities and the already established cooperation area of Marine and Arctic research. A potential area for new cooperation is around **earth observations.**

The Directorate for **Education & Human Resources** (EHR)'s mission is to achieve excellence in all Science, Technology, Engineering, and Math (STEM) fields to support the development of a well-prepared workforce and a well-informed citizenry. Within EHR, there is potential interest from the **Advancing Informal Stem Learning** (AISL) program.

Finally, the Directorate for **Social, Behavioral, and Economic Sciences** (SBE) supports interdisciplinary research on people and society. For a few topics of mutual interest, there is already cooperation between SBE and the EU. For example, there is an existing transatlantic partnership regarding the Digging into Data challenge. Beyond existing partnerships, many additional social science research questions of interest to SBE also align with the grand challenges that often drive EU funding priorities.

In all cases, NSF believes that collaborations should support basic, frontier research: ***"There is more potential for collaboration in new fields, where the big questions are still being figured out. In newer areas, there is also more international collaboration because they are less established, and therefore expertise is constantly shifting."***

National Institute of Health (NIH)

Background and Perception of Bilateral STI Cooperation

The mission of the National Institutes of Health (NIH) is to advance knowledge on the nature and behavior of living systems, and the application of knowledge to enhance health, lengthen life, and reduce illness and disability. Following this mission, NIH supports both basic and applied research through intramural research (conducted within the 27 Institutes that comprise NIH) and extramural research. With a budget of $31.3 billion, approximately 83% of NIH funding supports extramural research, through grants to hospitals, universities, medical schools and other facilities.[20]

NIH is the largest public funder of biomedical research in the world, and actively engages with Europe and the EU.[21] As one of the 27 Institutes, NIH supports the Fogarty International Center, which houses the Division of International Science Policy, Planning, and Evaluation; Division of International Relations; and, Division of International Training and Research. Fogarty is devoted to advancing NIH's mission by facilitating global research on health science and convening international partners.[22] Fogarty currently has 2,700 active merit-reviewed proposals with European

[20] "HHS FY 2016 Budget in Brief," U.S. Department of Health & Human Services, http://www.hhs.gov/about/budget/budget-in-brief/nih/index.html
[21] "About Grants," National Institute of Health, http://grants.nih.gov/grants/about_grants.htm
[22] "Our Mission and Vision," Fogarty International Center, https://www.fic.nih.gov/About/Pages/mission-vision.aspx

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members, amounting to $181 million in investments. Some of these activities are direct grants, while others are collaborative activities on topics ranging from AIDS research to analyses of global mental health services.

Compared to the MS, NIH's collaboration with the EC through the H2020 program is less established. The grant agreement, only recently resolved,[23] was a significant barrier.

In the past, there has been some success with mirrored calls. For example, NIH and the EC are both members of the Global Alliance for Chronic Disease. NIH has issued a joint RFA with the EU directly through this consortium, in support of hypertension and diabetes research. NIH believes that mirrored calls for applications, for example through aligned RFAs, could enhance coordination between EU and US researchers. NIH would prefer to work with the EC to develop mirrored calls: ***"It would be ideal to have a regular consultation with the European Union on plans; not necessarily with the outcome of an MOU, or a grants agreement, but just so we have shared priorities. So that when there's an area we feel might be stimulated to issue a [Request for Applications] in a certain area."***

With respect to commercial applications of scientific research, NIH notes that working with the EU affords closer access to the market for product development, which is an added value of cooperation. Intellectual property laws are comparatively less stringent, and corporate entities in the EU are more likely to collaborate with American entities. Working with MS individually also does not afford the same ease of single market access that working with the EC affords.

New Areas for Bilateral STI Cooperation

From a topical perspective, there are several areas of research that would benefit from enhanced EU-US cooperation. The NIH would like to see increased cooperation on **brain mapping** and **neural circuitry**.

NIH also sees value in aligning **genetics** research activities that involve **convening populations with variant phenotypes and genotypes** across a wide range of geographical areas, particularly for longitudinal studies. This is most easily accomplished by working with the EC, rather than individual MS. Cooperating in this area would enable collaborative trials, joint trials, and secondary analysis. However, to take full advantage of this diversity, standards and best practices must be agreed upon, as described below.

NIH is interested in cooperating with the EU on **environmental health research**, which is supported in the US through the National Institute of Environmental Health Services (NIEHS). Other areas of potential collaboration include **antimicrobial resistance**, **precision medicine**, and **cancer therapeutics**. It was discussed that the National Cancer Institute is frustrated because they see areas of overlap between EU and US research, but due to legal and logistical constraints researchers in these geographies are unable to delve more deeply into formal partnerships.

Beyond topical areas, NIH considers the EC a unifying force for the European scientific community. NIH expressed keen interest in developing transatlantic **ethical standards** for scientific research, and supporting work on **data standardization** and data collection, including **shared data collection methods**. It is the hope of some researchers in the US to eventually create shared data portals, where a range of information from many study volunteers could be accessible through an easily searchable database. Such research infrastructure would require mutual agreement on **intellectual property,** shared protocols for **informed consent**, and potentially **material transfer agreements.** Here, NIH believes that the way to begin is by sharing best practices between the EU and the US.

[23] "Newly signed EU-US agreement offers new opportunities for STI cooperation," BILAT, http://www.euussciencetechnology.eu/news/28

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Department of Energy (DOE)

Background and Views of Bilateral Cooperation

The US Department of Energy (DOE)'s mission is to advance energy technology and promote related innovation in the United States. DOE's FY 2017 budget totals $32.5 billion, including $30.2 billion in discretionary funding and $2.3 billion in new direct spending authority.[24] This funding supports research and development activities in the areas of nuclear security; clean energy; environmental cleanup; climate change; and, other science and innovation. The majority of DOE funding imposes eligibility limitations, for example by restricting competition to existing DOE National laboratories, or to DOE National Laboratories along with other federal agencies, and agency contractors.[25]

There are numerous examples of successful bilateral cooperation between DOE and European partners. Many activities may be traced to 2009, when the US-EU Energy Council was founded as a high-level of engagement between the US Secretary of State and the Commissions for External Relations, Energy, and Science and Research, as well as the EU Presidency.[26] There are also successful collaborations around the Hydrogen Economy between DOE and JRC, as well as between DOE and individual MS, particularly on methodologies for safety standards and building stacks of fuel cells. These collaborations primarily involve organizing conferences and coordinating work programs. As a third example, DOE's Argon National Lab works with JRC on smart grid and e-vehicle interoperability standards.

Cooperation is typically managed from within DOE's 17 National Labs. In the EU, European universities and research centers are considered natural partners. These corporations are structured as "normative," prioritizing research advancement over commercial development. Thus, partnerships avoid issues around commercial IP. DOE characterizes most existing cooperation as bottom-up, where EU researchers elect to travel to DOE labs on short visits, sabbaticals, and research agreements. As one DOE representative explains, ***"In 2016, DOE hosted over 10,000 European researchers. This bottom-up cooperation is considered more valuable than any top-down matchmaking efforts: You can't duplicate the 16,000 people who are already matched."***

These visits are supported by DOE's policy of open access, where any organization passing merit review may visit and use a lab's facilities. In some ways, this bottom-up approach actually protects cooperation by insulating researchers from change in top-down policy priorities. In other words, programmatic level cooperation may disappear with leadership changes. In addition, because many DOE investments do align with US markets, cooperation needs to be driven by the needs of transatlantic markets and the researchers that support these markets.

Despite the rich fabric of bottom-up cooperation, existing exchange patterns are typically visits from EU researchers to US labs. According to DOE, more work is needed to understand how many US researchers come to the EU. Promoting similar visits, which may require hosting and access to EU labs and other resources, is one potential way to enhance cooperation.

