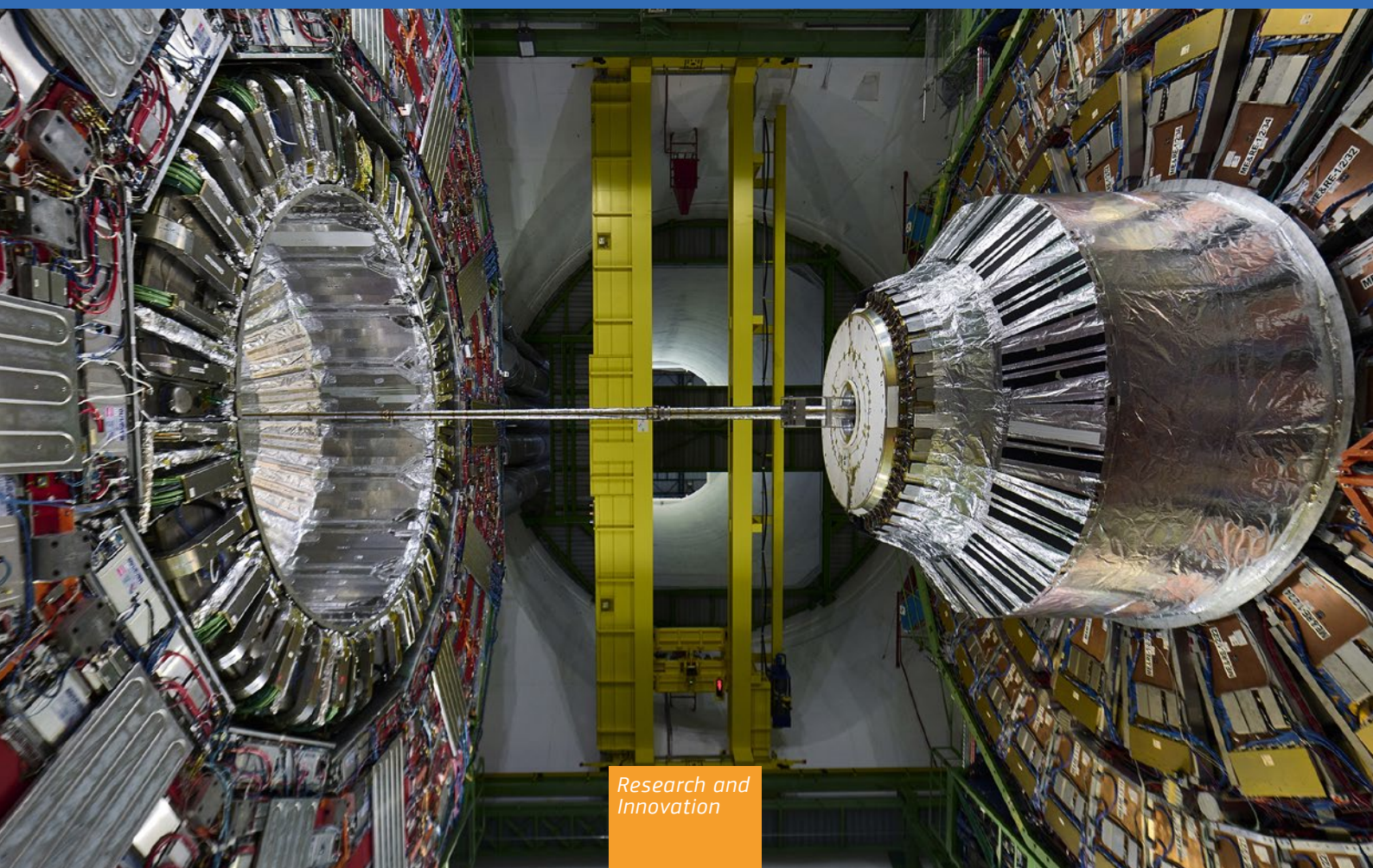
European Commission

A European Framework for Science Diplomacy

Recommendations of the EU Science Diplomacy Working Groups



Research and Innovation

A European Framework for Science Diplomacy

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A European Framework for Science Diplomacy

Recommendations of the EU Science Diplomacy Working Groups

edited by
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Directorate-General for Research and Innovation
Studies and Reports

Disclaimer

This publication represents the final report of five EU Science Diplomacy Working Groups that were established by the European Commission with the aim of developing recommendations for a future European Framework for Science Diplomacy.

The recommendations contained in this report reflect the collective view of the 130 experts that participated in the EU Science Diplomacy Working Groups. They do not necessarily reflect the position of, or commit, the European Commission, the European External Action Service, the governments of EU Member States, any mentioned stakeholders, or the employers of the working group members.

The sole purpose of these recommendations is to inform the discussions regarding a future European Framework for Science Diplomacy. Hence, the main target audience of this report are decision-makers at EU and Member State level in both the science and diplomacy arenas, while specific stakeholders are suggested in the recommendations when it comes to implementing proposed activities.

The mentioning of any stakeholders in this report should be understood as fully respecting the subsidiarity principle and the sovereignty of Member States in foreign and security policies as well as the principles of academic freedom and scientific autonomy.

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Foreword

Ekaterina Zaharieva
EU Commissioner for Startups,
Research and Innovation

Ekaterina Zaharieva

The world is going through a period of fundamental change. Ground-breaking developments in science and technology are impacting all aspects of our lives and leading to renewed competition between nations. At the same time, our societies are faced with complex global crises that call for more cooperation in research and innovation.

Breakthroughs in fields such as artificial intelligence, quantum computing and biotechnologies have boosted the role of research and innovation as a geopolitical currency. **Today, science, technology and innovation translate more than ever into power and geopolitical influence, and this is one of the reasons why they matter for diplomacy.**

The 2024-2029 Political Guidelines for the European Commission state **that Europe needs to be more assertive in pursuing its strategic interests in an age of geostrategic rivalries** – a need that is also reflected in my mission letter. Putting research and innovation policies at the heart of European competitiveness means putting it also at the heart of our foreign and security policies.

On the one hand, science diplomacy helps keep the international science system open. **Through the universal language of science, we can build and maintain bridges even when formal relations between nations are strained.**

On the other hand, science diplomacy must also promote the values we stand for. **We must implement the necessary safeguards to ensure that Europe keeps its competitive edge and technological sovereignty.** This requires a balanced approach, using science diplomacy both as a soft and hard power simultaneously. Thankfully, through Horizon Europe, the EU has one of the world's most powerful tools of science diplomacy.

Following the Council of the EU's call to develop a European Science Diplomacy Agenda, 130 experts from the science and diplomacy communities contributed to the present report. **It has brought together scientists and diplomats across Europe in a spirit of mutual understanding.**

I firmly believe that the recommendations contained herein provide an excellent base for the development of a **European Framework for Science Diplomacy**. Developing this framework will enable the EU to defend its strategic interests and reduce its vulnerabilities, while at the same time promoting our values and principles for serving the global public good.

Executive summary

2.

Science is a key shaper of the European and global economy through the development of discoveries, technologies and innovative solutions to a variety of challenges. It is also a key element in international relations, with emphasis on cooperation or competition or pursuing a combination of both. As clearly spelt out in the Draghi report[1], Europe is faced with three major challenges: closing the innovation gap with the US and China especially in advanced technologies; decarbonising the economy while boosting competitiveness; and increasing security and reducing dependencies. Research and innovation are at the very core of these challenges – in fact, there is hardly any (geo-)political development not affected by the output of research and innovation.

As science and technology have increasingly become a geopolitical currency, science diplomacy is emerging as a key element in leveraging our power and partnerships for a global Europe.

The Global Approach to Research and Innovation – the EU's strategy for international cooperation in research and innovation adopted in May 2021 – advocates that a stronger focus on science and technology in the EU's foreign and security policies would help the EU to project soft power and pursue its economic interests and fundamental values more effectively[2]. In its Conclusions on the Global Approach in September 2021, the Council of the EU highlighted the importance of integrating the Global Approach into the EU's external action and called on the Commission and the European External Action Service to develop a European Science Diplomacy Agenda[3].

The report "A European Framework for Science Diplomacy" delivers on this task and is the result of a European-wide co-creation process, which brought together 130 experts from the worlds of science and diplomacy.

The report describes the emergence of science diplomacy as a concept and sketches the varieties of science diplomacy practices. Rather than advancing a new definition, the report views science diplomacy as a practice or craft. "Science" is understood here to include all fields of academic study, not only natural sciences, technology, engineering, mathematics, and medicine, but also social sciences and humanities. "Diplomacy" refers to the pursuit of state interest by diplomatic means, as well as the pursuit of global interests, e.g., by international organisations.

Science diplomacy has been regarded in the past as a practice that covers three dimensions: *science for diplomacy, science in diplomacy, and diplomacy for science*. New challenges, such as a strong competition for technological supremacy and sovereignty amongst states as well as concerns revolving around research security have entered the field. In view of the rising geopolitical tensions and the risk of foreign interference, there is increasing awareness among science stakeholders that scientific developments and cooperation are being affected by global politics. Likewise, there is increasing awareness among diplomats that scientific and technological advances have a profound impact on international relations. As a result, a new dimension of science diplomacy so far not addressed becomes increasingly important: *diplomacy in science*, which refers to the use of diplomatic skills and tools in and by science.

There are multiple examples demonstrating the increasing role of science and technology in the foreign and security policies of the EU and its Member States. These range from an impressive number of EU policy documents with an international dimension referring implicitly or explicitly to science diplomacy, to Member States adopting national science diplomacy strategies and strengthening the scientific-technological capacities in their ministries of foreign affairs.

In view of these developments, science diplomacy efforts in Europe require better coordination and synergies, building on an EU-wide approach. This is important to avoid vulnerabilities against the background of a rapidly changing geopolitical and scientific-technological environment, with global competitors using science diplomacy more strategically.

As clearly stated in the political guidelines for the European Commission 2024-2029[4], in an age of geostrategic rivalries Europe needs to be more assertive in pursuing its strategic interests. Consequently, the reflection on what science diplomacy should or could offer to Europe, cannot be dissociated from the role research and innovation play in a changing world order. The underlying question is how Europe can turn its position as one of the global powerhouses in research and innovation into geopolitical clout.

1. https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead_en#paragraph_47059
2. COM(2021) 252 final
3. https://data.consilium.europa.eu/doc/document/ST-12301-2021-INIT/en/pdf
4. https://commission.europa.eu/document/download/e6cd4328-673c-4e7a-8683-f63ffb2cf648_en?filename=Political%20Guidelines%202024-2029_EN.pdf

As a guiding principle, European science diplomacy needs to be rooted in the principles and values that make Europe a trustworthy partner and provide both a foundation and signposts for navigating the complexities of a changing political world order.

European science diplomacy should aim at preserving spaces for exchange and fostering a shared responsibility for addressing common challenges and protecting global public goods, thereby supporting effective multilateralism, while at the same time defending Europe's strategic interests.

In addition, it should make sure that all relevant actors are heard and be accountable for pursuing scientific development and its deployment. Therefore, the science and diplomacy experts co-creating the input to the report advocate that a future European Framework for Science Diplomacy should contribute to:

- **Strengthening Europe's competitive position as a global science and technology actor;**
- **Maximising the deployment of European research and innovation potential for the pursuit of peace and multilateralism; and**
- **Reinforcing Europe's commitment to managing global public goods.**

Consequently, the mission of a European science diplomacy must be to ensure that the Common Foreign and Security Policy and Common Security and Defence Policy leverage on scientific expertise and networks, and the European Research Area leverages on diplomatic efforts to preserve spaces for negotiation, cooperation and exchange, especially in conditions of tension and competition.

Joining forces at the EU and broader European level, taking on board all relevant state and non-state actors, is necessary to address issues that transcend national borders and disciplinary boundaries.

Europe is faced with increasingly assertive economic and scientific powers of a size and weight that can only be matched by a joint European effort. The true added value of a European Framework for Science Diplomacy is to provide a strategic umbrella under which the EU, its Member States and the various science and diplomacy stakeholders can maximise the impact of their efforts, while strengthening the geopolitical influence and the scientific and technological weight of the EU overall.

Amidst these challenges, identifying, engaging and systematically nurturing European science diplomacy actors is of the essence. These include most notably scientists and diplomats, but also civil society and business, as well as intermediary actors, such as those involved in capacity building, training or scientific advice. In a concerted effort, which includes individuals and institutions from both the EU and Member State level, European science diplomacy should focus on achieving the following objectives:

- **Using science diplomacy strategically to tackle geopolitical challenges in a fragmented, multipolar world;**
- **Making European diplomacy more strategic, effective and resilient through scientific evidence and foresight;**
- **Strengthening science diplomacy in delegations and embassies and fostering the EU's global science diplomacy outreach;**
- **Building capacity for European science diplomacy.**

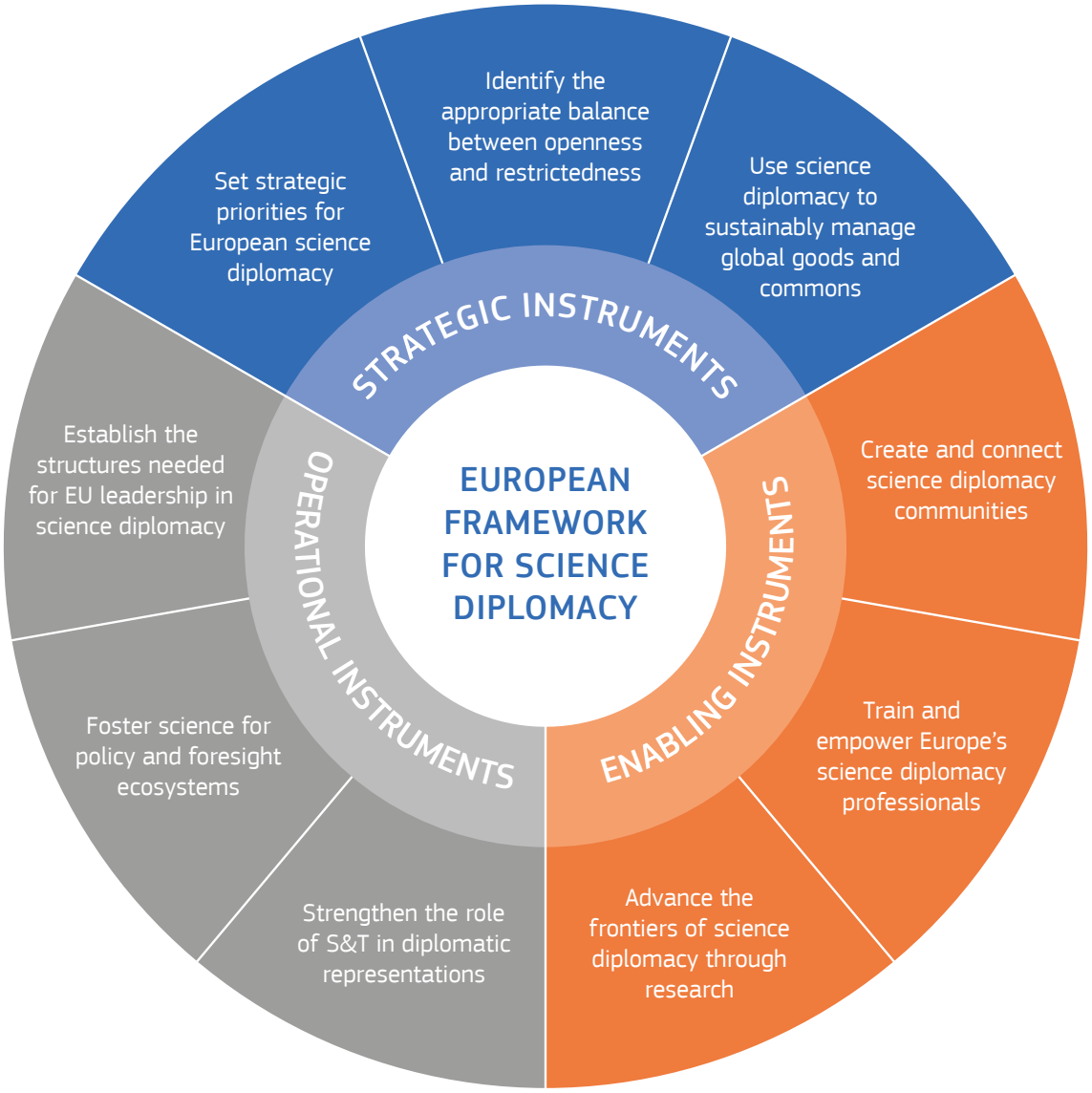
In order to implement these objectives, the report provides concrete recommendations and actions on how European leadership in science diplomacy can be achieved through strategic, operational and enabling instruments, assuming that the first step would be to define strategic priorities around which all relevant parties can be rallied.

To deliver on Europe's ambition, European science diplomacy must become more visible and be at the core rather than at the fringes of both, foreign and security policy as well as research and innovation policy.

A strategically planned and well-implemented European science diplomacy is needed to fulfil our political goals and secure a leading position for the EU in a multipolar world, based on our shared principles and values.

Our vision for European science diplomacy is for it to become a key instrument in the EU's diplomatic toolbox, fostering peace, European competitiveness, and a safe, sustainable and prosperous future for all by harnessing the power of science and technology in a responsible way.

Overview of the **recommendations** by the EU Science Diplomacy Working Groups



Setting the scene

3.1.
The co-creation process that led to this report

Science diplomacy forms an integral part of the Global Approach to Research and Innovation, the EU's strategy for international cooperation in research and innovation, which prominently advocates that a stronger focus on science and technology in the EU's foreign and security policies in terms of science diplomacy would help the EU to project soft power and pursue our economic interests and fundamental values more effectively[5].

In its Conclusions on the Global Approach adopted in September 2021[6], the Council of the EU highlighted the importance of integrating the Global Approach into the EU's external action and called on the Commission and the European External Action Service to develop a European Science Diplomacy Agenda[7].

Due to the institutional architecture of the EU, it is not straightforward to bring foreign and security policies and research and innovation policies together. For instance, the Common Foreign and Security Policy covers the EU27 and is characterised by unanimity voting, whereas the European Research Area and Horizon Europe cover also associated countries, with qualified majority voting being applied in EU decision-making. Given these institutional constraints, the European Commission set up in 2022 an informal Steering Team consisting of key stakeholders in the science and diplomacy fields to advise the Commission on the development of a European Framework for Science Diplomacy[8].

Following discussions with the different stakeholder groups, the Steering Team identified four main pillars for such a framework, which were reflected in the Commission's first Report on the Implementation of the Global Approach published in June 2023[9]:

- **Using science diplomacy strategically to tackle geopolitical challenges in a fragmented, multipolar world;**
- **Making European diplomacy more strategic, effective and resilient through scientific evidence and foresight;**
- **Strengthening science diplomacy in delegations and embassies and fostering the EU's global science diplomacy outreach;**
- **Building capacity for European science diplomacy.**

At the informal meeting of the Competitiveness Council in July 2023 in Santander, Spain, EU Research Ministers discussed science diplomacy for the first time at the political level, underlining the importance of European science diplomacy action and supporting the development of an ambitious European Framework for Science Diplomacy.