Another method is putting center directors in close contact. When center directors agree on key methodologies and the structure of a lab, two centers evolve as mirrors of one another, which makes cooperation easier. High profile

[24] "FY 2017 Department of Energy Budget Request Fact Sheet," DOE, http://energy.gov/fy-2017-department-energy-budget-request-fact-sheet
[25] "Funding Opportunity Announcements," DOE, http://science.energy.gov/grants/foas/
[26] "EU-U.S. Energy Council" *Annex 2* https://eeas.europa.eu/us/sum11_09/docs/energy_en.pdf

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launch events are also important for maintaining access to financial resources. Finally, DOE believes that it would be beneficial for merit officers to attend merit reviews of the other side, and/ or sit on selection protocols. DOE is not interested in joint calls, but is open to considering mirrored programs, as much as mutually beneficial or legally possible.

New Areas for Bilateral STI Cooperation

DOE identified three topical areas of interest for enhanced bilateral cooperation: **Energy systems**; **grid modernization**, particularly investing **renewable energy into the grid**; and, **offshore wind**.

More broadly, DOE believes that the EC can help by rationalizing the means by which cooperative activities arise. One role for the EU could be to figure out a way to organize or funnel cooperative agreements with 28 MS to support more efficient bottom-up cooperation between EU and US researchers. **Technology road mapping** could be one contribution of the EC, for example through analyzing what models for grid mappings are used by different universities and private sector companies at the MS level.

National Oceanic and Atmospheric Administration (NOAA)

Background and Views of Bilateral Cooperation

The National Oceanic and Atmospheric Administration (NOAA)'s mission is to understand and predict changes in climate, weather, oceans, and coasts, in order to share information with partners in the US and abroad, and to conserve and manage coastal and marine ecosystems and resources. In addition to internal research and management activities, NOAA supports external research and development through the office of Oceanic and Atmospheric Research (OAR). NOAA has requested $5.8 billion in FY 2017, including $520 million for OAR.[27]

NOAA maintains an active dialogue with the European Union on areas of mutual interest. For example, the US and the EU have met annually since 1997 (with the exception of 2008-2011) to discuss cooperation in the field of fisheries and fisheries research.[28] NOAA also signed a 2012 agreement with JRC to strengthen scientific cooperation on climate, weather, oceans and coasts. This agreement promotes cooperation through mechanisms including the exchange of personnel, shared use of scientific infrastructure, support for joint research, access to laboratory facilities, scientific training, and information exchange.[29]

NOAA provides funding to some foreign groups through grants. Historically, grantees have primarily included international government associations, including the United Nations, and international Non-Governmental Organizations (NGOs). At this stage, NOAA's preference for cooperation with the EU is to attend joint workshops and other meetings.

New Areas for Bilateral STI Cooperation

While NOAA's mandate is specifically domestic, there are opportunities for cooperation around areas that are by nature international in scope. Such areas include **oceans, agriculture, food security,** and **climate.** Regarding ocean

[27] "President's FY 2017 Budget Request," NOAA, http://research.noaa.gov/AboutUs/OurBudget.aspx
[28] "United States- European Union High Level Fisheries Consultation," NOAA, http://www.nmfs.noaa.gov/ia/agreements/bilateral_arrangements/eu/eubilat.pdf
[29] "U.S., Europe sign agreement to strengthen scientific coopeartion on climate, weather, oceans, and coasts," NOAA, http://www.nmfs.noaa.gov/stories/2012/05/docs/noaa_eu_science_agreement_brussels.pdf

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observation networks, NOAA is trying to strengthen their global partners to include more European partners. There may also be opportunities to cooperate around **cultural heritage.**

Within these broad areas, more specific topics of interest are **ocean acidification**; **climate services**; **fisheries** or **sustainable fisheries**; and, **marine debris**, including **marine litter and marine protected areas**. Around marine debris, NOAA is especially interested in bringing in third world countries as partners to share expertise and build networks.

The U.S. Environmental Protection Agency (EPA)

Background and Views of Bilateral Cooperation

The EPA's goals are to support research and assistance projects that advance human health and the health of the environment. In pursuit of these goals EPA funds research in the areas of air; climate change; ecosystems; health; safer chemicals; sustainability; and, water, through a competitive funding scheme. With a total budget of $8.6 billion, EPA budgeted $1.2 billion for grants in FY 2016.[30]

One successful instance of transatlantic cooperation spearheaded by the EPA is through the Regional Environmental Center for Central and Eastern Europe. Created by a US Presidential Initiative in 1990, the Regional Environmental Center for Central and Eastern Europe in collaboration with the EPA is now one of the key forums in which countries engage to address environmental challenges. REC has regional offices in each major capital in Central and Eastern Europe, and builds the capacity of national and local governments through these offices. EPA also collaborates with INTERPOL via the Environmental Compliance and Enforcement Committee, a body that prosecutes entities that transport, trade, or illegal dumping of hazardous substances.

According to EPA representatives, the most successful corporations to date have supported computational toxicology, including by exploring how modern molecular biology techniques from computer science could help determine how chemicals impact the human body. In this case, EPA and EC calls were successfully aligned, so that EPA funded two institutes, the Commission funded one, and all three interacted. Cooperation around nanotechnology through the ERA-NET mechanism was deemed less successful.

According to EPA, the bureaucratic hurdles to understanding and participating in H2020 are significant. Agency representatives report that their lawyers are confused by the large number and diversity of documents describing H2020 procedures, and believed that the grant agreement, which formerly required all conflicts to be negotiated in Brussels, was in violation of US federal policy. EPA is interested in being informed of JPIs, where RFAs are determined by the MS, especially around **water**, **agriculture**, and **climate**, in addition to the areas described above. EPA is also open to participating in workshops and symposia with the EC.

New Areas for Bilateral STI Cooperation

EPA identified a number of broad areas and specific topics for enhanced bilateral STI cooperation. **Microplastics** is one area of mutual interest. EPA is also interested in collaborative R&D around **biotechnologies**, and related high-data, high-content areas where EPA is evaluating chemicals and/or biology. Specific innovations here include **3D cultures, organs,** and **linking organs.** Because EPA is already cooperating with US partners including DARPA, NIH, and FDA in these areas, collaborating with the EU would be a logical expansion. In addition, research on **epigenetics** and

[30] "FY 2016 EPA Budget in Brief," EPA, https://www.epa.gov/sites/production/files/2015-02/documents/fy_2016_bib_combined_v5.pdf

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the **microbiome** could be of mutual interest, particularly for research exploring the **links between health and microbial resistance**.

EPA is interested in cooperatively exploring **sensor technology**, through **sensor development**, and by supporting **citizen science** activities. Additional topics include **water reuse**, **resource running**, and **premise plumbing; health management and vector control**; and, **toxicology and exposure**, especially when linked to **social behavior**.

Nothing that ***"you can't do big data research with small data sets,"*** EPA prioritizes **ensuring that research data is meaningfully open**, meaning that it can be easily understood, shared, and reused in a range of contexts by researchers on both sides of the Atlantic. EPA generates a lot of data, especially through robotic technologies, that is made public through interfaces. However, even though European partners like JRC recognize EPA data, there are no existing grant solicitations that give EU researchers resources to let them use US databases. In other words, there is no signal that proposals will be accepted if they use (for example) EPA or NIH data. On the flip side, access to EU databases such as the REACH database, is difficult for EPA. Closing access to data is a huge barrier to cooperation, and to science itself.