Given that science diplomacy is quickly evolving and spanning two very different policy fields, it was clear from the outset that a future European Framework for Science Diplomacy would have to be developed bottom-up in a co-creation process. Hence, the decision was taken to establish informal working groups composed of individuals from both, the science and diplomacy communities with the aim of developing joint recommendations. Each of the above-mentioned four pillars was addressed by one working group, while a fifth group discussed overarching issues regarding the definition, principles and EU added value of European science diplomacy action.

5. COM(2021) 252 final
6. https://data.consilium.europa.eu/doc/document/ST-12301-2021-INIT/en/pdf
7. In the subsequent discussions the European Commission suggested replacing the term "European Science Diplomacy Agenda" with "European Framework for Science Diplomacy", as it better reflects its purpose: to provide a strategic European frame for the science diplomacy related activities happening at EU and Member State level.
8. A list of the members of the Steering Team can be found in the annex.
9. COM(2023) 356 final

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Participants of the 1st European Science Diplomacy Conference

An open call for expressions of interest to participate in the EU Science Diplomacy Working Groups was launched by the European Commission in October 2023, to which 575 experts from both the science and diplomacy spheres responded. Applicants working for government institutions (such as research ministries or ministries of foreign affairs and related agencies) were required to have the nationality of an EU Member State, while applicants working outside government were required to have the nationality of an EU Member State or of a country associated to the Horizon Europe programme or, if having a different nationality, be employed by an institution established in any of these countries. This facilitated the inclusion of views also from non-EU countries, in particular those in the European neighbourhood.

The members of the Steering Team screened all applications and made a selection, ensuring that all working groups were balanced in terms of gender, geography, and expertise[10]. Members of the working groups were not remunerated and acted in their personal capacity. Each working group was co-chaired by one scientist and one diplomat, to ensure co-ownership of the process. Each working group had 25 members, except for the working group "Using science diplomacy strategically to tackle geopolitical challenges in a fragmented, multipolar world" which had 30 members for being the group that gathered most interest at the stage of applications.

To kick off the discussions, the European Commission organised together with the Spanish Presidency of the Council of the EU the first European Science Diplomacy Conference, which took place on 18-19 December 2023 in Madrid, bringing together more than 300 science diplomacy stakeholders from across Europe and beyond[11]. Meanwhile, the EU Science Diplomacy Alliance delivered its own input to the debates with the policy brief "Strengthening science and diplomacy in and for Europe through Horizon Europe"[12].

The EU Science Diplomacy Working Groups started their work in January 2024 and delivered their reports to the European Commission at the beginning of July of the same year[13]. Counting on the technical support of a Commission contractor, each group was autonomous in organising the co-creation process, e.g., by setting up subgroups, with discussions in the working groups following Chatham House rule. A key element in all working groups was the organisation of a physical co-creation workshop held at different locations in the EU, including at institutions playing a critical role in European science diplomacy[14]. Prior to submitting their reports, which followed a standard template, the working groups consulted their draft recommendations also with experts outside the working groups in order to gather additional feedback.

After the delivery of the reports, the European Commission established a Drafting Team consisting of members of the Steering Team and the working groups to draft this final report based on the various contributions. The draft report was consulted with all members of the working groups as well as major stakeholders.

The editors of this report wish to thank all co-chairs and members of the EU Science Diplomacy Working Groups for their hard work, and the team of the Global Service Facility, in particular Katharine Höne, Maria Josten, Charlotte Rungius, and Julia Schmälter, for their excellent technical support throughout the process.

10. A list of all working group members can be found in the annex.
11. See https://eu-science-diplomacy.service-facility.eu/
12. See https://www.science-diplomacy.eu/media/Policy-Brief_EU-SD-Alliance_Horizon-Europe_Feb-2024_Final-release1-1.pdf
13. The individual working group reports can be found on https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/europe-world/international-cooperation/science-diplomacy_en
14. WG1 held its co-creation workshop at the Finnish Academy of Science and Letters in Helsinki, WG2 at the European Commission's Joint Research Centre (JRC) in Ispra, WG3 at the College of Europe in Bruges, WG4 at the International Institute for Applied Systems Analysis (IIASA) in Laxenburg and the Vienna School of International Studies, and WG5 at Sorbonne Université in Paris.

Five EU science diplomacy **co-creation workshops** were organised in 2024

1. Working Group 1 in Helsinki, April 2024
2. Working Group 2 in Ispra, April 2024
3. Working Group 3 in Bruges, March 2024
4. Working Group 4 in Laxenburg/Vienna, March 2024
5. Working Group 5 in Paris, March 2024

3.2.
The structure of this report

The report first describes the emergence of science diplomacy as a concept and sketches the varieties of science diplomacy practices. It then analyses the paradigm shifts observed in science diplomacy in recent years, in view of the changing geopolitical and scientific-technological context and the related opportunities and challenges for the EU. It then turns to the evolution of science diplomacy in the EU, continues with an overview of the various institutions and actors involved, and provides a description of the suggested mission and objectives of European science diplomacy, and the related principles and values.

In its main part, the report presents the recommendations developed by the working groups. As many suggestions overlapped with each other, the decision was taken not to list the suggestions as presented by the working groups, but instead to merge them into nine overall recommendations and related actions.

For ease of reference, the recommendations have been structured into three types of instruments[15]:

- **Strategic instruments** that aim to give overall directions for European science diplomacy,
- **Operational instruments** that aim to put European science diplomacy into practice., and
- **Enabling instruments** that aim to facilitate and support European science diplomacy.

Under each of these instruments the reader will find three recommendations each, underpinned by related actions.

The report finishes with a set of conclusions and an outlook towards the future of European science diplomacy, followed by an annex detailing all experts involved in the process.

This report aims at laying the foundations for a European Framework for Science Diplomacy and a potential future EU policy document in this area by fostering a common understanding of the subject matter and providing insights to inform future steps. It is for this reason why this report does not go yet into detailed regional or thematic priorities that will rather be part of a future implementation phase. Therefore, the report should be seen as the beginning rather than the end of a process.

15. A similar distinction was suggested in European Commission and Luk Van Langenhove (2017): Tools for an EU science diplomacy, https://data.europa.eu/doi/10.2777/911223

An introduction to science diplomacy

4.1.
The origins of science diplomacy and its conceptual basis

The concept of science diplomacy was only coined in the early 21st century, but long before that nation states have utilised science, scientific relations and higher education for foreign policy purposes. Throughout history, there have been practices of partnerships between scientists and diplomats that aimed at shaping and pursuing foreign and security policy goals and building bridges across cultures.

The long past of this science diplomacy *avant-la-lettre* is illustrated by classical examples that include scholars who have sought to influence international policy, from Alexander von Humboldt trying to convince US President Jefferson to build a canal through the isthmus of Panama to Niels Bohr's argument to share nuclear information with the USSR during World War II for international stability[16]. The 1959 Antarctic Treaty, as the first nuclear arms control agreement, emerged from the International Geophysical Year in 1957-1958, which was enabled by the International Council of Scientific Unions (ICSU), the predecessor of the International Science Council. A more recent example is the Nobel Prize-winning discovery that halocarbons such as chlorofluorocarbons destroy the planet's Ozone layer, which led directly to the adoption of the Montreal Protocol in 1987 banning these chemicals.

There has always been cooperation between scientists across political borders over time and on a multiplicity of issues, from particle physics using large-scale infrastructures, to ground-based astronomy, polar explorations, the study of marine and freshwater ecosystems, archaeological excavations, or anthropological fieldwork. Diplomacy has often benefitted from such bottom-up cooperations, even if they were not designed with a diplomatic purpose.

Therefore, while science diplomacy is a new concept, it is in fact an old practice that occurred long before the term was invented.

Science diplomacy emerged as a concept in the early 2000's. Key developments that established it as a topic of policy consideration have been the creation of a Center for Science Diplomacy by the American Association for the Advancement of Science (AAAS) in 2008 and the so-called "A New Beginning" speech in Cairo in 2009, in which the then President of the US Barack Obama proposed to step up scientific cooperation with Islamic regions and countries to foster common understanding[17].

This was followed by the publication in 2010 of the ground-breaking Royal Society/AAAS report "New Frontiers in Science Diplomacy: Navigating the Changing Balance of Power"[18]. This report introduced the concept of science diplomacy as an element of international relations and linked it to the notion of soft power. The report set forth a typology of three ideal-types of science diplomacy practices and goals, which to the day serve as a common reference to characterise science diplomacy:

- **Science in diplomacy**: Informing foreign and security policy objectives with scientific advice. Many areas of negotiation require a high level of research-based knowledge, whether from natural sciences, engineering, social sciences, and humanities. Examples of science in diplomacy are the Intergovernmental Panel on Climate Change (IPCC), nuclear arms control and non-proliferation agreements, or international economic and financial agreements such as the Bretton Woods system, influenced by John Maynard Keynes.
- **Diplomacy for science**: Facilitating international science cooperation by diplomatic action. Examples include international agreements such as the decision by the US and Russia in 1993 to build an International Space Station, or the 2017 Arctic Council agreement on Arctic scientific cooperation, but may include also practical diplomatic support, e.g., for scientists doing research abroad.

16. Ingo Schwarz (2001): Alexander von Humboldt's Visit to Washington and Philadelphia, His Friendship with Jefferson, and His Fascination with the United States. In: Northeastern Naturalist, Vol. 8, Special Issue 1: Alexander von Humboldt's Natural History Legacy and Its Relevance for Today (2001), pp. 43-56, https://www.jstor.org/stable/4130726; Finn Aaserud (2019): Statesmen and Diplomats Encounter Niels Bohr, plenary lecture at the conference Diplomats in Science Diplomacy: Promoting Scientific and Technological Cooperation in International Relations, Niels Bohr Institute, University of Copenhagen, 19-20 July 2019.
17. https://obamawhitehouse.archives.gov/issues/foreign-policy/presidents-speech-cairo-a-new-beginning
18. The Royal Society and the American Association for the Advancement of Science (AAAS), New Frontiers in Science Diplomacy: Navigating the Changing Balance of Power, January 2010, https://www.aaas.org/sites/default/files/New_Frontiers.pdf.

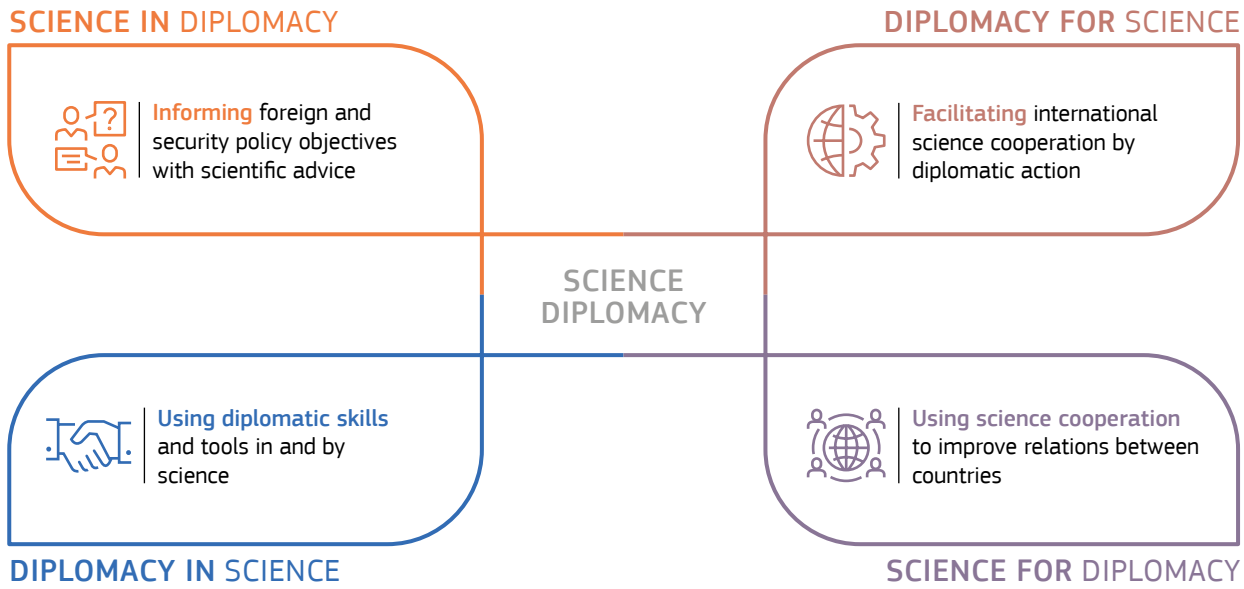
- **Science for diplomacy**: Using science cooperation to improve relations between countries, e.g., using personal scientific networks to build trust when states refuse to engage in formal relations, or using international research infrastructures for trust-building or as vehicles for informal talks.

These three categories of science diplomacy activities and goals are interdependent. **Diplomacy for science** allowing and funding cross-border research and education is necessary to create scientific cooperation and networks, which in turn are necessary for **science for diplomacy**. The international scientific networks and cooperation at the basis of **science for diplomacy** may also be a necessary condition for **science in diplomacy**.

From the publication of the Royal Society/AAAS report onwards, science diplomacy was on the radar of many, including a rapidly growing number of states as well as scholars that turned it into an area of study, resulting in an ever-growing body of scientific literature. An increasing number of countries and major international actors such as the UN or the EU endorsed and adopted the concept in a very short time, and in recent years a growing number of countries in the South, e.g., in Asia, Africa and Latin America, joined the debate, as their voices were still missing at the table back in 2010. The above typologies are much debated and certainly have their flaws but serve as a useful starting point for looking at science diplomacy practices and how science diplomacy can contribute to reaching diplomatic and scientific goals. Science diplomacy intermingles practices of state and non-state actors, which makes such ideal-type categories of practices analytically useful.

The concept of science diplomacy continues to evolve, responding to the reality of a rapidly changing world. As a result, the 2010 Royal Society/AAAS categorisation of science diplomacy activities and goals is being criticised, as it lacks a dimension that becomes increasingly important: **diplomacy in science**, which refers to the use of diplomatic skills and tools in and by science[19]. Such dimension includes scientific institutions becoming diplomatic players in their own right, e.g., when the International Science Council engages as the "global voice of science" with United Nations bodies, or when higher education institutions / universities, research-performing organisations, or research funders cut ties with partners in other countries for political reasons, often following public pressure. Such a diplomacy in science dimension would add a more realistic angle to the original concept of science diplomacy, which was coined by a very optimistic view on the world, reflecting the time of its conception back in 2010[20]. It is therefore suggested by this report to add a **diplomacy in science** dimension as a fourth pillar to the original concept of science diplomacy..

Typology of science diplomacy



19. See Luk Van Langenhove and Jean-Claude Burgelman: Viewpoint: Science diplomacy needs a refresh to meet contemporary European needs, https://sciencebusiness.net/viewpoint/viewpoint-science-diplomacy-needs-refresh-meet-contemporary-european-needs
20. The Royal Society/AAAS definition is being reviewed on occasion of its 15th anniversary, see also the Special Issue of the AAAS journal Science & Diplomacy (https://www.sciencediplomacy.org/editorial/2024/special-issue-science-diplomacy-15-years).

4.2. Varieties of science diplomacy definitions and practices

In general terms, science diplomacy is an overarching concept that refers to interactions between the realm of science and technology on the one hand, and the realm of international relations, foreign affairs and diplomacy on the other. "Science" should hereby be understood as all fields of academia, including social sciences and humanities, not only natural sciences and engineering. "Diplomacy" refers to the pursuit of state interest by diplomatic means, although international organisations can also use diplomacy for the pursuit of global interests.

Science diplomacy being a relatively new concept, it has sparked a scholarly and policy debate on what the term entails. This debate has not reached conclusions on how to ultimately define science diplomacy, with the concept developing dynamically in view of today's geopolitical situation. This debate is useful and healthy for thinking policy-wise and strategically about science diplomacy. At the same time, the large variety of interpretations poses a risk that the concept of science diplomacy becomes a 'catch all phrase'[21].

The present document has no intention to interfere in those debates. We acknowledge that there is no shortage of views on what science diplomacy is or should be, which makes it difficult to come up with one specific or ultimate definition, beyond the rather general three-pillar concept of the Royal Society/AAAS definition mentioned above, complemented by a fourth pillar on diplomacy in science. Science diplomacy definitions generated by this debate feature different foci, such as a historical approach, a descriptive approach, a normative approach, or a theoretical approach. All those attempts to define science diplomacy certainly have their merits.

In this context, it is important to note that science diplomacy should not be equated with international science cooperation. Science diplomacy implies a larger policy impact than just science, technology and innovation policy. This is echoed by the Madrid Declaration on Science Diplomacy[22] that describes it as a series of practices at the intersection of science, technology and foreign policy.

Science diplomacy differs from other so-called 'new diplomacies' that have emerged – such as green diplomacy, climate diplomacy, space diplomacy, ocean diplomacy, digital diplomacy – in that science and technology underpin all of them in a horizontal manner, which explains why science diplomacy may sometimes not be as visible as other diplomacies[23]. However, in all thematic domains, diplomats will have to interact with the scientific community in one way or the other. They can do so in different ways, including in 'track I' or 'track II' diplomatic activities that are mainly led by diplomats and other state actors (track I) or led by scientists, artists or NGOs (track II). To give a practical example: In track I diplomacy, science diplomacy can be deployed, e.g., to support the negotiation of international treaties, including those related to areas that are both of scientific interest and critical planetary importance, such as the Ocean and Seas, the Arctic, or the Amazon rainforest, while track II science diplomacy may be deployed to overcome "diplomatic silence" between the actors involved.