Department of State (DOS)

Background and Views of Bilateral Cooperation

The U.S. Department of State (DOS), a federal executive department, is responsible for implementing the United States' foreign policy and diplomatic strategy. During FY 2016, the State Department awarded $1.6 billion in grants, and nearly $5 billion in contracts.[31] RFPs are issued under a specific sub-office of the State Department, for example the Bureau of Public Affairs, or the Bureau of Democracy, Human Rights, and Labor. Within the STI realm, the US DOS's Science and Technology Cooperation is unique in that it establishes a program specifically for global collaboration on STI: the Global Innovation Through Science and Technology Initiative. DOS also maintains an Office of the Science and Technology Advisor to the Secretary of State.

There is a strong history of cooperation between the US and EU in science and technology. It is in part due to the State Department's support for bilateral agreements, including the "Agreement for Scientific and Technological Cooperation."[32] In 2009, then-Secretary Hillary Clinton announced the first three Science Envoys, independent researchers who agreed to travel abroad and advise the State Department about insights gleaned from meetings with foreign counterparts in the STI community.

Today, the State Department believes that transatlantic collaboration was much facilitated under FP6 and FP7, in a wide area of STI fields and research topics. Unfortunately, since the inception of H2020, transatlantic STI cooperation has grown increasingly difficult for US researchers, universities and government bodies. Consistent with this analysis, The US Department of State understands that some US researchers have been discouraged by their own institutions to actually join H2020 grant agreement, as illustrated by MIT's disclaimer in their research guidelines.[33] The EU and

[31] "Agency Profile: Department of State," USASpending, http://bit.ly/2b3Nuzd
[32] "U.S-EU Cooperation in Science and Technology," U.S. Department of State Bureau of European and Eurasian Affairs, http://bit.ly/2b65AOa
[33] "Participation in collaborations sponsored by the European Commission's Horizon 2020 Programme (H2020) are often of great interest to our faculty, yet contain non-negotiable terms that MIT has not been able to accept. Proposals for such programs are therefore strongly discouraged, as MIT will not be able to participate as an Institute at this time." From "International Activities," MIT Office of Sponsored Programs, http://osp.mit.edu/grant-and-contract-administration/international-activities.

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the US have agreed that progress on reciprocal understanding of legal, administrative and financial issues of Horizon 2020 as well as relevant US programs is needed. US federal agencies are trying to work a path towards a solution with EU counterparts for the next Program.

New Areas for STI Cooperation

More transatlantic STI cooperation would certainly be regarded as a positive development. New areas for STI cooperation could be identified in the future, but the most urgent steps are to ease the processes of cooperation, for example by developing clear guides to the legal requirements, particularly those regarding **intellectual property**, and administrative processes associated with H2020 for US audiences.

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VIEWS OF BILATERAL STI COOPERATION—US FOUNDATIONS

Introduction

In addition to federal agencies, research and innovation is supported by private US Foundations. While these foundations have significantly smaller budgets than government entities, many are more agile in their funding mechanisms. For example, very few foundations issue public calls: rather foundation staff - including high-level directors and individual program officers - develop research priorities and manage portfolios.

Gordon and Betty Moore Foundation

Background and Views of Bilateral Cooperation

The goal of the Gordon and Betty Moore Foundation (The Moore Foundation) is to create positive outcomes for future generations by fostering scientific discovery, environmental conservation, patient care, and improvements to and preservation of the special character of the San Francisco Bay Area. The Moore foundation manages $6 billion in total assets, which translates into approximately $315 million of private grants each year.[34] The Moore Foundation exclusively funds basic or fundamental science. Areas for funding are internally developed, where program officers invite proposals as appropriate. Within the Moore Foundation's science portfolio, the bulk of assets support three main areas: Marine microbiology; data-driven discovery; and, emerging phenomena in quantum systems.

The Moore Foundation has occasionally funded European partners in marine microbiology research. A more significant cooperation is with Canada, where the US and Canada have collaborated on workshops and joint symposia in marine microbiology. The Moore Foundation is open to expanding their collaboration with the EU, either through the EC or with individual MS.

The Moore Foundation is most interested in funding joint workshops and symposia in one or more areas of mutual interest. In addition, the Moore Foundation supports research centers at institutions including New York University, the University of California-Berkeley, and the University of Washington. Moore would potentially support one of these research centers hoping to cooperate with a European partner.

New Areas for Bilateral STI Cooperation

The Moore Foundation would potentially be interested in cooperation around the following established areas: **microbiology**, especially **ocean microbiology**; and, **data-driven discovery**, particularly **big data**.

There are additional opportunities for cooperation in smaller, emerging portfolios and areas of interest. One potential area is **quantum physics** and **space science**, where institutions such as Max Plank and MS including Germany, France, and England are considered ideal partners. A second intriguing area is **science learning** and **informal science education,** especially research conducted with the goal of **promoting lifelong interest in science,** and/or **making science accessible** through **low cost instrumentation**. The Moore Foundation would also be interested in cooperation around **earthquake early warning detection** and **seismic sensor networks**.

Building on and extending these topical areas, the Moore Foundation prioritizes encouraging academic institutions to view **data management** and **data research** as an actual science and discipline. While the Moore Foundation does

[34] "Our Finances," Moore Foundation, https://www.moore.org/about/our-finances

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directly fund data science research, the foundation is also interested in **better understanding national policies for data sharing and data access**, and understanding **perceptions of data sharing and data access in different disciplinary communities**.

The Blavatnik Family Foundation

Background and Views of Bilateral Cooperation

The Blavatnik Family Foundation (The Blavatnik Foundation) supports scientific and technology research and development conducted in a range of educational, scientific, cultural, and charitable institutions. While it is difficult to estimate average annual donations, the Blavatnik Foundation recently awarded a $10 million grant to Yale University to accelerate the commercialization of key life science research.[35] In addition, the Blavatnik Foundation offers three unrestricted $250,000 awards to young scientists each year in cooperation with the New York Academy of Sciences. All awards are offered at the discretion of the foundation's employees, and the recommendations of science advisory councils.

The Blavatnik Foundation will expand the reach of their awards to the UK and Israel in 2017. The foundation is open to exploring collaboration with the EU, either through the EC or individual MS, in areas that align with the interests of existing grantees.

Due to the small size of the Blavatnik Foundation and the nature of funding decisions, joint or mirrored calls are not a possibility. The Blavatnik Foundation is interested in supporting joint symposia or other meetings to build relationships between Blavatnik awardees and EU scientists. In particular, the foundation believes that researchers at Stanford, MIT, Harvard, and Scripts would benefit from the mutual exchange of ideas, along with the winners of Blavatnik's young scientist awards.

New Areas for Bilateral STI Cooperation

The Blavatnik Foundation is currently exploring a number of new funding areas that align with EU research. These include research on **NMP**, **new materials sciences**, **energy efficiency**, and **smart technology**. Research on **climate change**, particularly in the Arctic and the Antarctic, is another area of mutual interest. The Blavatnik Foundation considers Norway a potential collaborator here.

The Internet of Things (IoT) is a potential area for cooperation that could involve either basic or applied research. From a commercial standpoint, the Blavatnik Foundation is investing in **green energy**, particularly **algae research**, and how algae can be used to take nitrogen oxide and carbon dioxide out of the air in locations such as cement factories. There is also the opportunity to work together on **social science research**, especially around **cultural integration** and **counter-radicalization** of potential terrorists.

Science Philanthropy Alliance

Following significant cuts in federal science research funding in 2012, the Science Philanthropy Alliance came together with the mission of substantially increasing philanthropic support for basic research in the natural sciences and mathematics. There are currently seven members, which support a significant portion basic STI research funding in

[35] "Blavatnik Family Foundation provides $10 million for innovation in the life sciences at Yale University," YaleNews, http://news.yale.edu/2016/08/18/blavatnik-family-foundation-provides-10-million-innovation-life-sciences-yale-university

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the US. These include the Howard Hughes Medical Institute; the Kavli Foundation; the Moore Foundation; Research Corporation for Science Advancement; Simons Foundation; Alfred P. Sloan Foundation; and, Wellcome.