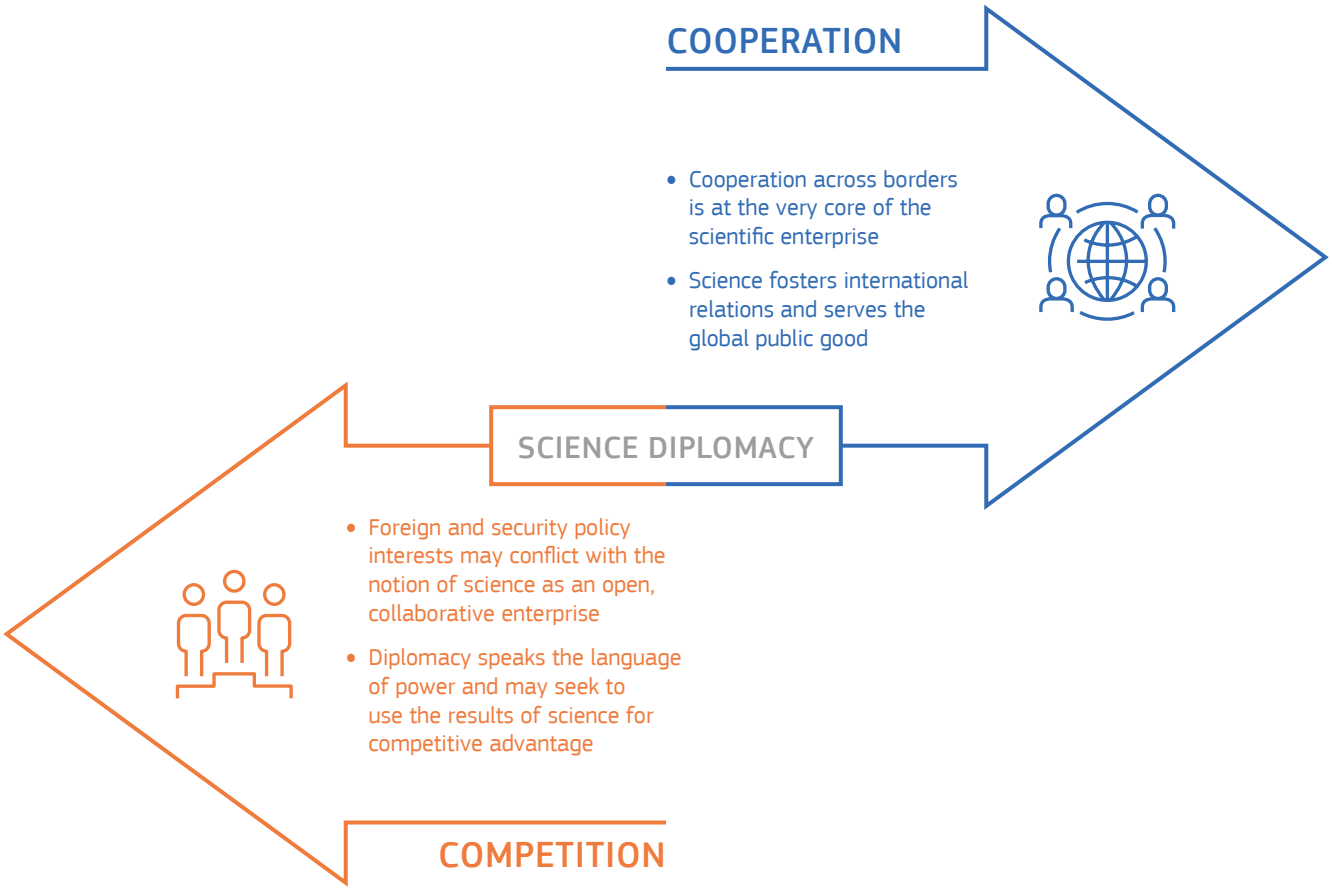
It is important to recognise that there are different schools of thought on science diplomacy that range from a cooperation-oriented view that sees science diplomacy as serving the global public good, tackling global challenges for the benefit of humankind and building bridges between nations, to a competition-oriented *realpolitik* perspective that regards science diplomacy as "the use of science for foreign policy purposes"[24], emphasising science as an instrument for state interests such as strategic autonomy, technological sovereignty, or economic competitiveness.

21. Charlotte Rungius and Tim Flink (2020): Romancing science for global solutions: on narratives and interpretative schemas of science diplomacy, in: Humanities and Social Sciences Communications 7:102, p.7, https://www.nature.com/articles/s41599-020-00585-w
22. See https://www.s4d4c.eu/wp-content/uploads/2019/04/madrid-declaration-1.4.pdf
23. In fact, even science diplomacy itself is increasingly becoming differentiated with terms like tech diplomacy, innovation diplomacy, and knowledge diplomacy entering the scene.
24. Björn Fägersten (2022): Leveraging Science Diplomacy in an Era of Geo-Economic Rivalry: Towards a European strategy. Swedish Institute of International Affairs, https://www.ui.se/globalassets/ui.se-eng/publications/ui-publications/2022/ui-report-no.-1-2022.pdf

The **cooperation-oriented view** suggests that scientists all over the world speak a common language (the universal language of science), they follow similar scientific practices and are therefore well placed to foster a peaceful cooperation between states, given that the cooperation across borders is at the very core of the scientific enterprise. Science is thereby regarded as an activity esteemed for its objectivity and its public trust, providing unbiased evidence for political decisions. Such a cooperation-oriented view regards science as serving the common good, independent, and untainted by politics. This perspective views scientists as cultivating the practice and ethos of science as an international endeavour, based upon scientific cooperation and competition of ideas rather than cross-border political competition. As a result, science also became regarded as fostering international relations based upon shared values, for instance by developing technologies that serve the global common good or which no nation state alone could afford, or by using scientific cooperation to install dialogue between conflicting states, e.g., to resolve disputes related to water resources, atmospheric pollution, or nuclear safety.

The **competition-oriented view**, in turn, sees science diplomacy as a tool in the diplomatic toolbox to achieve foreign and security policy interests, which may be national or trans-national[25]. Such interests may conflict with the notion of science as an open, collaborative enterprise. The decision by the EU to cut scientific relations with Russia following its full-scale invasion of Ukraine in 2022 is a case in point, limiting the access of China to cutting-edge Western technologies is another. Here, diplomacy speaks the language of power, and it may seek to use the results of science for competitive advantage.

Cooperation and **competition** in science diplomacy



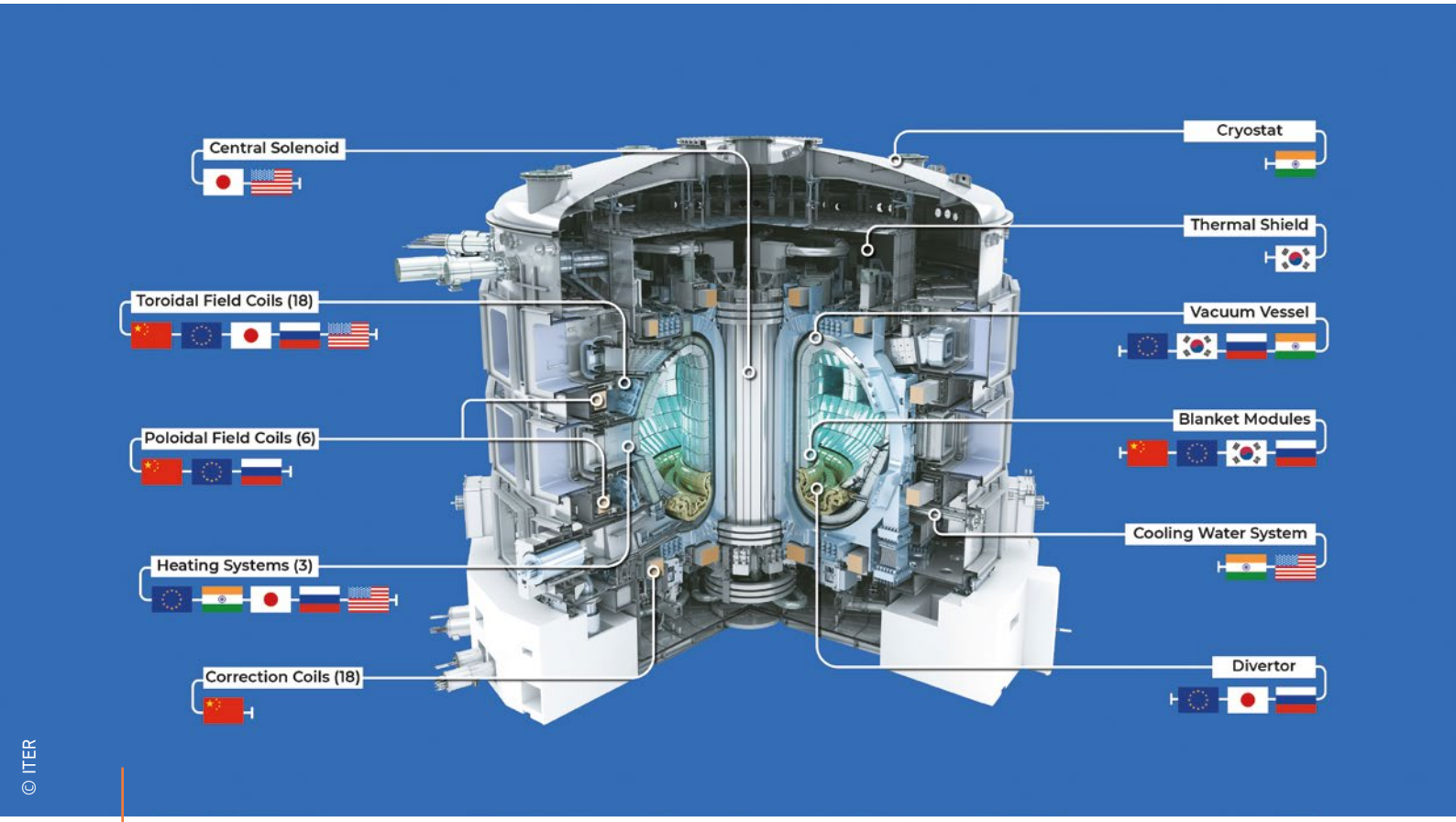
25. See also Peter D. Gluckman, Vaughan C. Turekian, Robin W. Grimes and Teruo Kishi: Science Diplomacy: A Pragmatic Perspective from the Inside, in: Science & Diplomacy, Vol. 6, No. 4 (December 2017), https://www.sciencediplomacy.org/article/2018/science-diplomacy-pragmatic-perspective-inside

While the cooperation-oriented view used to dominate the concept of science diplomacy in the last decade, the competition-oriented view gained increasing strength in recent years[26]. This creates tensions between scientists and diplomats, but at the same time opens opportunities to connect track I and track II diplomacy approaches[27].

Indeed, cooperation and competition are not mutually exclusive. They can co-exist in specific contexts, e.g., when despite sanction regimes some cooperation channels are kept alive. Cooperation with Russia on the International Space Station (ISS) or the International Thermonuclear Experimental Reactor (ITER) is a case in point. So even when scientific cooperation is restricted, for practical or strategic reasons some doors can deliberately be left open that may provide seeds for future relations. Hence, while it is tempting to focus on cooperation with like-minded partners in a polarised geopolitical climate, science diplomacy has the ability to carve spaces for dialogue and keep informal communication channels open between adversaries that are consistent with foreign and security policy and may contribute to conflict resolution.

Science diplomacy activities can be instigated **top-down** or **bottom-up** in varying degrees. They can be the result of top-down government decisions and policies or the bottom-up initiative of scientists or other non-state actors. Often science diplomacy activities take place within programmes or funding schemes, where governments or the EU give broad directions, which are filled out at the initiative of scientists or other non-state actors applying for grants.

Indeed, science diplomacy is characterised by the interaction of a wide range of **state and non-state actors**. Non-state actors can be efficient agents in that pursuit. Classical examples are French support for the private Jesuit Université Saint-Joseph de Beyrouth or US support for the private American University of Beirut and American University in Cairo. Religious orders, philanthropic organisations, and private companies (especially multinational companies) have historically been and remain key science diplomacy actors.



© ITER

Contributions of members to the International Thermonuclear Experimental Reactor (ITER)

26. Pierre-Bruno Ruffini (2020): Collaboration and Competition: The Twofold Logic of Science Diplomacy. In: The Hague Journal of Diplomacy, https://brill.com/view/journals/hjd/15/3/article-p371_8.xml
27. Vaughan Turekian and Peter Gluckman (2024): Science diplomacy and the rise of technopoles, in: Issues in Science and Technology, Vol. XLI, no. 1, https://issues.org/science-diplomacy-technopoles-turekian-gluckman/

In fact, influential science diplomacy is implemented by states that enjoy synergy with credible and resource-full non-state actors. The soft power of the USA is based on Harvard, Hollywood, and Silicon Valley – not the US Government[28]. The role of non-state actors is growing in importance and merits particular attention: the fact that an American billionaire owns half of all active satellites in orbit is an issue of concern for scientists and diplomats alike.

In view of the rising geopolitical tensions in recent years and the risk of foreign interference, there is increasing awareness among science stakeholders that the idea of science being unaffected by global politics is illusive. The reality is that science and technology are pieces on the global geopolitical chessboard. Likewise, there is renewed awareness among diplomats that scientific and technological advances have a profound impact on international relations.

In fact, the organisation of the science system itself implies that science is often driven by state interests as illustrated by concepts such as national innovation systems or the quadruple helix. States compete for technological breakthroughs and want to attract the brightest minds. Competition is inherent to science, be it in the competition for research funding, Nobel Prizes, or the position in university rankings. At the same time, large international research organisations, programmes and infrastructures show that the development and circulation of scientific ideas and technologies do not stop at national borders.

In summary, science and technology are an enabler of cooperation and dialogue, but also a driver of competition. Therefore, when thinking about European science diplomacy, it is important to keep in mind both dimensions, one of cooperative dialogue and one of competing state interests.

Non-state actors play an increasingly important role in science diplomacy – and they do not necessarily act in Europe's interests

28. Joseph S Nye (2005): Soft Power: The Means to Success in World Politics

4.3. Paradigm shifts in science diplomacy

4.3.1. The changing geopolitical context

The world is characterised by multiple transitions, e.g., from Western countries to the rest of the world, from state to non-state actors, from analogue to digital ways of working, from unsustainable to sustainable behaviour[29]. These transitions also shape science diplomacy and its underlying conditions, both in terms of 'soft' and 'hard' power.

The world order is determined by the relative distribution of power between nations. The West has dominated the world in past decades based on economic development and science and technology. With economic, scientific and technological development outside the West, relative power is shifting. The world is increasingly divided between a US-led NATO world (including Australia, New Zealand, Japan, and South Korea) and a BRICS+ world, where China stands out as a world leader in terms of economy and science and technology, alongside the US. The rise (or return) of China is putting an end to post-Cold War US unipolarity, which is most visible in Sino-US competition and the conflict with Russia.

In recent years, the term "like-minded countries" appeared in political and diplomatic debates, referring to countries sharing common values and principles. The concept comes with a lot of caveats, as countries may be like-minded in research and innovation policies, but not like-minded in foreign and security policies (and vice versa) and the degree of like-mindedness may shift over time, e.g., with a major change in government. For this reason, this report tries to avoid the term.

As science and technology are at the basis of economic development and growth, they are deeply embroiled in competition over political, economic, and military power, especially between the US, the EU, and China. The efforts to use science and technology in pursuing such power makes science an ally of state interests. Science is essential for ensuring competitive advantage in innovation, as well as for state security and even for national prestige. Science and technology are also a target for intelligence gathering. Foreign interference in research and innovation is on the rise, including attempts to infiltrate academia and recruit diaspora scientists to gather intelligence in their host or home country. This triggered the development of a European toolkit on tackling foreign interference in R&I[30] as well as the adoption of the 2024 Council Recommendation on enhancing Research Security[31].

The importance of knowledge and its valorisation in the competition of world powers, including the role of standards and intellectual property, has led to scientific knowledge as well as emerging and disruptive technologies like AI, quantum computing or gene editing becoming strategic geopolitical tools, with direct impacts on the EU's strategic autonomy and technological sovereignty. Often this results in putting boundaries on the openness of science, in particular vis-à-vis economic competitors. While it is in the interest of the scientific community and even society to share research results as openly as possible, economic and geopolitical competition on critical technologies calls for an effective and proportional approach to research security. There is increasing awareness that research must be done in a secure, safe and ethical way and that a suitable degree of technological autonomy is necessary to prevent complete reliance on technologies developed elsewhere. The role of science diplomacy in this regard is to help keeping spaces for dialogue and finding the suitable balance to pursue scientific cooperation that is open and safe.

Another power transition is from state to non-state actors. There has been a democratisation of science and technology. Decades ago, only the most powerful states and a few non-state actors could communicate and disseminate globally and instantaneously, whereas every citizen can do so now with a mobile phone. In the past, only great powers could bomb each other's cities, whereas the 9/11 attacks in New York were carried out by a non-state actor. Space was the domain of superpowers, where now many players, from nation states to private companies to universities are present[32]. While science diplomacy always has been a domain of influential non-state actors, including NGOs,

29. See also Joseph S. Nye (2011): The Future of Power
30. https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/3faf52e8-79a2-11ec-9136-01aa75ed71a1
31. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C_202403510w
32. Joseph S. Nye (2011): The Future of Power

private entities, and even religious actors[33], the power transition and democratisation of science and technology has significantly strengthened the role of non-state actors in science diplomacy.

Scientists also started reflecting more carefully about their relations with local communities and the recognition of indigenous knowledge in areas ranging from the siting of telescopes to the pursuit of clinical trials, archaeological excavations or gathering data in tropical forests or the polar zones. Avoiding 'parachute science' has been one of the values of post-colonial research and in many cases involves diplomatic efforts to facilitate access to remote or difficult areas or negotiate with local to national actors.

Despite these efforts, the rise of populist parties in many Western democracies reflects that there is an increasing part of the population that sees science as part of the problem, rather than as part of the solution. In such narrative, scientists (and experts more generally speaking) are seen as part of the liberal elites and the allegedly existing "deep state". Consequently, trust in science has been declining in recent years (although trust in scientists is still relatively high overall) and attacks on science, including ad hominem attacks on scientists, are increasing, especially since the COVID-19 pandemic. Given that Europe has been the cradle not only of democracy but also of the enlightenment, there is a clear role for European science diplomacy to defend science and the scientific method globally.

Certainly, the truth is that existential threats to humankind have been ultimately unleashed by science and technology, not least when being used for military goals, as can be demonstrated by the invention of the atomic bomb. The development of automated killer drones targeting everything that matches the characterisation "human", may evolve into a similar threat. As unwanted inventions cannot be de-invented, it has been one of the key tasks of diplomacy to manage the risks caused by the use of such inventions, and it did so far very well when it comes to the use of nuclear weapons. These negative examples should, however, not overshadow the immense benefits brought by science and technology, from cancer treatments to clean energy, from air travel to mobile communications.

The question remains though whether diplomacy will be able to cope with today's unprecedented speed of technological development. As humankind reaches and exceeds planetary boundaries – a scientific concept introduced into diplomatic debate – diplomacy is increasingly asked to respond and will depend on expert knowledge to do so, in particular as policy challenges are more and more becoming systemic, complex and interconnected. Without doubt, European diplomacy needs to get a much better grasp of how emerging and disruptive technologies are going to change the world. Deep transdisciplinary understanding of a given science or technology is the basis to manage its multiple-use potential.

Besides the race for staying at the forefront of cutting-edge technologies, the world is experiencing also an unprecedented politisation, militarisation and commercialisation of areas beyond national jurisdiction, such as the high seas and the seafloor as well as Low Earth Orbit and outer space, including the Moon, all of which have become more accessible through technological development. Again, this requires diplomacy to engage with science, not only because scientists know these spaces best, but also because they have been managed and governed de facto by science in the past.

Pressures on the global commons are on the rise

Diplomacy is changing too, as a result of developments in communication technologies and their impact on international relations. Today, political leaders talk to each other via video calls and post selfies on Instagram, and what used to be a carefully crafted note verbale between diplomatic services nowadays may be hammered out in a social media post in 280 characters with capital letters.

Therefore, the reflection what science diplomacy should or could offer to Europe, cannot be dissociated from the role research and innovation play in a changing world order. The underlying question is how Europe can turn its position as one of the global powerhouses in research and innovation into geopolitical clout. When the COVID-19 pandemic hit, European entrepreneurs were able to quickly develop a vaccine based on a novel technology, thanks to years of basic research in mRNA technologies supported by the European Research Council and collaborative research funding though the European Research and Innovation Framework Programme. But what if next time the only effective vaccine against a new pandemic virus comes from a 'strategic rival'?

33. An example is the Papal Encyclical Laudato Si', which was co-written by the Pontifical Academy of Sciences and which had a major impact on the Paris Agreement.

4.3.2. The changing scientific-technological context

Science and technology have always been evolving as new knowledge, theories, methods and applications emerged. And that in turn has altered the relationship with society at large. Today, we witness some game-changing developments in how science is conducted and how it interacts with society, mainly due to rapid digitalisation, the blurring of basic and applied research, science increasingly entering the sphere of diplomacy, and scientists being the voice for the global knowledge commons by supporting evidence-informed policymaking.

The first development is the digitalisation of 'everything', including science. This is especially notable in the trend towards open science (e.g., open access, data sharing, citizen science), underpinned by international agreements such as the UNESCO Recommendation on Open Science. The digitalisation and accessibility of publications and databases facilitates openness. But this trend is more than a technological process. It entails also a view on science-society relations, namely that the results of publicly funded research should be available to all, a position that has been strongly defended by the EU.

In addition, the evolution of digital social media has had major impacts on democracy and societal cohesion. Interestingly, this development also led to scientists losing the "truth monopoly", with the internet getting flooded with self-acclaimed experts, as could be seen during the COVID-19 pandemic[34]. This in turn contributed to a growing distrust in science and elites more generally speaking (cf. fake news, conspiracy theories, anti-science movements), creating vulnerabilities which are exploited through targeted foreign information manipulation, with narratives portraying evidence as 'fake news' or equating scientific results as mere opinions.

Such narratives promoting distrust in science – to be clearly differentiated from the normal and healthy criticism in scientific and public debates that characterise democracies – also promote polarisation within and between societies on matters ranging from vaccination to climate change. Polarising narratives are sometimes used as a technique in diplomacy to enhance negotiating stakes but can also undermine the possibility to find common grounds for dialogue. Science diplomacy should therefore consider developing de-polarising narratives that focus on scientific cooperation tackling common challenges.

Meanwhile, a second development took place, namely an increasing blurring of 'basic' and 'application-oriented' research. There is hardly a technological development without investment in 'basic' research: cases in point include the development of the Global Positioning System (GPS) being made possible by the elaboration of relativity theory, and – more recently – discoveries concerning nucleoside base modifications having enabled the development of effective mRNA vaccines against COVID-19, as already mentioned above. There is an increased expectation towards scientists to actively seek to increase the non-academic impact of their research, i.e., their impact on policy and society at large.

The quadruple helix is now common wisdom for science policymakers. Incentive schemes encourage scientists to work with the private sector, and the pressure is high for scientists to contribute to competitiveness and knowledge valorisation, and to bringing innovation faster to the market. This also applies to research that can have both civilian and military applications: while the funding of civilian research and military research have been kept on distinct tracks (e.g., Horizon Europe can only fund civilian applications, while the European Defence Agency funds military research), synergies through dual-use research are being increasingly explored.

A third development is that science is increasingly stepping into the sphere of diplomacy, as can be demonstrated by the IPCC being awarded the Nobel Prize for Peace in 2007, CERN receiving official observer status in the UN General Assembly (2012), the World Science Forum (2017) being organised under the motto "Science for Peace", and the International Science Council (ISC) being created in 2018 as a "global voice for science." The ISC is running major track II bodies like the Committee on Space Research (COSPAR) and the Scientific Committee on Antarctic Research (SCAR) and has recently opened a liaison office in New York. Many scientific institutions have evolved into diplomatic actors, some voluntarily, others non-voluntarily, some successfully, others with rather unfortunate actions.

34. Andrea Saltelli and Daniel Sarewitz (2022): Reformation in the Church of Science. How the truth monopoly was broken up, in: The New Atlantis, https://www.thenewatlantis.com/publications/reformation-in-the-church-of-science

© CERN

Science is increasingly stepping into the sphere of diplomacy (and vice versa)

Scientific institutions are becoming acutely aware that academic freedom comes with academic responsibility. In recent years, we increasingly see academia applying restrictive measures. The decision of many European universities to cut relations with Russian partners following Russia's full-scale invasion of Ukraine – a war officially applauded by Russian university rectors following pressure from the Kremlin – or the decision by some universities to interrupt cooperation with Israeli institutional partners due to the humanitarian situation in Gaza following Israel's response to the Hamas attacks are examples of scientific organisations applying diplomatic tools. At the same time, efforts are being undertaken by scientific institutions to support refugee scientists and dissident scientists, while also safeguarding spaces for dialogue by distinguishing between individual researchers and institutions in countries with authoritarian regimes (e.g., keeping people to people contacts with Russia alive, while cutting formal relations at the institutional level).

A fourth development is the increasing role for scientists in becoming "spokespersons" for the global knowledge commons, i.e., for knowledge as a global public good. With a continuous increase over the last 50 years in resources for science and the numbers of scientists, we are now in a situation where never in human history has there been so much knowledge available on just about anything. The EU has made great strides, both at EU and Member State level, to strengthen its science for policy ecosystems, a commitment emphasised recently in the Council Conclusions on strengthening the role and impact of research and innovation in the policymaking process in the Union[35].

This applies obviously also to the area of foreign and security policies. Such commitment requires diplomats to ask questions to science, and scientists to step up their efforts to provide evidence in a timely and meaningful way, acting as honest brokers[36]. In such a relationship, the domain independent skills of the diplomat are brought to bear through the domain specific knowledge of the expert.

A key role in this relationship is played by those working at the interface of science and diplomacy doing the translation job in both directions, such as science advisors in ministries of foreign affairs. An increasing number of countries in the EU and worldwide have created such roles in recent years, leading to the development of networks such as the Network of Science Advisors and Science Diplomacy Coordinators in EU Ministries of Foreign Affairs or the global Foreign Ministries Science and Technology Advice Network (FMSTAN)[37]. The creation of the UN Secretary-General's Science Advisory Board needs to be seen in the same context[38].

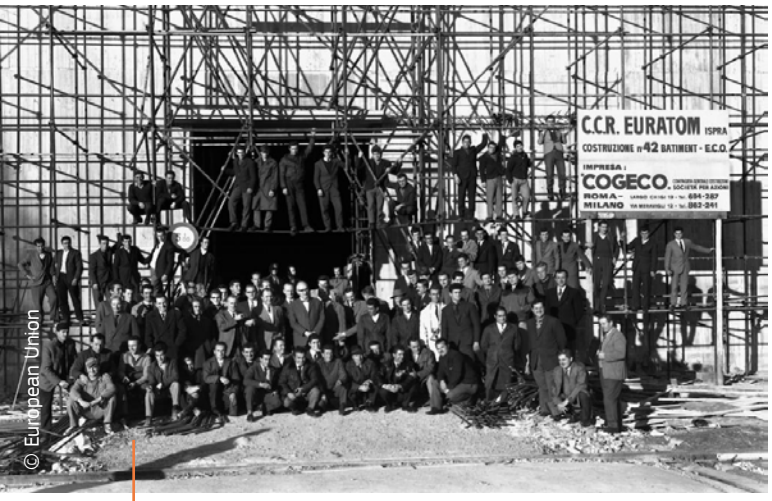
The science-policy interface is not without challenges. In this sense, the COVID-19 pandemic has been an eye-opener for many as it revealed both the benefits and the pitfalls of communicating science to policymakers, including in the foreign policy domain, e.g., regarding decisions about the closure of borders or the equitable distribution of vaccines. In recent years, plenty of literature has emerged about how to improve the science-policy interface and relevant knowledge hubs have been launched, e.g., by the European Commission's Joint Research Centre (JRC) and the International Network for Governmental Science Advice (INGSA)[39].

35. https://data.consilium.europa.eu/doc/document/ST-16450-2023-INIT/en/pdf
36. Roger A. Pielke jr. (2007): The honest broker: Making sense of science in policy and politics
37. https://ingsa.org/divisions/fmstan/
38. https://www.un.org/scientific-advisory-board/en
39. See https://knowledge4policy.ec.europa.eu/home_en and https://ingsa.org/knowledge-hub/

Science diplomacy in the European Union

5.1.
Evolution of science diplomacy in the European Union

The EU practiced science diplomacy long before the term was coined. In fact, it is fair to say that science diplomacy contributed to the very foundation of the European Communities. It is certainly no coincidence that the establishment of CERN in 1954 preceded the Treaties of Rome in 1957, and that the European Commission's Joint Research Centre (JRC) was created by one of those Treaties, namely the EURATOM Treaty. Many other European research infrastructures and organisations followed in the 1960's and 70's, such as the European Southern Observatory, the European Molecular Biology Laboratory, or the European Space Agency, to mention just a few. The European Cooperation in Science and Technology (COST) established in 1971 was instrumental in integrating national approaches to science and technology, being a precursor to the European Research and Innovation Framework Programmes as of 1984, which in turn laid the ground for the European Research Area launched in the year 2000. Science diplomacy has also been instrumental to the various enlargements of the EU: it is interesting to note that since 1984 no country has become a member of the EU without having been associated to the Research and Innovation Framework Programme before[40].



© European Union

The Joint Research Centre (JRC) was established by the EURATOM Treaty

Being the largest multilateral research funding mechanism in the world, Horizon Europe is the EU's primary tool of science diplomacy, as can be illustrated by the following examples:

- The programme offers association as the closest status of partnership not only to countries which are members of the European Economic Area (such as Norway or Iceland), to acceding countries and candidate countries (such as the Western Balkan countries or Ukraine), and to European Neighbourhood Policy countries (such as Tunisia or Armenia), but also to countries outside Europe sharing our values (such as Canada or New Zealand), with the different categories of association following broader foreign policy considerations.
- The programme facilitates and funds the participation of low- and middle-income countries in a spirit of equal partnership, offering targeted instruments such as the Africa Initiative and the AU-EU Innovation Agenda.
- The programme supports international research infrastructures and networks such as the SESAME Synchrotron in Jordan, the All-Atlantic Ocean Research and Innovation Alliance, the Partnership for Research and Innovation in the Mediterranean Area (PRIMA), and Mission Innovation, as beacons of science diplomacy, as well as the international mobility of researchers.

International science and technology collaboration has always been part of the EU's Research and Innovation Framework Programmes, but mainly as an instrument and not as a policy of its own[41]. That changed in 2008 when the Commission introduced a roadmap, "A strategic European framework for international science and technology cooperation"[42], which proposed to establish an institutionalised partnership between Member States and the Commission. The 2012 Communication from the Commission 'Enhancing and focusing EU international cooperation in research and innovation: a strategic approach'[43] is the first official EU policy document that refers to science diplomacy and marks the beginning of a process towards a strategic approach regarding the topic[44].

40. In fact, also no country has left the EU without having been associated to the Research and Innovation Framework Programme afterwards.
41. See Heiko Prange-Gstöhl (2010): International Science and Technology Cooperation in a Globalized World
42. COM (2008) 588 final
43. COM (2012) 497 final
44. Ibid. P.4

Championed by then EU Research Commissioner Carlos Moedas, the 2015 policy declaration "Open innovation, Open Science, Open to the World"[45] developed the concept further and pointed towards the potential contribution of science diplomacy towards good policymaking and to building mutual understanding and trust. In 2017, the Commission published a report 'Tools for an EU Science Diplomacy'[46], which concluded that science diplomacy efforts in Europe remained largely uncoordinated, calling for a proper EU strategy to underpin the Common Foreign and Security Policy.

From 2017 onwards, the EU funded three Horizon 2020 projects on science diplomacy[47]. This triggered the evolution of a vibrant scholarly basis for science diplomacy in Europe, as well as the development of methodologies and training materials, and resulted, inter alia in the publication of the Madrid Declaration on Science Diplomacy[48]. After the completion of these projects, the coordinators decided to establish on a voluntary basis the EU Science Diplomacy Alliance[49]. This network became operational in March 2021 and at present counts some 40 member institutions inside the EU as well as various global networking partners outside the EU.

In parallel, there have also been developments on the diplomatic side, with the European External Action Service appointing for the first time a Science & Technology Advisor in 2020, publishing a website about science diplomacy[50], and launching the informal Network of Science Advisors and Science Diplomacy Coordinators in EU Ministries of Foreign Affairs in 2021. The Council of the EU's former Strategic Forum for International S&T Cooperation (SFIC)[51], in turn, established a Science Diplomacy Task Force which, inter alia, suggested the development of an EU Science Diplomacy Platform and Roadmap[52].

In May 2021, the European Commission adopted the Global Approach to Research and Innovation, which prominently advocates that a stronger focus on science and technology in the EU's foreign and security policies in the form of science diplomacy would help the EU to project soft power and pursue its economic interests and fundamental values more effectively[53]. In its Conclusions on the Global Approach adopted in September 2021[54], the Council of the EU highlighted the importance of integrating the Global Approach into the EU's external action and called on the Commission and the European External Action Service to develop a European Science Diplomacy Agenda.

EU Member States have also become increasingly active in the domain of science diplomacy. In recent years, roughly a third of the Member States have adopted national science and/or tech diplomacy strategies or agendas[55], and two thirds of them have appointed science advisors or science diplomacy coordinators in their ministries of foreign affairs[56]. An increasing number of recent EU policy documents have made explicit or implicit reference to science diplomacy and the need for foreign and security policy to be based on the best possible evidence[57].

In view of these developments, science diplomacy efforts in Europe require better coordination and synergies, building on an EU-wide approach. This is important to avoid vulnerabilities against the background of a rapidly changing geopolitical and scientific-technological environment, with global competitors using science diplomacy much more strategically.

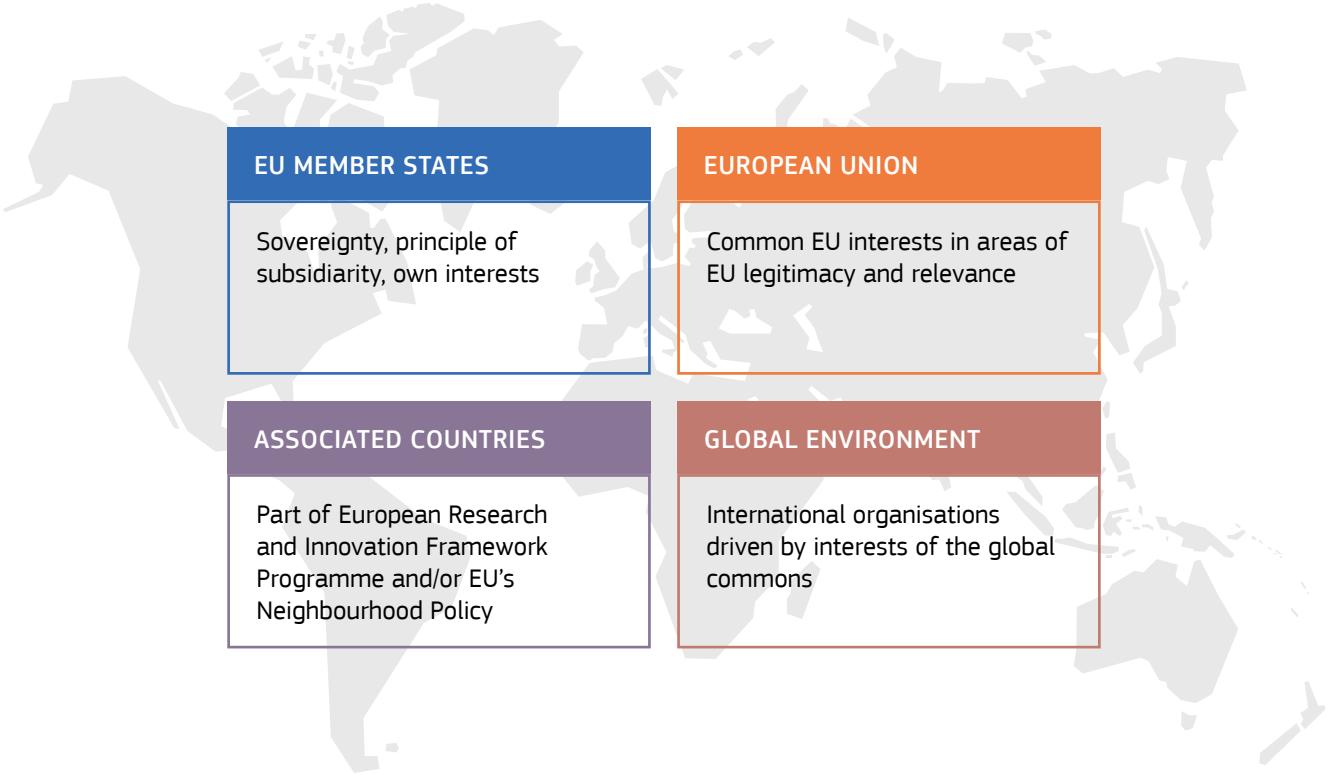
45. European Commission (2015): Open innovation, open science, open to the world – A vision for Europe, https://data.europa.eu/doi/10.2777/061652
46. European Commission and Luk Van Langenhove (2017): Tools for an EU science diplomacy, https://data.europa.eu/doi/10.2777/911223
47. European Leadership in Cultural, Science and Innovation Diplomacy (EL-CSID), Inventing a Shared Science Diplomacy for Europe (InsSciDE), Using Science for/in Diplomacy for Addressing Global Challenges (S4D4C)
48. https://www.s4d4c.eu/wp-content/uploads/2020/12/madrid-declaration-1.12.pdf
49. See www.science-diplomacy.eu
50. https://www.eeas.europa.eu/eeas/science-diplomacy_en
51. See https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/europe-world/international-cooperation/science-diplomacy/sfic_en; SFIC has been replaced by the ERA Policy Forum Standing Subgroup on the Global Approach
52. See https://era.gv.at/public/documents/4558/SFIC_Task_Force_Science_Diplomacy_EU_SD_Agenda_Impact_Pathways.pdf
53. See COM (2021) 252 final
54. https://data.consilium.europa.eu/doc/document/ST-12301-2021-INIT/en/pdf
55. e.g., France 2013, Spain 2015, Austria 2019, Germany 2020, Denmark 2021 and 2024
56. e.g., Chief Science Officer in the Dutch Ministry of Foreign Affairs, Science & Innovation Advisor in the Lithuanian Ministry of Foreign Affairs, Ambassador at Large for Research & Innovation in the Slovak Ministry of Foreign Affairs, Tech Ambassador in the Danish Ministry of Foreign Affairs, creation of Science Diplomacy Directorates or Units in the Italian, Hungarian, Romanian and Slovenian Ministries of Foreign Affairs
57. Examples include the EU Global Strategy (2016); the Joint Communication on strengthening the EU's contribution to rules-based multilateralism (JOIN(2021) 3 final); the Joint Communication on a stronger EU engagement for a peaceful, sustainable and prosperous Arctic (JOIN(2021) 27 final); Communication on a European strategy for universities (COM(2022) 16 final); Council Conclusions on Research Infrastructures (15429/22); Council conclusions on Climate and Energy Diplomacy (5263/21); Council Conclusions on EU Digital Diplomacy (11406/22 and 10526/23); Council's Strategic Compass for Security and Defence (7371/22); see also ERAC-SFIC input paper 1352/20.