The Science Philanthropy Alliance has had multiple discussions regarding cooperation between foundations and the US federal government. The consensus of Alliance members is that formal collaborations of this kind are not successful. Rather, it is preferable for philanthropists to initiate projects that interest them, and let the government take over at a later time if research is consistent with a particular agency's mission. Members of the Science Philanthropy Alliance have similar beliefs regarding a cooperation with the EC or MS. Thus, the kind of formal convening and coordination supported by the BILAT project is not of interest to most members, with the exception of the Moore Foundation.

New Areas for Bilateral STI Cooperation

For reasons described above, the Science Philanthropy Alliance declined to offer suggestions regarding new cooperation areas.

VIEWS OF BILATERAL STI COOPERATION—EUROPEAN PERSPECTIVE

Introduction

The European Union is an economic and political union comprised of 28 member states. The EU is made up of the European Parliament (the EU's lawmaking body), the European Council (which convenes EU leaders and defines the EU's political agenda), the European Commission (the executive arm responsible for enforcing legislation as well as by implementing policies and the EU budget), and various judicial, regulatory, and banking arms. The EU can apportion funding for MS in cases where the state is unable to fund an action on its own, or when it is more economically sound to pool resources.[36] Naturally, MS also set priorities and issue calls on their own.

Since the EU-side follows such a unique and complex structure the following chapters depict only an incomplete "European Perspective" which was possible in the frame of given resources in the BILAT.

European Commission and EU Delegation

Background and Views of Bilateral Cooperation

The European Commission is divided into several departments, known as Directorate-Generals (DGs). Some DGs, such as Communication, are responsible for providing logistical support to the EC and interfacing between the EC and MS. Other DGs, such as Environment, directly support European R&D, for example by advising H2020 priorities, or by issuing funding. One way that the EC interacts with the US is through diplomatic activities. For example, the Delegation of the European Union to the United States works in close coordination with the Embassies and Consulates of the 28 EU MS to promote EU policies in the United States. By engaging with government actors, the media, academia, business, and civil society, the Delegation raises awareness of EU issues and concerns, and promotes the importance of the EU-US relationship among the American public. It also analyzes and reports on the political, social, and economic situation in the US to headquarters in Brussels.

As introduced earlier, there are numerous existing cooperation areas that the EC considers active and successful.

[36] "EU Budget," European Commission, http://ec.europa.eu/budget/index_en.cfm

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Marine and Arctic. Since 2013, perhaps the most successful area for collaboration, and the first to take off has been Marine and Arctic. This includes innovation topics such as marine ecology, and literacy in marine and arctic sciences. This field of collaboration has been well structured, organized, and conducted with a process in place to deliver high-end results (funding and further collaboration). Engaging additional partners, including NSF, NASA, and NOAA, could expand the established priority area of Marine and Arctic even further.

Transport. EU-US STI cooperation has been quite fruitful in the area of transportation. This success is explained by two factors: excellent contacts from agencies to agencies at the program management level, and fruitful collaboration between and within clusters of projects.

Health. Health is one of the most successful cooperation areas for EU-US, as it relies on a decade of calls for collaborative funding and exchange of interests and contacts between the two continents. For example, at the project level the EU Delegation reports that US researchers have often been allowed to take part directly in Horizon 2020, leading to fruitful collaboration. The fact that most collaborations were international over just bilateral has also contributed to successful cooperation in this thematic area.

A third contributing factor is the ease of developing collaboration with informal, personal synergies between EU-US actors. Encouraging ongoing collaborations that are flexible, agile, and ad-hoc therefore make sense. There is also a critical mass of key actors to promote this kind of collaboration. As one example, the Health Research Council – composed of NIH and EC health research institutions – organizes a host of meetings.

NMP. The Materials Genome Initiative (MGI) was originally launched by the White House but is now developing into an area of more complete EU-US STI cooperation. The Materials Genome Initiative is now a multi-agency initiative designed to create a new era of policy, resources, and infrastructure that support US and EU institutions in the effort to discover, manufacture, and deploy advanced materials twice as fast, at a fraction of the cost. Advanced materials are essential to economic security and human well-being, yet it can take 20 or more years to move a material after initial discovery to the market. Accelerating the pace of discovery and deployment of advanced material systems will therefore be crucial to achieving global competitiveness in the 21st century. Since the launch of MGI in 2011, the US federal government has invested over $250 million in new R&D and innovation infrastructure to anchor the use of advanced materials in existing and emerging industrial sectors in the US.

In this area of materials modeling and materials new discovery, there is a breakdown at the program level on respective EU and US sides. However, the EU is largely running ahead in materials modeling and materials new discovery. In contrast, the US is lagging behind in this area, taking advantage of knowledge coming from the EU. This kind of dynamic is not beneficial to a mutually trustful relationship.

There are a number of processes that could be initiated or expanded to support enhanced EU-US STI cooperation. One representative of the EC noted that while EU researchers frequently take sabbaticals at US institutions, researcher mobility is not necessarily a two-way street. Rather, some US policies may impede researcher exchange to the EU both in the short term (e.g., for conferences) and in the longer term (e.g., for the longer term appointments required to truly pursue joint research agendas). Here, any solutions would be driven by US funding agencies.

The EU Delegation would like to see a new, no-strings-attached pot of money to seed all manner of fresh ideas. This could be compared to the Common Fund at NIH, created several years ago within the Director's office to encourage scientists to think outside the box. There is also a need for more convergent research and support for mid-scale

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infrastructure (costing tens of millions of dollars) such as NSF 2050 (i.e., a common fund to seed large, ambitious projects).

New Areas for Bilateral STI Cooperation

First and foremost, the EC believes that existing priority areas are still relevant and should be expanded.

Within the area of marine and arctic, new areas include **technology for enhanced ocean observation and seabed mapping**; and, **research and outreach for prevention and remediation of marine litter.**

The EC wishes to expand the collaboration on transport by focusing on the following themes, which require **interoperability**: **transport management systems and cargo tracking and tracing;** and, **general aviation**. In addition, the EC believes it is imperative to cooperate around **safety**, especially in regard to **vehicle automation**, **road safety and city logistics**, and **aviation safety**. Cooperation around transport could also include **climate change adaption** and **climate change mitigation**.

New topics and priorities for health cooperation concern **antimicrobial resistance** and **genomics** research, as well as the parallel research projects in **neurosciences** (Human Brain Project (EU) / Human Brain Initiative (US)). Additional support could target the following sub-themes: **Rare disease,** through the International Rare Diseases Research Consortium; **cancer**, for example through the International Cancer Genome Consortium; and, **chronic disease**, for example through the Global Alliance of Chronic Diseases. In general, there is consensus that ***"all health research areas are potentially interesting, taking advantage of the good relations between the EC (in particular the Health Directorate of DG RTD) and, on the US side, the National Institutes of Health, the Bill & Melinda Gates Foundation, and the National Science Foundation."***

Nanotechnologies, **nanomaterials** and **environmental health security** are long standing areas of EU-US cooperation. However, this cooperation (however successful) is still considered operational at the pilot level, and could be expanded.

While the EC and MS are currently collaborating with different US organizations around **energy**, this is not yet an established area for cooperation. However, the EC wishes to build upon and expand existing initiatives through the EU-US Energy Council and its Technology Working Group. Potential topics include **clean energy research and innovation**, particularly through a global clean energy innovation initiative to make clean energy (**wind**, **concentrated solar power**, **PV reliability**, **geothermal energy**, etc.) widely understood and affordable. Additional topics include **fission energy**, with research prioritizing nuclear safety, and **hydrocarbon**, including by deepening transatlantic discussion regarding **the environmental issues related to carbon capture and storage,** as well as the **environmental impacts of shale gas**.