5.2.
Actors and institutions of European science diplomacy

Before discussing the different and institutions in European science diplomacy, it is important to understand the different levels at which European science diplomacy is practiced:

- **EU Member States** at national or sub-national level carry out science diplomacy activities, in the context of their sovereignty and in line with the principle of subsidiarity, following their own interests.
- The **European Union** carries out science diplomacy activities, pursuing common EU interests in areas where the EU has legitimacy and relevance, e.g., in EU research and innovation policy, the Common Foreign and Security Policy / Common Security and Defence Policy and sectors identified as strategic in terms of the EU's sovereignty.
- Science diplomacy activities are also carried out in a **wider European sense**, e.g., involving countries that are associated to the European Research and Innovation Framework Programme and/or countries that are part of the EU's Neighbourhood Policy, often implemented through regional or pan-European organisations such as the Union for the Mediterranean (UfM), the North Atlantic Treaty Organization (NATO), the Organisation for Security and Cooperation in Europe (OSCE), or the UN Economic Commission for Europe (UNECE).
- European science diplomacy is also implemented in the **global environment**, e.g., through organisations like UNESCO, WHO, UNEP, IAEA, etc., which are driven by interests of the global commons.

Levels of European science diplomacy



Main actors involved in European science diplomacy

The main actors of European science diplomacy are scientists, diplomats, and other professionals working in the science and diplomacy spheres (e.g., administrators, policy officers, etc.) as well as intermediaries enabling the bridging of both worlds (e.g., science advisors, science communicators, trainers, etc.)[58]. Institutions include those at global, wider European, EU, regional, national, and sub-national levels involved in developing and deploying science diplomacy in relation to specific issues (e.g., pursuit of the Sustainable Development Goals, nuclear disarmament, international environmental treaties, scientific cooperation agreements, development of ethics standards for Artificial Intelligence, building of science diplomacy capacity).

The figure describes the main actors involved in science diplomacy – with the main ones coloured in pink and those with the important function of intermediaries in yellow. The figure does not include arrows describing the directions or intensity of relations in the network as they change depending on the issue at stake, configuration of actors, time, and other variables.

58. These could be labelled as "science diplomats", although there are different views of what this term entails.

Scientists pursue the advancement of ideas and knowledge grounded in values such as academic freedom, independence and scientific integrity. They work in higher education institutions / universities, research-performing organisations as well as the private sector. Some are part of the state, e.g., working in ministries, agencies or defence/military organisations. Some may work as diaspora scientists abroad or as "science diplomats" in the strict sense of the word, e.g., as science attachés in embassies, thus being embedded in diplomatic services. Others may be involved in the scientific study of science diplomacy itself.

Diplomats are usually appointed by national governments or international organisations to conduct official negotiations and maintain political, economic, and social relations with another country or a group of countries. In their role, they serve political principles and defend national or EU interests in the field of foreign and security policy. They regularly serve in duty stations abroad. Some of them may have a scientific background or are dealing with scientists on a regular basis due to the nature of their task (e.g., climate policy, ocean policy, space policy).

Institutions involved in European science diplomacy include on the science side higher education institutions / universities, research-performing organisations – including major international research institutes and infrastructures (see textbox) – academies and learned societies as well as research ministries, agencies, and councils.

Major political players shaping European science diplomacy from the science side include, inter alia, the research ministries of EU Member States, the Directorate-General for Research and Innovation of the European Commission, the European Parliament's Committee on Industry, Research and Energy (ITRE) and Science & Technology Options Assessment Panel (STOA) as well as the Research Working Party of the Council, EU agencies with a scientific mandate like the European Food Safety Authority, the European Environment Agency or the European Medicines Agency, and a number of consultative bodies such as the ERA Forum Standing Subgroup on the Global Approach.

Examples of major international research institutes and infrastructures located in Europe and the European neighbourhood:

CERN	European Organisation for Nuclear Research
ELI ERIC	The Extreme Light Infrastructure ERIC
EMBL	European Molecular Biology Laboratory
ESA	European Space Agency
ESO	European Southern Observatory
ESRF	European Synchrotron Radiation Facility
European XFEL	European X-ray Free-Electron Laser Facility
ICTP	Abdus Salam International Center for Theoretical Physics
IIASA	International Institute for Applied Systems Analysis
ILL	Institute Laue-Langevin
ITER	International Thermonuclear Experimental Reactor
JRC	European Commission Joint Research Centre
SESAME	Synchrotron-light for Experimental Science and Applications in the Middle East

The EU-supported Synchrotron-Light for Experimental Science and Applications in the Middle East (SESAME) in Jordan is a stellar example of science bridging political divides

© SESAME

On the diplomacy side, major players include the European External Action Service (EEAS) and the ministries of foreign affairs of Member States with their vast networks of embassies and delegations/representations and related agencies. Major policymaking bodies include the relevant Directorates-General of the European Commission (such as DG INTPA, DG NEAR) and the relevant Parliament and Council committees. A key role is being played by the Political and Security Committee (PSC), which is chaired by the EEAS. In addition, there are science-based agencies supporting the Common Foreign and Security Policy and Common Security and Defence Policy such as the EU Satellite Centre (SATCEN) or the EU Institute for Security Studies (EUISS). Of major importance are also the multilateral organisations in which either the EU and/or EU Member States are a member, such as the bodies of the UN system, G7/G20, NATO or OECD.

In addition to the above, there is a major group of **intermediary actors**, such as those involved in developing capacity building, training, scientific advice, networks, and other initiatives to foster science diplomacy, which have an important role to play at the European as well as national and local levels. This could be, for example, diplomatic academies (often attached to the ministries of foreign affairs), including the newly established European Diplomatic Academy, entities focusing on scientific advice for policymaking such as the European Commission's Scientific Advice Mechanism (SAM) and the Science Advice for Policy by European Academies consortium (SAPEA), the European Commission's Joint Research Centre (JRC) as well as networks and NGOs such as the EU Science Diplomacy Alliance, the International Network for Governmental Science Advice (INGSA), the Geneva Science and Diplomacy Anticipator (GESDA), and other civil society, philanthropic and business actors, including a large variety of foreign and security policy think tanks.

Private companies can also serve as intermediaries between scientific and diplomatic actors – e.g., multinational corporations developing research in their labs in different parts of the world and interacting with both diplomatic actors from home and subsidiaries in other countries. At the same time, they are clearly actors on their own, pursuing a for-profit agenda.

Examples of intermediary bodies

EU Science Diplomacy Alliance https://www.science-diplomacy.eu/	The EU Science Diplomacy Alliance is a bottom-up initiative created by EU- funded projects in the field in 2021, with the support of several founding members. Its aim is to facilitate interactions and dialogue, training, institutional capacity-building and coordination of grant-seeking or the use of joint funding, if available. The Alliance serves as a hub for cooperative activities and voluntary coordination and relies upon the participating membership community and networks.
Scientific Advice Mechanism of the European Commission (SAM) https://scientificadvice.eu/	The Scientific Advice Mechanism provides independent scientific evidence and policy recommendations to the College of European Commissioners on any subject, including on policy issues that the European Parliament and the Council consider to be of major importance. It consists of three parts: • the Group of Chief Scientific Advisors, seven eminent scientists whose role is to make policy recommendations; • Science Advice for Policy by European Academies, a consortium which brings together Europe's academies and Academy Networks to review/synthesise evidence; • the SAM secretariat, a unit within the DG Research and Innovation whose role is to support the Advisors and liaise between SAM and the European Commission.
Network of Science Advisors and Science Diplomacy Coordinators in EU Ministries of Foreign Affairs	The Network of Science Advisors and Science Diplomacy Coordinators in EU Ministries of Foreign Affairs is an informal network established in 2021, gathering those responsible for science advice and/or science diplomacy in the ministries of foreign affairs of EU Member States. The network meets regularly to discuss matters of common interest, including relevant EU policy files.

5.3. Mission, objectives and values

Given the above analysis of the present geopolitical situation, this report advocates that a future European Framework for Science Diplomacy should contribute to:

1. **Strengthening Europe's competitive position as a global science and technology actor,**
2. **Maximising the deployment of European research and innovation potential for the pursuit of peace and multilateralism,**
3. **Reinforcing Europe's commitment to managing global public goods and commons sustainably and achieving the Sustainable Development Goals.**

Thus, the **mission** of a European science diplomacy is to ensure that the Common Foreign and Security Policy and Common Security and Defence Policy leverage on scientific expertise and networks, and the European Research Area leverages on diplomatic efforts to preserve spaces for negotiation, cooperation and exchange, especially in conditions of tension and competition.

Joining forces at the EU and broader European level, taking on board all relevant state and non-state actors, is necessary to address issues that transcend national borders and disciplinary boundaries. Europe is faced with increasingly assertive economic and scientific powers of a size and weight that can only be matched by a joint European effort.

Such European effort does not need to be invented from scratch: it can build not only on a vast legacy of European science diplomacy but also on multiple science diplomacy activities happening at both EU and Member State level already. For example, the Erasmus+ International Credit Mobility action was largely funded by the Partnership Instrument which aimed at connecting different policy fields, including science, and EU foreign policy. Another example is the Technical Assistance and Information Exchange instrument of the European Commission (TAIEX), which plays an instrumental role in strengthening the technical expertise of public administrations with regard to the approximation, application and enforcement of EU legislation as well as facilitating the sharing of EU best practices, including with partners world-wide. Many science diplomacy initiatives exist at Member State level as well, in line with the respective foreign policy interests, from posting science fellows in embassies to funding scholars at risk programmes.

However, if the EU wants to be able to compete with powers like the US and China, and emerging powers like India and Brazil, it cannot afford losing synergies by Member States running in different directions. This is where the true added value of a European Framework for Science Diplomacy lies: to provide a strategic umbrella under which Member States can maximise the impact of their efforts, while strengthening the geopolitical clout of the EU overall.

The EU needs to set its supranational interests in the field of science diplomacy, while building on the subsidiarity principle and respecting the sovereignty of Member States, with the need for EU and national interests to complement each other. A concrete example for such added value is that the EU is a member or observer in many international organisations where it can put forward its position on behalf of the Member States, and in other occasions alongside them, drawing on scientific knowledge from across the EU.

Without this list claiming to be exhaustive, the **objectives** of European science diplomacy should include most notably:

1. **Using science diplomacy strategically to tackle geopolitical challenges in a fragmented, multipolar world.**

This includes:

- Fostering international R&I collaboration and the exchange of knowledge among academies, higher education institutions / universities, research-performing organisations, and regulatory agencies to address common challenges and foster peace and stability;
- Strengthening science diplomacy initiatives at international research institutes and infrastructures located in Europe and the European neighbourhood as well as European infrastructures located abroad for enhancing global cooperation and ensuring synergies between research efforts and the EU's diplomatic goals;
- Strengthening rules-based multilateralism through science diplomacy;
- Using science diplomacy strategically in order to support confidence-building wherever possible and exerting pressure where needed, especially in conflict situations;
- Harnessing science diplomacy for building positive narratives and fighting foreign information manipulation and interference, including disinformation;
- Supporting the EU's open strategic autonomy and technological sovereignty, including by fostering economic and research security, and leveraging the EU's influence as a global regulatory power.

2. **Making European diplomacy more strategic, effective and resilient through scientific evidence and foresight.**

This includes:

- Strengthening foresight and science advice in foreign and security policy by strengthening science advisory ecosystems and processes;
- Enabling diplomacy to deal with opportunities and threats of new and disruptive technologies and their impact on foreign and security policy;
- Facilitating the development and implementation of research-based solutions for managing global goods and commons;
- Boosting the European Green Deal and supporting the achievement of the Sustainable Development Goals;
- Mobilising science for tackling the systemic nature of global and regional risks, crises and emergencies such as climate change and pandemics, and supporting diplomacy to better prepare and respond.

3. **Strengthening science diplomacy in delegations and embassies and fostering the EU's global science diplomacy outreach.**

This includes:

- Leveraging the role of science diplomacy in EU and Member State diplomatic representations as well as international organisations;
- Fostering the EU's global science diplomacy outreach beyond capitals and official representations, e.g., by engaging with alumni of EU mobility schemes as well as diaspora scientists;
- Supporting science diplomacy engagement with partners worldwide, thereby promoting the European approach to science diplomacy;
- Protecting and projecting the EU's interests and values.

4. **Building capacity for European science diplomacy.**

This includes:

- Building capacity and promoting 'brain circulation' in science and diplomacy through the training of scientists, diplomats, and professionals at the intersection of science and policy, including the development of career paths;
- Strengthening the interface between science and diplomacy through networking and creating spaces for interaction, and advancing European science diplomacy know-how by sharing knowledge and resources across the EU, thereby strengthening a robust European Research Area (ERA);
- Advancing the frontiers and practices of science diplomacy through research.

Through these objectives, European science diplomacy:

- Provides the knowledge-based resources and tools for managing global commons, addressing international challenges to sustainability as well as security threats;
- Provides the basis for technological and innovation-based competitiveness and progress as well as general frameworks to define standards and technical regulations;
- Engages 'soft power' to address international tensions between states and societies, fostering mutual understanding and the (re-)building of trust among peoples, especially when official channels are restricted;
- Engages 'hard power' in dealing with threats to peace, democracy and economic security, such as unwanted access to or theft of intellectual property;
- Counteracts the misuse and the "weaponisation" of science to undermine international law, by promoting and protecting academic freedom, open science and the physical safety of researchers;
- Comes into effect whenever international challenges require scientific expertise and agency, leveraging scientific collaboration and knowledge by promoting cross-border and cross-disciplinary cooperation to address shared global challenges, thereby fostering evidence-based decision-making.

European science diplomacy promotes the EU as a political, regulatory, technological, and economic power with global impact, inter alia, attracting global talent, promoting a fair international cooperation, and promoting openness to international knowledge circulation and co-creation, while keeping in focus the needs for such openness to be exercised safely and reciprocally. To do so, European science diplomacy needs to be rooted in principles and values that make Europe a trustworthy partner.

The recent Draghi Report on the future of European competitiveness specifically refers to the need for the EU's competitive edge "*to be guided by European values, which should be further reinforced by its action. These encompass fundamental values, including human rights, the rule of law and democracy, but also values of specific relevance to research and innovation, such as academic freedom and independence, research integrity and ethics, transparency, diversity, inclusion, gender equality, open science and open access to scientific publications and research data*"[59].

59. https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead_en#paragraph_47059

A Ministerial meeting took place in Brussels on 16 February 2024 to discuss the Multilateral Dialogue on Principles and Values in international R&I cooperation

In a world undergoing rapid and profound change, the affirmation of these principles and values needs to be (and be seen as) consistent and coherent, avoiding 'double standards'. Europe must acknowledge and respect the diverse knowledge systems, including indigenous knowledge, that have contributed and are still relevant for scientific development. European science diplomacy should aim at fostering a sense of solidarity, a shared responsibility for addressing common challenges and protecting global goods and commons, should avoid assertions that might be perceived as arrogant, dominant or triggering a sentiment of colonialism, and should involve an examination of the appropriate ways of engaging with different partners.

Being firmly rooted in human liberties and human rights, such as the Universal Declaration of Human Rights and the UN Declaration on the Rights of Indigenous Peoples, principles and values in international cooperation in research and innovation were set out comprehensively in the EU Council Conclusions of 2022[60] and at the 2024 Ministerial Declaration of the Multilateral Dialogue on principles and values for international research[61]. These principles and values become especially powerful when combined with European legislation governing academic research (including academic freedom, e.g., Art. 13 of the EU Charter of Fundamental Rights on protecting the freedom of arts and science) as well as EU and national legislation on research conduct (including on research integrity, research data, open science, research security, research ethics). The combination of principles and values with laws provide the EU with a distinct and robust toolbox for its endeavours in the field of science diplomacy.

Principles and values provide both a foundation and signposts for navigating the complexities of the changing political world order. In fact, principles and values on the one hand, and broader EU interests on the other, are mutually reinforcing: e.g., it is in the interest of the EU and its Member States and of other European countries to preserve and promote academic freedom as part of the broader democratic freedoms of our societies. Likewise, it is in the European interest to preserve and promote research integrity and responsible conduct as indispensable elements of the quality of science and thus a sound contribution to policy and diplomacy, while acknowledging that there will always be tensions between openness and restrictedness.

60. https://www.consilium.europa.eu/media/56956/st10125-en22.pdf
61. https://research-and-innovation.ec.europa.eu/document/download/94d6bb42-1fe7-478c-b6b4-d0be4dfb0204_en?filename=brussels-ministerial-statement-2024-02.pdf

Recommendations for a European Framework for Science Diplomacy

As explained in chapter 3, the following recommendations are based on the outputs of the five EU Science Diplomacy Working Groups set up by the European Commission and were identified in a co-creation process involving 130 scientists and diplomats. They are divided into three headline categories, namely strategic instruments, operational instruments and enabling instruments, with three recommendations each, i.e. nine recommendations in total.

For each recommendation specific short- to medium-term or medium- to long-term actions are suggested. This classification tries to give a sense of priorities – how soon should work on the action start and how long will it take to implement it. In addition, the actions also indicate the relevant actors at different levels that would need to be involved in their implementation. The mentioning of these actors should be understood as fully respecting the subsidiarity principle and the sovereignty of Member States in foreign and security policies as well as the principles of academic freedom and scientific autonomy on the side of academies, higher education institutions / universities and research-performing organisations. The proportionality of the suggested actions to the capacity of such institutions to act would need to be assessed in future steps, such as the development of a policy document at the EU level.

Overview of the **recommendations**

Strategic instruments	
Recommendation 1	Set strategic priorities for European science diplomacy
Recommendation 2	Identify the appropriate balance between openness and restrictedness in international science cooperation
Recommendation 3	Use science diplomacy to tackle global challenges and sustainably manage global goods and commons, including with partners in the South
Operational instruments	
Recommendation 4	Establish the structures needed for EU leadership in science diplomacy
Recommendation 5	Foster science for policy and foresight ecosystems for more effective and resilient foreign and security policies
Recommendation 6	Strengthen the role of science and technology in diplomatic representations
Enabling instruments	
Recommendation 7	Create and connect science diplomacy communities in Europe and beyond
Recommendation 8	Train and empower Europe's current and future science diplomacy professionals
Recommendation 9	Advance the frontiers of science diplomacy through research and the development of innovative approaches

6.1.
Strategic instruments

Recommendation 1:
Set strategic priorities for European science diplomacy

Despite the encouraging developments described in chapter 5, the European science diplomacy landscape is still scattered and lacking strategic direction, while competitors worldwide are strengthening their capacities in the field, with an increasing number of countries investing in science diplomacy. The actions in this section are aimed at tackling this vulnerability.

Short- to medium-term	
Action 1.1	Make science diplomacy visible as an important component of the external action of the EU and Member States
Action 1.2	Identify thematic priorities for European science diplomacy action
Action 1.3	Support the development of strategic, tailored and impactful narratives, combatting disinformation, and strengthening democracy
Action 1.4	Carry out country- or region-specific analyses as well as sectorial assessments to inform science diplomacy action
Medium- to long-term	
Action 1.5	Establish dedicated EU science diplomacy initiatives vis-à-vis specific partner countries or regions
Action 1.6	Develop a holistic science diplomacy approach towards countries not sharing our values
Action 1.7	Conduct a review on how the potential of large research infrastructures as platforms for excellent science, technological leadership, international collaboration and outreach can be leveraged for European science diplomacy

Acknowledge science diplomacy as a distinct and vital component of European foreign and security policy

Science and technology underpin multiple sectoral diplomacies such as climate diplomacy, water diplomacy, space diplomacy, Arctic diplomacy, ocean diplomacy, and digital diplomacy to mention just a few. The interconnected nature of science diplomacy is possibly the reason why science diplomacy is often not sufficiently visible in diplomatic services: it acts in the background and is at times regarded as a subset of cultural diplomacy, mostly acknowledging it as a soft power tool but disregarding its role as a "geopolitical battleground". Yet never before have science and technology played such an important role in the relationships between nations and people. While being a driver of innovative solutions, emerging and disruptive technologies can also be a source of conflict. With the fundamental changes happening in life sciences, quantum physics, energy, and digital technologies (amongst many other fields) and the consequent technology race for ground-breaking discoveries, science diplomacy is coming more strongly to the fore. This is clearly reflected in the political guidelines of the European Commission 2024-2029 and the Draghi Report, which put research and innovation at the heart of European competitiveness.

Science and technology are also closely linked to the EU's role as a regulatory power, as technical regulations developed by the EU for the functioning of the internal market depend to a significant extent on scientific-technical expertise. The so-called "Brussels Effect"[62], i.e. the adoption of EU standards and regulations by other countries, is not only linked to the power of the EU's internal market, but also to its ability to technically develop and implement standards and regulations based on the interplay of scientific excellence and regulatory know-how. Recognising the relevance and potential of science and technology for the foreign and security policy of the EU and its Member States is a precondition for using it as a strategic tool in the EU's diplomatic toolbox.

Action 1.1 (short- to medium-term)

Make science diplomacy visible as an important component of the external action of the EU and Member States, thereby integrating also the EU's Global Approach to Research and Innovation into the EU's external action. This will also require a more global and strategic projection of the European Research Area (ERA), including the ERA action on promoting international cooperation in STI (*to be implemented by European External Action Service, European Commission and Member States*).

62. Anu Bradford (2020): The Brussels Effect: How the European Union Rules the World

Define thematic priorities for science diplomacy interaction between the EU and Member States and partners abroad

There is a clear need to identify thematic priorities for science diplomacy interaction in areas that are both of strategic interest for research and innovation as well as for foreign and security policies. A first step has been made at the EU level by recognising education and research as a key component of the Global Gateway strategy. However, science and technology must not be seen as a mere add-on. The topics and priorities of Global Gateway must be informed by the latest scientific advances and Europe's strategic goals in research and innovation, while taking the interests of partners equally into account.

Likewise, relevant actions developed under the EU's research and innovation framework programme, currently Horizon Europe, must consider the EU's foreign and security policy priorities and be flexible enough to react to geopolitical developments. The immediate support made available to Ukraine after Russia's unlawful invasion is a good example of how the research and innovation ecosystem can respond to shifting geopolitical priorities. The identification of such priorities will require stronger coherence and alignment between the EU and Member States and require work across relevant Council working parties, both on the research and the external relations side.

Thematic priorities in science diplomacy should be informed by current or upcoming priorities on the international agendas and related EU action. Climate change is a best practice example where there has been a long-standing cooperation between scientists and diplomats, e.g., through the Intergovernmental Panel on Climate Change (IPCC) and the Conferences of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC). Similar efforts have been developed in past years through the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), with efforts underway to establish a Science-Policy Panel on Chemicals, Waste and Pollution. Although the related processes can certainly be improved, such science-policy platforms can serve as a model for other policy domains, also outside the climate/environment arena.

Action 1.2 (short- to medium-term)

Identify thematic priorities for European science diplomacy action, to be updated at regular intervals, under the joint leadership of the Research and External Relations Working Parties of the Council of the EU (*to be implemented by Council of the EU, European External Action Service and European Commission*).

Use science diplomacy to build positive narratives and combat disinformation

As detailed in chapter 4, narratives that promote the value of evidence-based reasoning and policymaking are important factors in the development of scientific cooperation and science diplomacy. In fact, the role of narratives in shaping people's minds and behaviour has become an important area of research and debate. For example, hostile foreign actors are using sensitive identity-based features, such as gender, race, and ethnicity, as well as LGBTIQ+ related issues as a strategic angle to manipulate and divide societies. With the explosion of available data thanks to social media, Big Data, and AI, there is a wealth of information online that can inform researchers about emerging narratives and possible motivations that underpin certain trends. Tools such as the European Narrative Observatory (https://nodes.eu/) provide useful information to help guide and shape more strategic, tailored and impactful narratives.

Based on a stakeholder mapping of existing research initiatives and groups working on depolarisation and narratives (such as Enlightenment 2.0 at the European Commission's Joint Research Centre or the Information Integrity and Countering Foreign Information Manipulation and Interference Division at the European External Action Service), narrative patterns, meta-narratives, values, susceptibility to disinformation and narrative bridges should be identified, involving also citizens, to support targeted science diplomacy action complementing existing activities.

Action 1.3 (short- to medium-term)

Support the development of strategic, tailored and impactful narratives, combatting disinformation, and strengthening democracy with a focus on international research cooperation and science diplomacy action. One element could be an online guide providing 'tips and tricks' to apply to a variety of audiences and contexts (*to be implemented by the European Commission in close cooperation with the European External Action Service*).

Use science diplomacy to strengthen ties with trusted partner countries and international partners worldwide

Europe is not the only part of the world reflecting about the increasing role of science diplomacy. Many partners sharing our values are developing similar approaches. This does not only include major global powers and emerging economies, but also low- and middle-income countries. Given the fact that democracies and the rule of law as well as rules-based multilateralism are increasingly under threat, science diplomacy can provide an important avenue for inclusive engagement with trusted partners, in order to team up and act jointly, always keeping in mind that such partners may also be economic competitors of the EU.

In 2022, the EU's Foreign Affairs Council identified strategic partner countries, with whom the EU should conduct outreach as response to the effects of Russia's war of aggression against Ukraine. There is, however, no evidence that such identification so far has led to any science and technology agreements being signed, joint calls being launched, or science counsellors being posted as a result. Vice versa, the scientific community has strategic interests in partner countries, e.g., to remove administrative barriers for cooperation or to build a major research infrastructure abroad. In such cases the support from diplomats is needed.

To inform the EU's international engagement in science diplomacy, country-specific analyses and approaches should be developed, identifying actions and strategies that would contribute to the goals of the foreign and security policy agenda in line with the EU's open strategic autonomy, while taking research interests and the action plan on strategic priority countries into account. An example would be an analysis how to link targeted science diplomacy action to the role a country plays in global value chains and related EU dependencies. Such work could be initiated by the local EU Delegation, involving EU Member States' science diplomats, European researchers present in the respective country, and the private sector, who may contribute to these analyses thereby effectively using the available resources and capabilities.

Such analyses could enable a coherent EU-wide approach, as opposed to having conflicting positions amongst Member States or between Member States and the EU. Assessing countries or regions of joint interest for European science diplomacy action and the related topics (e.g., supporting researchers from Ukraine or targeted activities with the African Union), developing a roadmap process to earmark resources, allocating responsibilities and operationalising actions, and envisioning desired outcomes and impact, will also increase European visibility vis-à-vis external partners, raising the EU's trust and credibility. A close link to Global Gateway and the Neighbourhood, Development and International Cooperation Instrument (NDICI) should be foreseen.

Depending on the identified priorities, the EU should strategically use the full range of research policy instruments at its disposal (e.g., association to Horizon Europe, signature of science and technology agreements, posting of science counsellors, design of joint research calls, creation of joint research laboratories, establishment of scholarship programmes), including those targeted at specific world regions[63]. At the same time, science diplomacy should be informed by and built on research findings and initiatives developed by researchers in a bottom-up mode, including curiosity-driven research and people to people cooperation in research.

Action 1.4 (short- to medium-term)

Carry out country- or region-specific analyses as well as sectorial assessments to inform science diplomacy action with trusted partner countries and strategic international partners, harnessing local knowledge of EU delegations, Member State embassies, higher education institutions / universities, research-performing organisations, and diaspora scientists (*to be implemented by EU delegations and Member State embassies with the support of higher education institutions / universities, research-performing organisations, and diaspora scientists*).

Action 1.5 (medium- to long-term)

Establish dedicated EU science diplomacy initiatives vis-à-vis specific partner countries or regions to harness the soft power of science diplomacy. This could be implemented through Horizon Europe association agreements, Global Gateway, or other existing strategies or mechanisms such as the Partnership for Research and Innovation in the Mediterranean Area (PRIMA) or the AU-EU Innovation Agenda (*to be implemented by European Commission and European External Action Service*).

63. The Partnership for Research and Innovation in the Mediterranean Area PRIMA (https://prima-med.org/), the All-Atlantic Ocean Research and Innovation Alliance (https://allatlanticocean.org/), the Africa Initiative in Horizon Europe (https://euraxess.ec.europa.eu/worldwide/africa/news/africa-initiative-ii-horizon-europe-strengthens-eu-africa-cooperation) or the ARISE programme (https://arise.aasciences.app/) are existing good examples for such efforts.

Develop a holistic science diplomacy strategy towards countries not sharing our values

As one of the identified objectives for European science diplomacy is to keep communication channels open and use its potential soft power more systematically, it is necessary to create the mechanisms that enable diplomatic services to reach out into the scientific community, including to diaspora scientists and alumni of EU mobility schemes. This is particularly relevant in situations where diplomatic ties are severed or damaged, as scientists can and do serve as a conduit to maintain informal communication channels. For example, many European scientists have ongoing collaborations with Iran and know the situation on the ground very well, whereas the European External Action Service does not have a delegation in Teheran.

However, there will also be instances when science diplomacy needs to be used as a hard power, i.e., for shutting doors rather than keeping them open by applying restrictive measures, as happened in the wake of the Russian aggression against Ukraine. A coherent, strategic approach to such situations should be developed, replacing the ad-hoc reactions currently characterising the science diplomacy action of the EU and Member States as well as of the scientific community itself. For example, certain areas of research pertaining to addressing global challenges such as climate change, biodiversity loss, food security, health, should be considered to remain open for collaboration. Such a strategic approach, including the assessment of the impact of cooperation and non-cooperation on science and society at large should enable a holistic response, which may include both soft and hard power elements at the same time, being complementary also with research security and technological sovereignty policies.

Action 1.6 (short- to medium-term)

Develop a holistic science diplomacy approach towards countries not sharing our values and as a response to geopolitical events, combining a mix of soft and hard power approaches (*to be implemented by European External Action Service, European Commission and Member States*).

Maximise the potential of large research infrastructures for European science diplomacy

Large research infrastructures have always played a central role as "beacons" of science diplomacy. Places like CERN, SESAME, IIASA, ICTP, or Ny-Ålesund have an almost mythical meaning to everybody engaged in science diplomacy and regularly feature in political speeches. Large research facilities like the Large Hadron Collider or the Extremely Large Telescope inspire people and nations globally, thereby projecting Europe's values and ambitions. They are a testimony to what Europe can achieve if acting together, as no Member State could build them alone. In fact, in some cases, the price tag of these facilities is so high that they can only be built through global collaboration, as is the case of the International Space Station or the International Thermonuclear Experimental Reactor (ITER), which brings the EU, China, India, Japan, Korea, Russia and the US together, despite their ideological differences. Of course, large research infrastructures are not immune to geopolitics, and CERN's decision to discontinue cooperation with Russia is a case in point.

Besides their essential role in advancing the frontiers of science, inspiring young people to choose careers in STEM, but also social sciences and humanities, and attracting skilled researchers to the EU, large research infrastructures are key to keeping Europe's technological edge. CERN was not built to invent the World Wide Web, but it did, as the engineering challenges to build and run large machines often lead to unexpected innovations. Moreover, the question who has the biggest accelerator, the biggest telescope or the biggest synchrotron is a question of both prestige and technological leadership, as is the question who is the first to land on Mars or establish a base on the Moon. Europe needs to be ahead of the pack in this race. Right now, Europe hosts the most important research infrastructures worldwide[64], but competition is stiff and given the very long time frames of planning and building such infrastructures, Europe must be ready to invest in the long run. This includes also international infrastructures in the social science and humanities domains which offer comparative large datasets and can help us to understand human behaviour and societal processes that are of relevance for diplomacy, including cultural diplomacy. Last but not least, large European research infrastructures regularly receive visits of heads of state, royals, and other dignitaries, or serve as filming locations for blockbuster movies, thus being fundamental tools of Europe's soft power.

Action 1.7 (medium- to long-term)

Conduct a review on how the potential of large research infrastructures as platforms for excellent science, technological leadership, international collaboration and outreach can be leveraged for European science diplomacy (*to be implemented by the European Commission in close cooperation with the European Strategy Forum on Research Infrastructures (ESFRI), European large research infrastructures such as the EIROforum members, and international infrastructures / institutes hosted in Europe*).

64. Besides its own facilities, Europe is also hosting the headquarters of many global facilities such as the International Thermonuclear Experimental Reactor (ITER), the Abdus Salam International Centre for Theoretical Physics (ICTP), the Square Kilometer Array Observatory (SKAO), the International Institute for Applied Systems Analysis (IIASA), or the CGIAR network of international agricultural research institutes.

Recommendation 2:
Identify the appropriate balance between openness and restrictedness in international science cooperation

The motto "as open as possible, as closed as necessary" has become very popular in research and innovation policy circles in recent years. But how open is possible and how closed is necessary? We should work towards open and safe research cooperation rather than opposing openness with closure. Finding the right balance has become increasingly relevant as the EU strives to boost open science, academic freedom and research security at the same time. Ensuring international cooperation is open and safe, requires putting in place research security safeguards that are effective, but most importantly also proportionate. In some cases, restrictive measures are being applied to deal with geopolitical events, such as Russia's war of aggression against Ukraine, which is perfectly understandable from a political point of view but has repercussions on our ability to deal with common challenges, e.g., in Arctic research.

In addition, emerging and disruptive technologies such as artificial intelligence, quantum technologies, or biotechnologies are increasingly pervasive and impacting on our daily lives. They have the potential to offer huge benefits to society but can also undermine the values of human dignity, freedom, democracy, equality, the rule of law and respect for human rights on which the EU is founded. As technological leadership typically also translates into geopolitical power, this has profound impacts on foreign and security policies in the current, exceedingly polarised geopolitical environment, being used and misused by state and non-state actors, both in the civil and military sphere, at large scale or by dedicated groups. The misuse of such technologies to spread disinformation and undermine electoral processes in other countries is a case in point.

In the field of Digital Diplomacy, the United Nations have adopted the Global Digital Compact in September 2024[65], while at the EU level two sets of Council Conclusions[66] have already been approved, setting EU priority actions in this field. Given the multitude of activities in technology diplomacy and digital diplomacy, and to avoid duplication, the following actions will focus on the way science diplomacy can address the linkages between foreign and security policy and research and innovation policy by keeping research security considerations in focus while fostering spaces for dialogue and engagement.

Short- to medium-term	
Action 2.1	Form an inter- and transdisciplinary advisory group to reflect on how to best balance scientific interests with foreign and security policy interests
Action 2.2	Ensure that both science diplomacy and research security considerations are taken into account when designing strategies towards engaging (or not engaging) with specific countries in certain technology areas

65. https://www.un.org/global-digital-compact/sites/default/files/2024-09/Global%20Digital%20Compact%20-%20English_0.pdf
66. See for instance Council Conclusions on EU Digital Diplomacy (11406/22 and 11088/23)

Use scientific advice to assess the impact of restrictions on research and innovation

Policymakers often lack the knowledge necessary to anticipate the scientific or technical consequences and impacts of pursuing or interrupting cooperation in science and technology. Sanctions, embargoes, and other restrictive measures applied in the scientific realm, while necessary from a foreign and security perspective, may not only impact on our capacity to jointly address global challenges, but actually have repercussions on European competitiveness.

The report "*Align, Act, Accelerate" drafted under the leadership of Manuel Heitor clearly concluded the following: "In a changed and complex world, European companies and researchers need to operate in key markets and cooperate with the best scientists even when they are in countries with which the EU competes politically, economically, technologically or militarily. They need to do so precisely to avoid isolation and marginalisation, and to ensure Europe's future security, prosperity and competitiveness.*"[67]

At the same time, researchers and research organisations may not always grasp the broader geopolitical and security implications of their work. It is therefore necessary to find mechanisms that can integrate those aspects better in both directions. This requires awareness raising efforts, joint analysis of opportunities and risks and introducing, where necessary, safeguards that are effective and proportionate into science and technology related planning processes (e.g., towards the next EU Research and Innovation Framework Programme FP10), strategic economic policies (including the implementation of the Economic Security Strategy) as well as into foreign and security policy related decision-making processes, particularly when balancing technological sovereignty and strategic autonomy on the one hand and retaining a philosophy of open science on the other.

Indeed, science asks for and strives through sharing ideas, concepts and data, and open science ensures that scientific research is made as accessible as possible for the benefit of science, the economy and society at large. Sustainable and well-structured open access to the results and accomplishments of various European research and innovation instruments, such as the EU Research and Innovation Framework Programmes and COST Actions, should be regularly revisited to identify potential improvements and viable solutions within the existing framework initiatives, such as the European Open Science Cloud.
We need to strive for a more cohesive yet secure research environment that allows open scientific endeavours without compromising the EU's strategic interests. In addition, this focus can also help balance the need for technological sovereignty alongside the objective of facilitating continued scientific dialogue with both partners and competitors about technological progress in sensitive areas (cf. space and nuclear energy historically, or AI and quantum today).

Action 2.1 (short- to medium-term)

Form an inter- and transdisciplinary advisory group with experts from legal, technological, economic, security, area studies, and international relations fields to reflect on how to best balance scientific interests with foreign and security policy interests, e.g., assessing the impacts of restrictions, sanctions, and export controls on international scientific cooperation, or how to balance research security with open science (*to be implemented by European Commission and Member States, in cooperation with the future European Centre of Expertise on Research Security as well as existing science advisory structures such as the Commission's Scientific Advice Mechanism (SAM), European Science Advisors Forum (ESAF), and the European Academies Science Advisory Council (EASAC), as well as diplomatic services*).