The EU Delegation pointed out that the National Science Foundation has selected nine major topics of interest for the future. NSF priorities that are similar to EU priorities include Harnessing data for 21st century science and engineering; Shaping the human-technology frontier **(ICT,** including **big data and smart cities)**; Understanding the rules of life (i.e., **predicting phenotypes from genotypes**); The next quantum revolution **(physics)**; Navigating the new **Arctic** (including **a fixed and mobile observing network**); and, Windows on the universe (**multi-messenger astrophysics**).

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Beyond these topical areas, more work is needed to improve framework conditions and develop new infrastructure to facilitate cooperation. Key priorities include developing a mutual understanding of and agreement on **intellectual property**, and developing a mutual understanding of and tools to support **data interoperability**, **data management**, and **data access**.

SFIC-Consultation

The Strategic Forum for International R&D Cooperation (SFIC) contributes to the Internationalization of the European Research Area (ERA) by enabling the EU MS and the Associated Countries (AC) of the EU Research Framework Program to exchange information about international research and innovation activities and to attempt to bundle these. It is tasked to implement and drive forward a European partnership in the field of international scientific and technological cooperation. In order to ensure concrete progress, SFIC in 2010 started to focus on countries, which are important R&D partners for many MS and the EC. The country initiatives develop measures to achieve targets in the research collaboration with the relevant country, which is important for the SFIC members. The US until recently was one targeted focus of SFIC. In the context of this deliverable, the BILAT contacted SFIC Members of the US country initiative and asked to fill out the online survey. The BILAT also used its European networks to receive responses. 20 policy makers, funders and universities, representing the interests of 14 MS/AC from Denmark, Finland, Germany, Greece, Italy, Latvia, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden and Switzerland completed the survey.

Background and Views of Bilateral Cooperation

The nature of survey research generally limits feedback outside of pre-determined questions. Still, a few participants shared their perceptions of bilateral cooperation in response to the survey question, “Are there any priority areas where collaboration between EU and US is difficult for strategic, legal, or other reasons?”

First and foremost, participants noted that there are certain areas where it may not be feasible to work together for competitive reasons. Regarding the development of navigation systems the Galileo services by the EU and the efforts made by the US to improve GPS will create a fierce competition arena. In such cases the EU and US should simply work together to ensure that different systems are interoperable.

Legal barriers represent a second hurdle. In particular, intellectual property policies between the US and EU are not always compatible. As one Finnish participant explains, "*So far the problems in collaboration have arisen from legal issues and IPR. However these must be continuously discussed jointly in order to make any progress some days later*.”

A third limitation is the absence of agreements between EU and US financial bodies for matching funds (aside from a handful of exceptions, including agreements with NIH). While US institutions can participate in H2020 calls at no cost in most cases, and receive partial funding in a few additional cases, this is not sufficient incentive for US institutions to cooperate through H2020.

Finally, while researchers from the EU make both short- and long-term visits to the US, it is far less common for US researchers to travel abroad.

New Areas for Bilateral STI Cooperation

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Many respondents believe there is significant value to EU-US cooperation around **ICT**. Funders and policymakers in the MS consider ICT valuable as a distinct and **separate domain** to target broadly for cooperation, and also recommend ICT improvements associated with other research and innovation areas. Within ICT, key research priorities include **artificial intelligence**, **cognitive computing**, **automation,** and, **big data**, including **data storage, data management,** and **energy-efficient computation.** There are also opportunities for cooperative research and development around **next generation networks and services,** including **high-speed networking** and **eco-friendly networking**. While joint investments in ICT could be especially useful for boosting frontier research, technologies near the market may be less suited for cooperation due to industrial competition.

Pursuing ICT research and development could be an independent goal. At the same time, new ICT research and development is often contextualized within specific application areas or domains, such as **the environment**, **water technologies, solar energy, mining operations,** and **UAV systems**.

Survey respondents also hoped for expanded cooperation in **nanotechnologies** and **nanomaterials.** These topics build upon and move beyond NMP as an already-identified area of cooperation. For example, interesting topics in **micro-nanoelectrics** include **2D materials for future electronic devices** and **new memory technologies for information storage**. Topics within **eco-nanotechnologies** include **the development of robust analytical techniques to track nanomaterials in the environment** and **new libraries of compounds**.

As with ICT, nanotechnologies and nanomaterials are priorities in themselves that also support work in other areas. For example, research and development activities could be initiated around **new photonic materials and technologies in cultural heritage** and **new photonic enabled microfluidic chips for applications in biomedicine, environmental sensing,** and **energy** (e.g., for **high sensitivity gas tracing).**

Biotechnology, biophysics, biocomputing, and **synthetic biology** are related areas of interest for EU-US STI Cooperation. Topics within these areas include **simulation of physiology**, including **organs on a chip**, and **bio-resources to support space travel.**

One important application area that can benefit from research in nanotechnology and biotechnology is **agricultural research.** Making this a priority would help advance R&D to understand and support **global nutrition, food security, sustainable agriculture production,** and **biomass energy.**

While supporting research and development around such new technologies is an important and shared priority, it is equally important to cooperate on **socio-technological studies on emerging technologies**, including **AI**, **robotics**, **neurotechnology**, **synthetic biology**, and **personalized healthcare**. Socio-technological studies on these topics should be supported as an independent priority, and not just as a small component of research and development activities that advance the technologies themselves.

There is significant interest in pursuing bilateral cooperation in the **social sciences**, both generally and with specific topics in mind. Many respondents would support cooperation to better **understand and adapt to a changing world and workforce,** including through work on **risk aversion and its effect on innovation and society**. Some advocated for cooperation in the areas of **culture and identity, workforce and global competition, and migration studies.** Specific topics within these areas include **better understanding sociocultural identities** and **cultural heritage**, and also developing **best practices in absorbing migrants and equipping them to succeed.** The EU and US could also cooperate on tools to support cultural science by developing **new materials for conservation.**

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Some of the funders and policymakers surveyed support cooperative STI innovation around **new materials,** including **light metal and alloys processing**. Finally, respondents hoped that the EU and US can cooperate on **public security**, including the **prevention of terrorism**.

European Funding Agencies

In order to have a broader picture on the European landscape, in addition to the SFIC-consultation process, the BILAT was able to conduct in person, phone, or email interviews based on the availability of funding agencies from Austria, Denmark, France, Norway, Spain, Sweden, and the United Kingdom. Given information was complemented via desk research.

Austria

Background and Views of Bilateral Cooperation

Austrian science agencies including FFG (Agency for Applied Science) and FWF (Agency for Basic Science) have a number of bilateral agreements with international partners. However, there is currently no agreement with US agencies. Despite this fact, more than half of all outgoing FWF projects are carried out in cooperation with partners outside of Austria, respectively with Germany, followed by the US, the UK, France, and Switzerland. In addition, Austria recently launched the Beyond Europe Program, which is designed to support the internationalization of Austria in research, technology, and innovation.[37] According to the results of the first call for proposals, the US is Austria's biggest cooperation partner in this scheme. International cooperation is embedded in transnational programs, mainly through ERA-NET actions as well as JPIs.

New Areas for Bilateral STI Cooperation

For Austria, some existing areas of cooperation may be expanded. New topics in health could include **rare diseases**, **cardiovascular disease**, **infections diseases**, **systems medicine,** and **cancer research**. Expanded cooperation in NMP could focus on **Future and Emerging Technologies (FET)**, **ICT**, and nanotechnology (especially **smart grids**, **broadband**, **advanced materials** and **advanced manufacturing**).