67. European Commission (2024): Align Act Accelerate. Research, Technology and Innovation to boost European Competitiveness, https://op.europa.eu/en/publication-detail/-/publication/2f9fc221-86bb-11ef-a67d-01aa75ed71a1/language-en

Ensure holistic and coherent approaches between science diplomacy strategies and research security policies

The EU has an opportunity to articulate a coherent and ambitious approach for technological leadership that can guide in a proactive and protective manner both, its foreign and security policy and research and innovation policy, in strategic technology fields. Over the past few years, the EU has produced various sets of policy initiatives, strategies and tools towards its goals of open strategic autonomy and technological sovereignty (e.g. the Economic Security Strategy; the Digital Strategy; the Strategic Compass; Global Gateway; as well as technology-specific policies in quantum computing, high performance computing, chips, critical raw materials, etc.) spurring also the discussions on research security.

Research security is important as it provides the necessary guardrails for international scientific cooperation and ensures international cooperation in research and innovation remains open and safe. This may involve limiting international engagement in certain science and technology areas and/or with certain countries where risks cannot be sufficiently mitigated. Science diplomacy, in turn, complements this approach with a proactive engagement strategy seeking to get traction in areas where progress is possible and desired. For this reason, a future European Framework for Science Diplomacy complements the Council Recommendation on enhancing Research Security adopted in 2024. Taking a holistic approach to science diplomacy and research security will allow the EU to take a nuanced stance vis-à-vis international partners and competitors, considering also potential impacts on the next EU Research and Innovation Framework Programme (e.g., with respect to limitations in participation or association policies).

In the cooperation with countries governed by authoritarian regimes, diplomats might want to employ scientific cooperation as an avenue to keep engagement going even when diplomatic relations are hampered. In these cases, it will be even more important to have clear research security guidance in place, as the threat that rival countries pose may not only be geopolitical or military, but also scientific because the near absence of academic freedom in some of these countries may affect research integrity in a cooperation and pose risks to the personal safety of scientific partners.

Action 2.2 (short- to medium-term)

Ensure that both science diplomacy and research security considerations are taken into account when designing strategies towards engaging (or not engaging) with specific countries in specific technology areas, and provide guidance to higher education institutions / universities, research-performing organisations, projects and individuals on how to deal with risks in R&I cooperation to ensure a balanced approach that maximises opportunities while managing related risks (*to be implemented by European Commission, Member States, higher education institutions / universities, research-performing organisations, research funders*).

Recommendation 3:

Use science diplomacy to tackle global challenges and sustainably manage global goods and commons, including with partners in the South

Amidst rising global challenges, science diplomacy is a potential avenue to address multilateral crises and enhance cooperation among nations. To address these crises and challenges, it is necessary to not only anticipate geopolitical developments and scientific-technological developments, but to assess their combined impact and to incorporate these findings in the design of foreign and security policies. It is also important to coordinate and align the efforts of relevant stakeholders. In so doing, science diplomacy should also help the EU to position itself as the partner of choice for countries worldwide.

Short- to medium-term	
Action 3.1	Make greater use of science diplomacy to address global challenges and sustainably manage global goods and commons, thereby contributing to better position Europe's partnership offers
Medium- to long-term	
Action 3.2	Develop and deploy specialised science, innovation, education and training programmes in and with developing countries

Use science diplomacy strategically to link existing policy and diplomacy tools for more coherent European approaches to address global sustainability challenges

In today's world, grand societal challenges, especially those linked to sustainability, do not respect territorial borders. Most of these challenges call for mutually informed actions shared by and accessible from all parts of society, including policy, science, industry, and civil society actors. By leveraging the collective expertise of various stakeholders and creating commitment in the EU, including the European Commission, EU Member States, higher education institutions / universities, research-performing organisations, funding agencies, and diplomatic services, a collaborative, win-win approach involving multiple tiers of engagement can be developed in a strategic and coordinated way. This would also help in formulating targeted partnership offers to tackle those challenges together with countries and regions around the globe and help implementing the EU's economic foreign policy under the new Commission mandate. Its success will rely on the optimisation of existing resources, targeted engagement, and the integration of available expertise.

One way of optimising resources is to harness science diplomacy to leverage the potential of established policy tools. This should take precedent over designing new policy frameworks. As an example, the European Green Deal, climate action, and the Sustainable Development Goals (SDGs) are thematically linked and greatly benefit each other through an integrated approach. Boosting their links through instruments such as the Neighbourhood, Development and International Cooperation Instrument (NDICI) or Global Gateway (e.g., in topics like advanced materials), Mission Innovation and the Net Zero Industry Mission as well as Global North-Global South dialogues (e.g., on bioeconomy issues), can address pressing environmental concerns while unlocking economic, social, and geopolitical benefits and promoting peacebuilding. Such an integrated approach calls for research in critical fields and the promotion of science-based policy formulation to advance green technologies, sustainable practices, and climate resilience, and should be combined with efforts to increase public engagement and awareness of science diplomacy, thereby underpinning existing diplomacy strands such a climate, green or water diplomacy.

In addition, science diplomacy can help strengthening multilateralism, e.g. by developing universally acceptable solutions through international cooperation in research and innovation, which can then be used by diplomats negotiating international agreements. Such cooperation may also provide EU negotiators with relevant intelligence needed to inform their negotiation tactics in order to achieve optimal outcomes.

Action 3.1 (short- to medium-term)

Make greater use of science diplomacy to address global challenges and sustainably manage global goods and commons, thereby contributing to better positioning Europe's partnership offers, e.g. by harnessing the potential of science diplomacy to link established policy and diplomacy tools (*to be implemented by European Commission, European External Action Service, and Member States*).

Develop science diplomacy partnerships with the Global South

The scientific relationships with the Global South are becoming more complex and require new approaches to research and innovation collaboration, as can be demonstrated by the AU-EU Innovation Agenda[68]. Co-creating inclusive science, innovation, education and training programmes and providing grants for scientists in developing countries and emerging economies can increase their knowledge and career opportunities, particularly in the fields of science diplomacy and science advice to policy, thereby benefitting also the EU.

Taking inspiration from existing mechanisms like the INGSA-Africa Science Advice Skills Development Program[69], the African Research Initiative for Scientific Excellence (ARISE)[70], and the EU International Partnership Academy[71], the European Commission, Member States and relevant networks (e.g., EU Science Diplomacy Alliance) should develop science diplomacy activities in and with developing countries. Aiming to empower the research communities in these fields as well as to feed the policy advice pipeline, their specific needs have to be taken into account through joint development and implementation and a level playing field.

Such an effort would offer a unique opportunity to young scientists from developing countries and emerging economies to advance their capacities and career prospects. This will contribute to learning opportunities for EU stakeholders, fostering mutual understanding and strengthening Europe's position in the science diplomacy landscape. In fact, science diplomacy could create a new space for dialogue and action to redefine fairer and less asymmetrical rules in scientific collaborations and the sharing of knowledge between Europe and the countries of the South.

Action 3.2 (medium- to long-term)

Develop and deploy specialised science, innovation, education and training programmes in and with developing countries to foster a pool of science diplomats with whom Europe can engage (*to be implemented by the European Commission using existing programmes and initiatives towards education and training; Member States adapting their respective development programmes to fund bilateral or multilateral activities; networks like the EU Science Diplomacy Alliance through forming respective partnerships and preparing / implementing such activities within their remits with the support of higher education institutions / universities and research-performing organisations*).

68. https://research-and-innovation.ec.europa.eu/system/files/2023-07/ec_rtd_au-eu-innovation-agenda-final-version.pdf
69. https://ingsa.org/event/2023-sasdp/#:~:text=The%20objective%20of%20the%20SASDP,to%20foster%20their%20overall%20development
70. https://arise.aasciences.app/
71. https://webgate.ec.europa.eu/intpa-academy/

6.2.
Operational instruments

Recommendation 4:
Establish the structures needed for EU leadership in science diplomacy

The world is confronted with unprecedented global challenges threatening common resources that require coordinated international efforts. However, increased friction among great powers results in less cooperation on managing the global commons and presents significant hurdles to effective multilateral cooperation. Furthermore, traditional paradigms of multilateralism are being challenged and even undermined by escalating tensions among global and regional actors, posing a threat to international collaboration when it is most needed. Operational actions in this field will allow the EU to strengthen its diplomatic influence, promote cooperation among Member States and Associated Countries, and contribute to global solutions to complex and pressing issues. Additionally, engaging in science (in and for) diplomacy reinforces the EU's commitment to multilateralism and inclusive collaboration, furthering its position as a global leader in both science and diplomacy while promoting multilateral collaboration.

Short- to medium-term	
Action 4.1	Establish a taxonomy of EU science diplomacy
Action 4.2	Consider appointing science diplomacy coordinators in European and national diplomatic services
Medium- to long-term	
Action 4.3	Assess and monitor international scientific activities in support of a European science diplomacy strategy including through consultative platforms
Action 4.4	Establish a mechanism based on a Team Europe approach to co-define topics of joint science diplomacy operation with relevant partners in regions of interest for Europe

Map EU science diplomacy actors, organisations and their interlinkages

To develop a clear understanding of how to better operationalise science diplomacy strategies, it is first important to map, classify and characterise the existing groups and entities that are currently (or have the potential to become) key science diplomacy actors and organisations for the EU. This would include individuals and organisations at EU level, within EU Member States but also those based outside the EU, including the networks of science attachés, alumni of mobility schemes, and diaspora scientists. Scientific diaspora could include EU researchers (in academic and non-academic environments) settled abroad, non-EU researchers settled in the EU, non-EU researchers who studied in the EU and then returned home, etc[72]. With possibly different objectives, capacities and even loyalties, this plethora of actors is currently contributing to science diplomacy in a scattered, non-coordinated and potentially inefficient way. A better overview regarding these key actors will also shed light on successful science diplomacy actions that could be scaled up or modified while bearing in mind the EU's science diplomacy objectives and the respect for the subsidiarity principle and the national sovereignty of Member States.

While there is a wealth of networks, initiatives and resources, there is a lack of a comprehensive overview. This gap is both a weakness and an opportunity to systematise knowledge on science diplomacy. When addressing the gap, it is important to avoid duplication of efforts. Moreover, obtaining a more systematic knowledge of the EU's science diplomacy landscape is fundamental to understanding where the EU's efforts have the greatest chance of success. Such an overview can help determine to what extent policymaking venues incorporate science into their decision-making processes and how that has evolved over the past decades. Additionally, it can assess the extent of the EU's influence in each venue.

Action 4.1 (short- to medium-term)

Establish a taxonomy of EU science diplomacy by mapping target groups, actors and descriptors (e.g., institutional, geographical, thematic) and their interlinkages (*to be implemented through an interdisciplinary study or part of a Coordination and Support Action that could be funded by the European Commission*).

72. For a specific recommendation on engaging with scientific diaspora and alumni groups, please see recommendation 7.

Consider appointing science diplomacy coordinators in diplomatic services

Having a focal point for science and technology in ministries of foreign affairs is essential, as it ensures that somebody follows the increasing number of science and technology related files from a diplomatic standpoint, it provides diplomats with the famous "single number to call" in their own ministry when faced with a scientific issue, and it provides an interface with the academic world, helping to formulate questions from diplomats to scientists and to translate scientific messages to diplomats. Such coordinators do not need to know all the answers, but they need to know whom to ask.

In recent years, many Member States have strengthened the scientific-technological capacities in their ministries of foreign affairs already. However, there is still one third of the Member States that do not have anybody in charge of science in their diplomatic service at all. The European External Action Service featured the position of a Science & Technology Advisor between 2020 and 2022, filled with a secondment from the Joint Research Centre (JRC), but the position was not retained. Such a position would have the natural role of coordinating those in charge of science diplomacy in the ministries of foreign affairs of Member States.

In addition, setups in ministries of foreign affairs in the EU are currently very diverse and range from Ambassadorial positions such as Special Envoys and Ambassadors-at-large, to Chief Scientists or Advisors, to in-house research or science diplomacy units, to "classic" international science cooperation units. While the diversity of these setups reflects the diversity of institutional cultures in Europe, it is important to ensure that these roles have a science diplomacy and possibly science advice remit.

Action 4.2 (short- to medium-term)

Consider appointing science diplomacy coordinators in European and national diplomatic services *(to be implemented by European External Action Service for the EU level as well as ministries of foreign affairs for the Member State level).*

Assess and monitor international scientific activities in support of a European science diplomacy strategy

Assessment, monitoring, and evidence-based analyses must underpin any viable science diplomacy framework and strategy. The EU science diplomacy community should achieve a common understanding and be pragmatic in approaches or practices, flexible and strategic in a long-term perspective. Learning from other countries and gathering intelligence should be part of such endeavour, considering that the EU is also the target of the science diplomacy of others.

Learning from the past is fundamental for devising adequate strategies for tomorrow. Examining past trends, causal factors, and models can provide insight into what may influence, constrain, or control the future. Similarly, a scan of the present can identify emerging issues that may need to be considered. Results can be used as the basis for foresight in science diplomacy to anticipate future challenges, opportunities, and strategic directions, and can be framed into concrete recommendations, e.g., for the consideration of future multilateral agreements.

The involvement of European scientific diasporas in third countries in such analyses could be valuable as they often have unique insights and rare (field-)work experience in countries which are of interest to the EU. Some of them may have even better insights than diplomats, who regularly change duty stations, and can therefore assist in further developing scientific ties between the EU and the country they are in or advise on the scientific and geopolitical context in which they operate.

Action 4.3 (medium- to long-term)

Assess and monitor international scientific activities in support of a European science diplomacy strategy including through consultative platforms of volunteering experts with substantial experience about certain third countries or world regions (e.g., alumni of EU mobility schemes or scientific diasporas) to support evidence-informed policymaking (*to be implemented by European Commission or European External Action Service by launching an expression of interest for experts and creating an online platform with restricted access and/or via a study, dedicated expert meetings or as part of a Coordination and Support Action*).

Establish a mechanism based on a Team Europe approach to co-define topics of joint science diplomacy operation with relevant partners in countries or regions of interest for Europe

Global goods and commons encompass resources that are shared by all nations. Given that they transcend national borders, they inherently require joint approaches (both scientific and political). However, most policy agendas are traditionally measured and implemented at the national level, leading to fragmented and often insufficient strategies to manage shared resources effectively, also known as the "tragedy of the commons"[73]. Unilateral actions, while necessary, are insufficient to address the complex and interconnected challenges that these resources face. Science diplomacy offers a pathway for nations to collaborate on these issues, creating common frameworks and strategies.

The role of science diplomacy also remains critical in securing international cooperation when responding to emergencies, even under highly competitive conditions. Hence, effective crisis preparedness in a globalised and inherently uncertain world is conditional upon a competent understanding of systemic risks.

Finally, the evolving landscape of global politics has empowered developing countries to assert their perspectives on global governance within platforms like the United Nations and the G20. Yet, the prevailing global order continues to be widely perceived as imposed by the West. The EU needs to recognise the increasing agency of the Global South in today's multipolar world for their diplomatic as well as scientific efforts to achieve effective multilateralism on a level playing field.

The EU has an opportunity to create and empower structures that can address this at the European level. It can do so by strengthening science diplomacy within the European External Action Service and across the EU through a Team Europe approach, as well as on the global level by creating initiatives and platforms for both diplomatic and scientific actors. Assessing topics and countries/regions of joint European interest, a roadmap process to earmark resources, operationalise actions, and plan resources and responsibility will increase European visibility vis-à-vis external partners, raising trust and credibility and simplify communication among all actors.

Developing such a mechanism would require:

a. Defining concrete themes for science diplomacy interactions, relevant to all collaborating partners, inside and outside the EU; these themes may be defined considering the level of maturity of different issues that are prioritised in the international agendas as they are relevant to all collaborating partners and should be underpinned by relevant research[74];
b. Identifying partners in concrete countries/regions for joint expressions of interest or actions by the EU institutions and actors in EU Member States;
c. Establishing intra-EU coherence in selecting meaningful cases to advance actions specified in items (a) and (b) above;
d. Defining pathways for short-, medium and long-term partnerships, and envisioning desired outcomes and impact. The appointment of special envoys may help advocate for specific EU science diplomacy priorities and ensure coherence and visibility; and
e. Providing creative new formats for exchange and the development of activities such as fora for piloting advanced policy innovation networks on key global risks, e.g., in the fields of health, emerging and disruptive technologies, and climate change, as well as the management of areas beyond national jurisdiction, bringing together stakeholders such as policymakers, diplomats, higher education institutions / universities, research-performing organisations, and civil society actors.

Action 4.4 (medium- to long-term)

Establish a mechanism based on a Team Europe approach to co-define topics of joint science diplomacy operation with relevant partners in regions of interest for Europe *(to be implemented by European External Action Service, European Commission and EU Member States in concertation with stakeholders and partner countries).*

73. See https://laviedesidees.fr/Elinor-Ostrom-Fighting-the-Tragedy-of-the-Commons
74. See recommendation 9

Recommendation 5:
Foster science for policy and foresight ecosystems for more effective and resilient foreign and security policies

Developing evidence-informed foreign and security policies and reacting to science and technology trends that intersect with such policies have become crucial for the EU to navigate a complex geopolitical landscape and to strengthen its position as a global power. The integration of science and technology into foreign and security policy should go beyond the mere input of knowledge. However, a successful integration of science advice and foresight into foreign and security policy requires a deep understanding and collaboration between the scientific and diplomatic communities.

Short- to medium-term	
Action 5.1	Harness multi-disciplinary think tanks for strategic science and technology foresight in foreign and security policies
Medium- to long-term	
Action 5.2	Review the scientific advice mechanisms in the European External Action Service and Member State ministries of foreign affairs and develop recommendations for their improvement
Action 5.3	Establish a framework for science diplomacy support to crisis management

Enhancing strategic foresight for foreign and security policies

Regulations take time, especially in a consensus-based structure like the EU. In a rapidly changing world with many other players willing to exercise influence, EU and Member States need to be able to develop capabilities and mindsets to identify quickly the challenges and consequences of global scientific and technological trends and their impact on international relations and agree from a strategic point of view on the challenges and the way forward. This will allow convergence of national legislations and level the ground for EU regulators to move quickly and deliver fast. Not doing so will give the EU's international competitors room and time to impose their narrative.

The European Commission has a history of developing and applying strategic foresight. This has gained new momentum since 2019 with the appointment of a Commissioner with responsibility for this topic[75]. The Commission manages internal and external foresight networks, as well as a methodological competence centre and issues annual Strategic Foresight Reports. There is also an interinstitutional programme (ESPAS) involving the European Commission, the Council of the European Union, the European Parliament, and the European External Action Service[76].

In addition, the European Commission launched in February 2024 the foresight platform futures4europe[77] to support engagement with strategic foresight activities for Horizon Europe. It brings together foresight experts and R&I policymakers from across the EU, collecting national and European foresight projects and promoting futures literacy through educational material and relevant newsletters.