France

Background and Views of Bilateral Cooperation

International cooperation in STI is mainly implemented through bilateral agreements, as well as by utilizing European instruments such as H2020, ERA-Net co-fund actions, and JPIs (France actively takes place in all 10 JPIs), as well as public-private partnerships (Joint Technology Initiatives). France also supports incoming research mobility through the Chairs of Excellence program. However, there is no cooperation between the BPI France, the innovation support agency in France, and a US funding body.

New Areas for Bilateral Cooperation

With regard to research priorities, France is very much in line with societal challenge topics of H2020 topics especially in the fields of **ageing**, **environment**, **climate change**, **oceans and seas**, **food security**. Additional scientific fields

[37] "Beyond Europe—The Programme," Austrian Research Promotion Agency, https://www.ffg.at/en/beyond-europe-programme

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identified by the Office of Science and Technology of France in the USA include **environment**, **life sciences**, **health**, **agronomy**, **food sciences**, **biotechnology**, **IT**, **clean technologies**, **bioinformatics**, **nanoscience**, and **physics**. France also puts innovation in the context of new development, technology transfer, and commercialization of new technologies. Key areas of interest here are fuel-efficient cars, digital hospitals, and e-education tools.[38]

Denmark

Background and Views of Bilateral Cooperation

Denmark coordinates its international cooperation through bilateral agreements, via joint EU programs, and through innovation centers located abroad. At the federal level, Denmark has a Memorandum of Understanding (MOU) with the US government regarding science and technology innovation, but no implementing agreement. The Denmark Agency of Science and Technology Innovation (DASTI) has bilateral agreements with three US Universities: MIT, University of Stanford, and UC-Berkeley. These agreements provide mobility grants to PhD students and Postdocs for up to six months stay at each university.

Denmark has established one US innovation center in Silicon Valley. This innovation center assists Danish companies, research, and educational institutions in surveying the market for technologies, finding potential research and innovation partners, and assessing US companies' business models and growth potential, as well as offering advice on opportunities for global growth. These innovation centers also work to establish partnership agreements with leading research organizations, in order to attract talent, support student mobility by facilitating exchange agreements, and organize networking activities such as workshops, conferences, and delegation visits.[39]

Regarding expanded cooperation, DASTI has bilateral S&T agreements and launches joint calls with emerging countries but not with the US. Due to the success of university agreements and the work of the Silicon Valley innovation center, Denmark sees no added value in having a bilateral agreement and shared funding call with a US agency.

New Areas for Bilateral Cooperation

STI priorities for Denmark generally align with H2020 priorities. However, Denmark is in the process of conducting a mapping exercise to identify additional priorities of interest. In addition the Innovation fund Denmark has identified six priority areas: **biosources, food and lifestyle**; **trade, service and society**; **energy, climate and environment**; **production, materials, digitization, and ICT**; **infrastructure, transport, and construction**; and, **biotech, medical, and health**.

Norway

Background and Views of Bilateral Cooperation

[38] "OECD SCIENCE, TECHNOLOGY AND INDUSTRY OUTLOOK 2014," OCED, HTTP://WWW.OECD.ORG/STI/OECD-SCIENCE-TECHNOLOGY-AND-INDUSTRY-OUTLOOK-19991428.HTM

[39] "RIO Country Report 2015: Denmark," European Commission Joint Research Centre, https://rio.jrc.ec.europa.eu/en/file/9320/download?token=-roC-PHW

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Norway is a European innovation leader as measured by high productivity, income per capita, and percentage of tertiary education, particularly in doctoral graduates in science and engineering. Yet, attracting foreign research talents to Norwegian R&D institutions has been a declared priority in Norwegian R&D policies.[40] To support collaboration with US, Research Council of Norway (RCN) has MOUs with the National Science Foundation (NSF) and the National Oceanic and Atmospheric Administration (NOAA). Regarding NSF, RCN is a partner in the PIRE program, which is designed to support coordinated research; in this case, RCN is working specifically with NSF's Polar office. Norway is also partner in the Belmont Forum, an international funding network chartered to address environmental challenges, where NSF also a partner.

RCN has a Letter of Intent with the National Institutes of Health (NIH), as well as guarantee arrangements with NIH in three health programs. These arrangements mean that if Norwegian researchers are partnering in a NIH research project they can apply to RCN for a Guarantee of co-funding. Norway also accepts NIH peer reviews.

Norway also works to support student mobility. Graduate students are supported for short-term exchange through the GROW Program. Further, there is a Nordic Center at Stanford and Harvard Universities, which consists of consortium of 8 Norwegian Institutions.

Despite these achievements, there are no joint calls issued between a Norwegian institution and a US agency. Norway believes that existing instruments are generally effective to support Norway-US collaboration, and should be maintained rather than augmented with new instruments. Coordinated calls are preferred to joint calls due to management advantages, particularly in system where one agency leads. Small mobility grants are useful for planning cooperation seeds. In addition, NSF's PIRE model is a good example that could be duplicated with other US partners, including DOE, Kavli Foundation, Carnegie Institute for Science, and Brookings Institute, as well as other NGOs with complimentary roles in policy making.

New Areas for Bilateral Cooperation

Polar and arctic, **geophysics**, **geoscience**, **energy**, **health**, **ICT**, **Society and Security** are important priority topics for cooperation with US. More specific topics, priorities, and application areas include: **aging population**, **medical technologies**, **increasing high tech knowledge in oil and gas**, **deep-sea exploration**, and **antibiotic resistance**.

Spain

Background and Views of Bilateral Cooperation

There is a need for the Spanish research and innovation system to better align their agendas with common grand challenges through optimal transnational cooperation. Joint activities are especially encouraged through the PECTI program "Promotion of R&I towards societal challenges." In 2014, the Ministry of Economy and Competitiveness (MINECO) signed a collaboration agreement with the National Science Foundation for R&I collaboration projects within the PECTI framework.

The Centre for the Development of Industrial Technology (CDTI), the Spanish innovation support agency, has no formal collaboration with the US or agreement with a US partner. According to experience, finding a suitable US partner is difficult. In Spain, innovation agencies primarily support companies and especially SMEs; however, because

[40] "RIO Country Report 2015:Norway," European Commission Joint Research Centre, https://rio.jrc.ec.europa.eu/en/country-analysis/Norway/country-report

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the technology level is generally lower in Spain than in the US, establishing R&D cooperation is difficult. Nevertheless, CDTI does offer funding to support companies who cooperate with US firms on R&D projects. Therefore, it would be very valuable to support such company-to-company collaborations in EU-US innovation partnerships.

New Areas for Bilateral Cooperation

CDTI has no defined priorities; rather, programs are completely driven from the bottom up. Nevertheless, **security** in the form of investments in **civil technologies** is a compelling area of interest. Regarding framework conditions, cooperation depends on understanding and agreeing on **intellectual property rights**.

Sweden

Background and Views of Bilateral Cooperation

International cooperation is often undertaken by bilateral agreements as well as through H2020 Programme and Eureka. However, STI cooperation with USA is mostly based on researcher-to-researcher relations rather than agency agreements. Therefore, Vinnova has established an office at Silicon Valley, located at Stanford University, as a way to facilitate connections between the Swedish innovation system and the ecosystem of Silicon Valley. The goals of this office are to conduct trend spotting and benchmarking; leverage and add value to present Vinnova investments, for instance by facilitating access for Swedish Startups to Silicon Valley; and, increasing awareness of Sweden as a dynamic innovative region.

At the international level, Sweden focuses on challenge-based partnerships rather than the research basis for innovation. From this perspective those transnational programs and instruments do not respond fully to the need to increase innovation. Therefore, while there is huge potential for EU-US cooperation in areas of innovation that are not technology based—including service innovation, social innovation, and civic involvement—Sweden prefers to let researchers drive STI cooperation needs. With this caveat in mind, Department of Defense's innovation support actions are of interest of Vinnova.

New Areas for Bilateral Cooperation

New areas of potential interest target **the intersection of transportation and the environment** (including solutions to **air pollution**, **noise**, **congestion and traffic accidents**; **fossil fuels, waste and recycling**; **bio-based materials in new applications**; a **smart electricity grid**; smart and **sustainable cities**; and, **city growth and attractiveness**.

Regarding **ICT**, Sweden is interested in supporting cooperation related to **system interoperability, integration** and **monitoring**; **data and information management**; and, **services and business opportunities**.

United Kingdom

Background and Views of Bilateral Cooperation

Within the EU, the UK participates in numerous transnational initiatives to promote information sharing, the development of joint research agendas, joint calls and joint programming including JPIs and ERA-NET activities to address the grand challenges.[41]

[41] "RIO Country Report 2015: United Kingdom," European Commission Joint Research Centre, https://rio.jrc.ec.europa.eu/en/file/9585/download?token=aPf6NdVV

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The UK is actively involved in developing mechanisms for interoperability with non-EU participation in national programs, such as lead agency system. Moreover, the UK has long-standing support schemes to support international STI cooperation such as those operated by the Royal Society, the British Council, and the recently established Newton Fund. With regard to better coordination of research activities, the Research Council of UK believes:

> ***"…There is a need for a more strategic and inclusive approach to international co-operation within the Framework Programme. This does not mean a rigid plan imposed by the Commission or standalone groups with limited membership such as SFIC, but a more coherent framework under which international co-operation activities can thrive and feed back into the Commission's activities. Funding for third country participation should continue to be available from within each sub/thematic programme"***[42]

This perspective applies to the US as well as other potential partners. There are number of collaborations between the Research Council and US Federal agencies in the field of basic science. In the field of applied science or innovation partnerships, the UK does not yet have a formal agreement with a US partner. Innovate UK, the innovation support agency of UK, is eager to expand bilateral relations.

Although UK is very active in JPIs within the EU, this is not seen as a potential instrument for innovation partnerships with US funders. The first challenge to expanding cooperation with the US is to identify a suitable partner, which is difficult due to a heterogeneous funding structure with many funding bodies. Innovate UK plans to send one of its experts to the US for 6-8 weeks in order to establish connections with most suitable agencies.

New Areas for Bilateral Cooperation

New areas of mutual interest for cooperation between the UK and the US include **materials and advanced manufacturing**; **expanded infrastructure systems**, especially **smart cities**; **energy**, particularly **low carbon energy**; **health and life sciences**; and, **emerging and enabling technologies** such as **robotics**.

[42] Ibid, p.6.

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DISCUSSION OF CONSULTATION PROCESS WITH FUNDERS AND POLICY-MAKERS

New Thematic Areas for EU-US Cooperation

Participants in the consultation, for example representatives from NSF, reported difficulty in identifying opportunities for cooperation due to mismatches between the terms and vocabularies used by funders and policymakers in the EU and the US. Such differences also make analyzing interview and survey responses from participants in different geographies problematic. In some cases, it is clear when two terms are related: "biology" and "life science" are obvious synonyms, and "climate change" and "climate adaptation" likely refer to similar things. In other cases—such as specific topics related to biotechnology—vocabulary differences are more difficult to reconcile. This may be in part because the fields themselves are still under development, and the scientific terminology itself evolving. With this caveat, there was broad consensus regarding a number of new STI cooperation areas. Areas of clear, non-ambiguous agreement by four or more organizations are depicted (with word size set to level of interest) in the word cloud below.

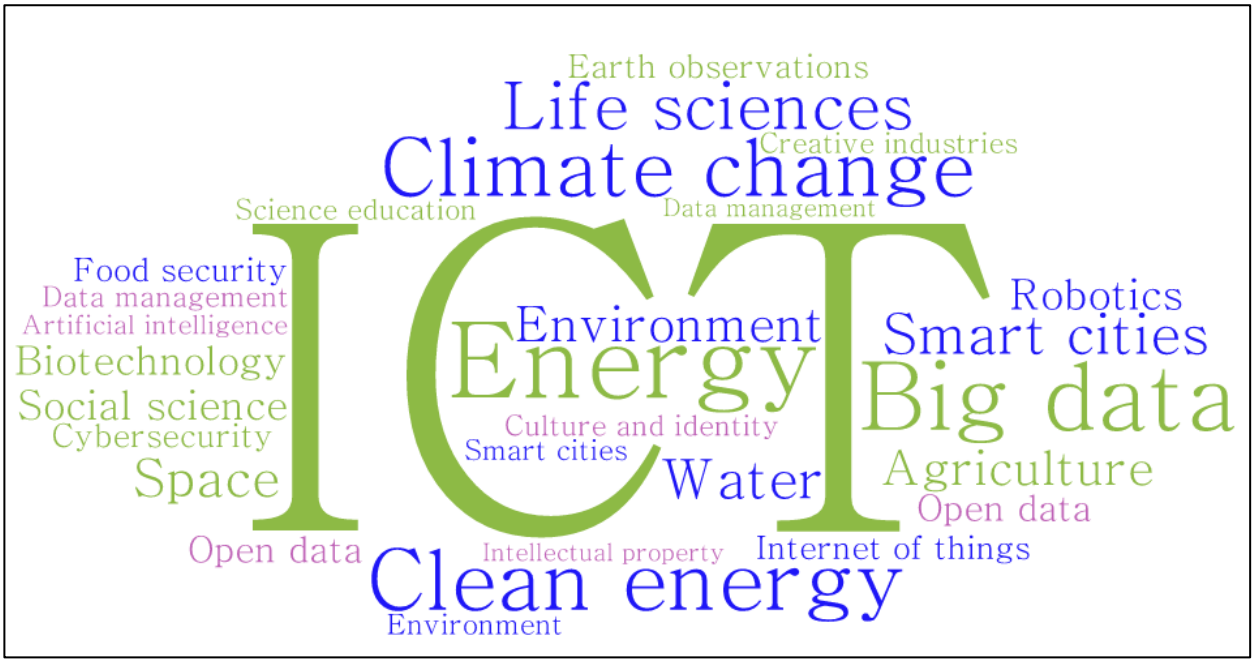

Figure 3: The emerged thematic areas

1. Information and communication technologies (ICT) was prioritized by 12 separate organizations who participated in the consultation.[43] Perhaps the most promising topics within ICT are **big data** (eight unique mentions); **smart cities** (six mentions); the **Internet of Things (IoT,** five mentions**)**; and, **data management** and **open data** (four mentions each). Additional topics of interest include **5G**, or **next generation networks and services**; **future of the Internet**; **artificial intelligence**; **robotics**; and, **cyber security** (three mentions each).[44]

[43] The importance of ICT as a new priority area for EU-US STI cooperation is further validated by the Picasso Project, http://www.picasso-project.eu/

[44] See also "Analysis of Industrial Drivers and Societal Needs: Towards new avenues in EU-US ICT collaboration, Haydn Thompson and Daniela Ramos-Hernandez, http://www.picasso-project.eu/wp-content/uploads/2016/11/PICASSO-Analysis-of-Industrial-Drivers-and-Societal-Needs-Public-Version.pdf

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2. EU and US representatives agree that understanding and supporting the **environment** (six mentions) generally, and addressing **climate change** specifically (nine mentions), is a shared priority. This work will be achieved in part through enhanced **earth and ocean observation systems** (seven mentions total). Even more so than with other application areas, new developments in ICT were considered enablers of environmental research and support systems.

3. While not a yet a formally established area of cooperation, there is interest from EU and US partners in continuing existing collaborations around **energy** (six mentions). Collaborative research and development to support **clean energy** (seven mentions), including green energy and different forms of renewable energy, is considered exiting.

4. Despite linguistic differences, there is clearly consensus that the **life sciences** and **biology** (six mentions) are prominent areas of mutual interest. **Biotechnology** (four mentions) may be particularly promising. However, due to the diversity of topics related to the life sciences and mentioned through this consultation, it will be crucial to narrow down an initial list through subsequent consultation with top researchers if this new area is to be embraced.

5. In addition to topical areas, participants in the consultation expressed interest in working together to understand and improve the framework conditions for collaboration. Understanding laws related to **intellectual property** (seven mentions) is imperative for successful cooperation, though establishing shared ethical codes of conduct, including procedures for informed consent, were mentioned as well.

6. Participants expressed interest in cooperating on a range of topics in the **social sciences** (five mentions). These include **culture and identity studies** (four mentions), especially to understand global issues like migration; **science education** (three mentions), covering both formal and informal STEM learning; and, understanding and supporting **creative industries** (three mentions).

7. Agriculture (five mentions), **food security** (three mentions), and **water** (three mentions) are additional topics of international interest.

8. Finally, there is a persistent desire between the EU and the US to collaborate in STI around **space** (three mentions).

Evaluation of Mechanisms for EU-US Cooperation

Throughout the consultation process, participants were quick to evaluate the success of current bilateral STI cooperation. While such information is not the focal point of this report, it is considered valuable as context for understanding the potential for expanded EU-US STI Cooperation. Many participants from the EU were able to compare cooperation with the US to cooperation with other geographies. Participants from the US offered constructive criticism as well.

In the majority of European funding agencies, international cooperation is handled through bilateral agreements as well as European and transnational programs and initiatives such as H2020, JPIs, and similar. In contrast, bilateral agreements with US agencies are available mostly in the area of basic science, and are usually very broadly written to avoid focusing on or indicating specific thematic areas. Funding is provided by respective national agencies to researchers directly. One reason for the lack of joint funding agreements may be that there are immediate economic outcomes where the US has a competitive advantage compared to the EU in the areas of technology levels,

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entrepreneurship, supporting start ups, and venture capital. It is thus easier to cooperate on basic research than on applied research, which may be closer to the market.

At a basic level, there are knowledge and attitudinal barriers to enhanced cooperation. Some US funders are unaware of how EU funding schemes in the EC and MS operate, and what areas of STI different funders prioritize. There also remain misconceptions about US participation in Horizon 2020, even among top US funders and policymakers (two separate interviewees suggested that US partners may never receive funding through H2020 channels).

A second issue limiting EU-US STI cooperation is the tendency for jurisdictions to exclude international stakeholders in defining STI priorities. H2020 does not include enough external perspectives and, similarly, funders including NSF do not give EU partners a chance to influence research priorities. A related problem is the tendency for funders in both the US and EU counterparts to unilaterally dictate the terms of cooperation. During the time of this consultation, the Grant Agreement was considered a significant impediment to bilateral cooperation. The recent Implementing Arrangement between the European Commission and the US will undoubtedly go a long way towards improving the framework conditions for STI cooperation—in part because it shows a willingness to truly consider and concretely advance the priorities of the other side.[45]

While joint calls with the EC are generally considered undesirable, for many agencies—including NSF and NIH—there is the opportunity to produce mirrored calls. Participants do note that it can be difficult to coordinate budgeting cycles and planning cycles. Still, for some agencies mirrored calls are an ideal cooperation mechanism because these allow granting agencies to bring more scientists into the field without having shared agreements. The RIO country reports similarly identify the development of joint research agendas as a major instrument in promoting international cooperation.

Finally, for the EU researcher mobility is still one of the most important instruments used widely in cooperation with the US. Participants in the consultation process in the EU and the US alike suggest that steps taken to enhanced US researcher mobility to the EU should also be encouraged.

Additional Opportunities for Expanded EU-US Cooperation

In addition to the areas described above, one direction that is too often neglected, and thus provides an opportunity for expansion, is “From Innovation to Market” (e.g., STI developments closer to market applications but still upstream market; similar to some of the TIPP orientations). The challenge here is for the US administration to set up clear topics for cooperation where industrial competition may be less of an issue. This would jumpstart an interesting area for collaboration with companies in areas such as the life sciences across the two continents.

Closing Thoughts

Many of US funders and policymakers expressed significant enthusiasm about expanded cooperation with the EU. At the same time, these potential partners—including federal funders like NSF, and private foundations—would appreciate the opportunity to further iterate on priority areas in order to establish internal consensus and further

[45] “Newly signed EU-US agreement offers new opportunities for STI cooperation,” BILAT, http://www.euussciencetechnology.eu/news/28

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narrow down somewhat vague areas. While potentially time consuming, an additional round of consultation and strategic matchmaking could help identify the most promising areas with buy-in from both sides.

At the same time, given that US priorities will evolve following the 2016 Presidential election, it may also be preferable to consult with the incoming White House Office of Science and Technology Policy (OSTP) to understand new STI priorities.

In the context of the larger BILAT project, the ideal timeframe for soliciting such input would be directly following the consultation with academic researchers, and proceeding the workshops addressing new thematic areas and/or framework conditions.

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ANNEXES

Annex A. Contributors to the Consultation Process

We are grateful to the following individuals who contributed to this report through interviews.

Participant	Political Affiliation	Organization
1	Austria	Austrian Research Promotion Agency
2	Denmark	Agency of Science and Technology Innovation
3	EU	Delegation of the EU, Science, Technology, and Education Section
4	EU	Delegation of the EU, Science, Technology, and Education Section
5	EU	European Commission DG RTD Directorate E- Health
6	EU	European Commission DG RTD Directorate F- Bioeconomy
7	EU	European Commission DG RTD Directorate G- Energy
8	EU	European Commission DG RTD Directorate H- Transport
9	EU	European Commission DG RTD Directorate I- Climate Action and Research Efficiency
10	EU	European External Action Service
11	France	EPIC BPI-Groupe
12	Norway	Research Council of Norway
13	Spain	Spanish Centre for the Development of Industrial Technology
14	Sweden	Vinnova
15	United Kingdom	Innovate UK
16	United States	Blavatnik Family Foundation
17	United States	Department of Energy
18	United States	Department of State Bureau of Oceans and International Environmental and Scientific Affairs (OES)
19	United States	Environmental Protection Agency

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20	United States	Environmental Protection Agency
21	United States	Environmental Protection Agency
22	United States	Environmental Protection Agency
23	United States	Gordon and Betty Moore Foundation
24	United States	National Oceanic and Atmospheric Administration
25	United States	National Oceanic and Atmospheric Administration
26	United States	National Science Foundation
27	United States	National Science Foundation
28	United States	National Institute of Health
29	United States	Science Philanthropy Alliance

We are grateful to the following individuals who completed surveys for inclusion in this report.

Participant	**Country**	**Organization**
30	Anonymous	N/A
31	Estonia	Estonian National Research Council
32	Finland	National Academy of Sciences
33	France	National Research Institute
34	Germany	Federal Ministry for Education and Research (BMBF)
35	Greece	Management authority for EU projects
36	Greece	National Centre of Scientific Research
37	Ireland	Atlantic Ocean Research Alliance Coordination & Support Action
38	Italy	National Research Council
39	Italy	National Research Council
40	Latvia	Council of Science
41	Netherlands	Organisation for Scientific Research
42	Norway	Simula Research Laboratory

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43	Portugal	Foundation for Science and Technology
44	Romania	Executive Agency for Higher Education, Development and Innovation funding
45	Romania	Romanian Office for Science and Technology to the EU
46	Slovakia	Innovation and Energy Agency
47	Spain	Universidata Politécnica de Madrid
48	Spain	Ministry of Economy and Competitiveness
49	Ukraine	Department of Innovation Policy
50	United Kingdom	Manchester Business School
51	United States	National Council of University Research Administrators

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