These activities provide a basis to further develop science and technology foresight capacity to inform foreign and security policies, both for predicting short-term developments and the exploration of mid- to long-term futures. Making use of cutting-edge methods like crowdsourced forecasting or judgmental forecasting to support foresight processes could prove especially useful for complex or "wicked" problems involving many sectors or situations where there is not enough data to make predictions based on exact models and previous data. There is a large number of foresight tools and methods that can be used to explore complex challenges and/or systems and which would benefit both science diplomacy and diplomacy more generally.

Action 5.1 (short- to medium-term)

Harness multi-disciplinary think tanks for strategic science and technology foresight in foreign and security policies, building on the ongoing work on strategic foresight in the EU and making use of cutting-edge methodologies (*to be implemented by EU institutions and the European External Action Service in cooperation with S&T foresight actors like GESDA[78], as appropriate*).

75. https://commission.europa.eu/strategy-and-policy/strategic-foresight_en#:~:text=Strategic%20Foresight%3A,%2C%20policy%2Dmaking%20and%20preparedness
76. https://www.espas.eu/
77. https://www.futures4europe.eu/
78. Geneva Science and Diplomacy Anticipator (https://gesda.global/)

Ensure robust science advisory ecosystems for foreign and security policy

The Council Conclusions on strengthening the role and impact of research and innovation in the policymaking process in the Union of 2023 clearly stated that science should be a key part of the process of preparing political decisions, as well as for implementing, evaluating and communicating them[79]. This applies to all policy areas, including foreign and security policies.

In fact, Europe is home to diverse science advisory ecosystems that have produced many reports and documents on issues of high relevance to foreign and security policies. However, the extent to which robust scientific expertise is integrated into the strategy and practice of the Common Foreign and Security Policy and Common Security and Defence Policy is unclear, as are the roles and the influence of different actors (e.g., foreign and security policy think tanks, formal and informal expert and advisory groups, etc.). While there are diplomacies which by the nature of their subject have a long-standing tradition in working with science (e.g., Climate Diplomacy, Green Diplomacy, Arctic Diplomacy, Ocean Diplomacy, Space Diplomacy), this is less evident in other areas such as trade policies or sanction regimes.

While some ministries of foreign affairs have established proper science advisor positions (e.g., Spain, the Netherlands, Estonia, Lithuania) and others count on in-house think tanks or research units (e.g., Finland, Bulgaria), many ministries do not have proper science advisory bodies facilitating the interaction with the scientific community. This became particularly evident during the COVID-19 pandemic when, for example, decisions on the closure of borders depended on robust scientific advice and the related mechanisms. The pandemic also exposed the role of social sciences and humanities, e.g., regarding the importance of societal and faith-based values and the behaviour of people.

Action 5.2 (medium- to long-term)

Review the scientific advice mechanisms in the European External Action Service and Member State ministries of foreign affairs and develop recommendations for their improvement, building on lessons learnt from existing science advice mechanisms in the Commission and Member State governments (*to be implemented by European External Action Service and Member State ministries of foreign affairs*).

79. https://data.consilium.europa.eu/doc/document/ST-16450-2023-INIT/en/pdf

Utilise science diplomacy for improving crisis management

The EU aims to strengthen resilience, foster global cooperation, and ensure a proactive response to multifaceted emergencies. It has been recommended by the Commission's Scientific Advice Mechanism (SAM) to "provide integrated, holistic, and transdisciplinary scientific advice in crises because of the cross-sectoral nature of crises, to integrate a knowledge hub into the governance framework of crisis management to provide essential scientific, legal, organisational, and practitioners' knowledge and to define schemes for fast allocation of emergency research funding to trigger rapid research development to solve aspects of the crisis"[80].

Based on long-standing and resilient networks of researchers, science diplomacy can play an important role in this context, as it can help identifying and leveraging at short notice expertise across national borders, especially on complex and unexpected, rapidly emerging crises, where inter- and transdisciplinary expertise is needed. One such example was the eruption of the Icelandic volcano Eyjafjallajökull in April 2010 that caused enormous disruption to air travel across Western Europe. This emergency required, e.g., Icelandic volcanologists to work with Italian atmospheric modellers, French economists and British aircraft turbine engineers, across national and disciplinary borders to find a way to deal with this cross-border crisis, which was not at all straight-forward, neither scientifically nor organisationally.

The potential of science diplomacy could further be harnessed through supporting multilateral action such as the implementation of the UN Sendai Framework for Disaster Risk Reduction[81], aiming to prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response/recovery, and thus strengthen resilience. Finally, humanitarian crises need targeted, time-critical response, often across nations, cultures and fields of expertise, regardless of whether these crises are the result of natural or "man-made" disasters.

The above activities could complement existing initiatives, such as the Community for European Research and Innovation for Security, the European Partnership for Pandemic Preparedness, or the European scientific partnerships for natural and anthropogenic hazards (ENHSP-ARISTOTLE and EAHSP), which deliver authoritative 24/7 scientific expert advice and services to the Emergency Response Coordination Centre (ERCC) on ongoing disaster risk emerging from natural and technological hazards, as well as existing knowledge exchange activities like the Union Civil Protection Knowledge Network.

Action 5.3 (medium- to long-term)

Establish a framework for science diplomacy support to crisis management (*to be implemented by the European Commission, in collaboration with EU Member States, higher education institutions / universities, research-performing organisations, research funders, and diplomatic services*).

80. European Commission (2022): Strategic crisis management in the EU – Improving EU crisis prevention, preparedness, response and resilience, Publications Office of the European Union, https://data.europa.eu/doi/10.2777/517560
81. https://www.undrr.org/implementing-sendai-framework/what-sendai-framework

Recommendation 6:
Strengthen the role of science and technology in diplomatic representations

Science and technology play an increasing role in diplomatic representations, going beyond the classic approach of promoting the EU or individual Member States as a place to do research. The gathering of intelligence about scientific and technological developments in the host country becomes more and more important, as is the provision of scientific advice to staff in the embassy or delegation. Diplomatic representations provide a unique space for facilitating the development and implementation of Team Europe approaches.

This could be operationalised rapidly through the assignment of clear mandates to Heads of Missions and the pooling of existing resources and then be strengthened over time through tapping into a wider pool of individuals and targeted training[82]. Moreover, embassies could encourage the formation of "science diplomacy clubs" fostering collaboration and knowledge-sharing among science counsellors and scientific communities in the respective host country, cooperating also with existing science diaspora networks to broaden their reach and impact.

This would contribute to making the EU a world leader in science diplomacy, based on its outstanding resources of a strong and internationally well-connected, multi-linguistic scientific community and the wealth of diplomatic expertise of its 27 Member States – each with their own regional priorities and global network of contacts. Such leadership in science diplomacy could help the EU speak with one voice and play a more prominent role in multilateral fora.

Short- to medium-term	
Action 6.1	Create networks and synergies between existing European science and technology attachés, revisit their roles and required competencies, and work towards a new generation of attachés by building a pool of future science diplomats
Medium- to long-term	
Action 6.2	Consider including science diplomacy as an element in the mission letters of EU and National Ambassadors

82. For specific related training recommendations see recommendation 8

Identify synergies and work towards a new generation of science diplomats

Scientific and technological expertise should be more readily available in EU delegations and Member State embassies through a well-connected pool of science and technology attachés linked with the development of networks and collaborations across the scientific and diplomatic communities. This would help position Europe at the level of other international players who are currently more strongly endowed with science-diplomacy networks and therefore more capable of leading certain science and technology fields and attracting resources (e.g., human, technological, financial).

The first step would be to leverage the existing resources, encouraging networks across current attachés in EU delegations and Member State embassies and identifying relevant synergies. Taken together, the European Commission and Member States have deployed some 500 science, technology, innovation, and digital attachés around the world, which provides an enormous and partly untapped resource for European science diplomacy, also in comparison with the US and China. A better overview of the European-wide capacities would help governments to take informed decisions on where and how many science diplomats to deploy.

The next step would be to revisit the role of science and technology attachés, develop a framework of related science diplomacy competencies and build a wider pool of science diplomats including through the recruitment of Seconded National Experts. New pathways could be offered for scientists interested in transitioning into science diplomacy careers while ensuring their continuous access to avenues for promotion and recognition[83].

Action 6.1 (short- to medium-term)

Create networks and synergies between existing European science and technology attachés, e.g. via dedicated science diplomacy clubs, revisit their roles and required competencies, and work towards a new generation of attachés by building a pool of future science diplomats (*to be implemented by European Commission, European External Action Service and EU delegations, and Member State ministries of foreign affairs and embassies*).

83. For additional recommendations on the relevant training needs, please see recommendation 8.

Promote science diplomacy in the mission letters of EU and National Ambassadors

The progressive development and implementation of a European Framework for Science Diplomacy requires a change of culture amongst the scientific and diplomatic communities, for which the recognition of the relevance of science diplomacy beyond mere thematic approaches (digital, climate, vaccine, etc.) within diplomatic missions is an essential step.

Science diplomacy will often constitute a relevant element of a diplomat's job portfolio. The EU and its Member States could set the example by starting to include science diplomacy as part of the mission of their delegations and embassies. Such an approach would facilitate that science, technology and innovation components are systematically included where relevant in broader diplomatic activities, that best practices are identified and extrapolated and that effective communication channels are established between headquarters and representations and across representations.

Action 6.2 (medium- to long-term)

Consider including science diplomacy as an element in the mission letters of EU and National Ambassadors (*to be implemented by: European External Action Service and Member State ministries of foreign affairs*).

6.3.
Enabling instruments

Recommendation 7:
Create and connect science diplomacy communities in Europe and beyond

A successful integration of science advice into foreign and security policy as well as the strategic use of research and innovation in the diplomatic toolbox of the EU requires a deep understanding and permanent dialogue between the scientific and diplomatic communities, and the development of joint activities and spaces – both through established and new EU policy tools – in which scholars and practitioners can meet, collaborate, and exchange relevant knowledge.

Science diplomacy is already practiced across the EU and beyond at different levels and through the engagement of several stakeholder groups. The EU and its Member States have appointed science counsellors/attachés within their diplomatic representations in partner countries and regions, have well established diaspora communities in third countries and developed science networks and programmes with international participation. However, European science diplomacy is currently scattered, neither harmonised nor coordinated, thereby leading to overlaps and gaps.

By leveraging the collective expertise of various stakeholders including the European Commission, EU Member States, diaspora communities, higher education institutions / universities, research-performing organisations, funding agencies, and diplomatic services, a collaborative, win-win approach involving multiple tiers of engagement can be developed. Its success will rely on the optimisation of existing resources, targeted engagement, and the integration of available expertise and know-how. We need to build on existing initiatives but at the same time streamline efforts, create fora and trusted places for dialogue to increase efficiency and nurture a new generation of science diplomats.

Short- to medium-term	
Action 7.1	Establish a virtual European Science Diplomacy Platform
Action 7.2	Organise European Science Diplomacy Conferences in regular intervals as well as targeted events
Action 7.3	Develop and fund programmes for refugee scholars and researchers at risk
Medium- to long-term	
Action 7.4	Allocate specific funding to assist in the creation and sustained operations of European scientific diaspora associations

Create a European Science Diplomacy Platform

In order to build up and integrate the EU science diplomacy community in the long run, and to provide an interaction space for continuous knowledge generation, community building and best practice sharing in and beyond the EU, a common platform, serving as a hub for science diplomacy should be created. This virtual European Science Diplomacy Platform would act as an "umbrella" as well as a gateway with interconnected nodes, enable dialogue inside the EU as well as with associated and third countries (or regions), support the development of evidence-based science diplomacy strategies (by facilitating collaboration and the co-design of ideas), and systemise interactions. The platform would serve as a centre of gravity for various thematic and regional networks of specialised experts, whose work might be coordinated by experienced knowledge curators.

The platform would support the development of an organised European science diplomacy community at large. It would improve access to relevant information not only for both, the scientific and diplomatic communities but for all science diplomacy actors and would help to consolidate the vast knowledge and experience available. Due to the sensitive nature of the topic, the platform should involve diverse stakeholders initially solely from the EU (or the European Research Area, as far as the academic side is concerned) but in the longer run it could reach out towards trusted partner countries from all over the world. By facilitating cooperation and fostering a common understanding, the platform could pave the way for new alliances and partnerships and as such contribute to strengthening Europe's soft power.

Long-term sustainability is key to avoiding the danger of lack of continuity. This can be ensured by providing adequate funding on the one hand and curating attractive content and organising activities and services for the scientific and diplomatic communities on the other. The platform could be built around the following pillars and services, taking into account current work carried out by the EU Science Diplomacy Alliance:

- **Information sharing and communication:** In addition to providing basic information about science diplomacy, research and innovation systems in Member States and third countries and their international strategies, a regular newsletter or news portal (featuring relevant information about seminars, conferences, funding opportunities, etc.) could keep the members engaged and informed. A toolbox with practical examples (e.g., harmonised templates, recommendations for country/culture-specific negotiations) would provide further support for interested users.
- **Training and career development:** The platform could contain specific European science diplomacy training modules for scientists and diplomats (building on the S4D4C training of the EU Science Diplomacy Alliance already available online[84]). This would help building a talent pool of European science diplomats. Career development can be facilitated by gathering and sharing training and career development modules including case studies, summer schools and other relevant training programmes via the platform.
- **Community-building:** Networks with a regional or thematic focus, tech hubs, alumni/diaspora associations, and science diplomacy clubs should be initiated, listed and supported via the platform. Platform functionalities could facilitate networking, learning, scouting, and communication among and beyond communities. The efficiency of these functions could be further enhanced with the help of experienced knowledge curators.
- **Database of experts and best practices:** The platform could include a searchable database of experts alongside their short resumés (e.g., science counsellors, diaspora scientists, alumni of mobility schemes, science diplomacy clubs), in line with Global Data Protection Regulation requirements. This would be useful for individuals or organisations looking for expertise to easily find potential speakers, interlocutors, and contacts. A collection of scalable best practice examples in the field of science diplomacy could be an interesting addition.

Even if the first impetus should come from the European Commission, the platform can only work in an efficient and sustainable way if all relevant stakeholders on all levels contribute to its proper functioning. One issue to be considered in this context is the question of multilingualism. Activities and information in EU languages used around the world could provide the EU with comparative advantages vis-à-vis other international actors.

Action 7.1 (short- to medium-term)

Establish a virtual European Science Diplomacy Platform via a Coordination and Support Action under Horizon Europe (*to be implemented by a consortium funded by the European Commission*).

84. https://www.science-diplomacy.eu/online-course/

Create fora for discussing science diplomacy

There is a need to create fora such as conferences, workshops, and open days, to discuss science diplomacy – including with the wider public – in order to foster awareness, mutual understanding and trust building. It will be of utmost importance that such fora are attractive for both the science and diplomacy communities. There is no point in discussing science diplomacy with just scientists or just diplomats being in the room.

The initiative by the European Commission to organise large **European Science Diplomacy Conferences** every two years in cooperation with the respective Council Presidency should be continued and their funding secured. They should become flagship events, thereby creating visibility also at the global scale by providing a platform for discussing major developments in science diplomacy and advancing the field more generally, while allowing discussions among the main European stakeholders.

The organisation of '**Science Diplomacy Open Days**' could be a very flexible and cost-effective format to ensure a broader outreach towards society and to showcase the added value of science diplomacy activities by discussing and presenting concrete practical examples or case studies. Open Days could address various science diplomacy topics and stakeholders in diverse formats at regional, national or European level, with the possible involvement of third countries and/or regional international organisations. They can also be a tool to foster science diplomacy in those Member States where science diplomacy is not yet very well developed. In contrast to larger scale science diplomacy conferences organised by the European Commission, these events would target smaller groups in more specific thematic or regional contexts, taking native languages into account. They could also be organised in association with third countries and/or regional international organisations.

Finally, it would be important to capitalise on the expertise of the EU Science Diplomacy Working Groups to help overcome the current division between the scientific, diplomatic, and policymaking communities as they have succeeded precisely in bringing these communities together to reflect on existing challenges and potential solutions and ways forward. The European Commission should think about the best ways to take advantage of the expertise embedded in the working groups towards the implementation of a European Framework for Science Diplomacy.

Action 7.2 (short- to medium-term)

Organise European Science Diplomacy Conferences in regular intervals that could also monitor progress of a European Framework for Science Diplomacy (*to be implemented by European Commission in cooperation with the Member State holding the Presidency of the Council of the EU*); as well as **targeted events** such as workshops or Open Days on emerging thematic topics and/or targeted at specific stakeholders, countries or regions (*to be implemented by interested stakeholder organisations*); and a **hybrid information day to disseminate the main outcomes of the European Framework for Science Diplomacy**, to raise awareness about the recommendations and to create commitment for the implementation of the proposed actions (*to be implemented by European Commission with the support of working group members*).

Support researchers at risk

The EU is a safe haven for many researchers that had to leave their home countries because of oppression, war, and other circumstances. Besides the humanitarian aspect, and acknowledging the risks of brain drain, it is important to keep in mind that the EU has an interest in attracting scientific talent from abroad. Hence, it is important to create and reinforce funding opportunities for researchers in exile or academics at risk. The possibility to apply for a small grant, travel fund, fellowships, relocation subsidies or article-processing fee subsidies can already make a big difference for this vulnerable group of scientists. As the influx of refugee scholars and researchers at risk is likely to grow given the geopolitical circumstances, it is important to move from ad-hoc schemes targeted at the "crisis of the day" to a more strategic, integral support for displaced scientists.

Therefore, specific continuous support programmes of critical mass for refugee scholars from around the world and researchers at risk should be developed, such as fellowships for displaced scholars at partnering higher education institutions / universities within the European Research Area. This is especially relevant also for women as well as marginalised groups, as they are often exposed to particular risks, especially in armed conflicts, and are underrepresented in many related funding programmes. Inspiration and learnings can be taken from initiatives such as Inspireurope – Support Researchers at Risk[85], MSCA4Ukraine[86], ERA4Ukraine[87], Foster cooperation for improving access to protection (SAFE)[88], Science4Refugees[89], as well as national initiatives like the Philipp Schwartz Initiative[90] and the PAUSE Programme[91].

Action 7.3 (short- to medium-term)

Develop and fund programmes for refugee scholars and researchers at risk (*to be implemented by European Commission, Member States as well as academies, higher education institutions / universities, research-performing organisations, and research funders*).

85. https://sareurope.eu/what-we-do/inspireurope-support-researchers-at-risk/
86. https://sareurope.eu/msca4ukraine/
87. https://euraxess.ec.europa.eu/ukraine
88. https://migrant-integration.ec.europa.eu/integration-practice/safe-project_en
89. https://euraxess.ec.europa.eu/jobs/science4refugees
90. https://www.humboldt-foundation.de/en/apply/sponsorship-programmes/philipp-schwartz-initiative
91. https://www.programmepause.fr/en/

Engage with the EU scientific diaspora within other Member States and in third countries as well as third country scientific diaspora in the EU

This action acknowledges the role that internationally mobile scientists can play in science diplomacy. Three cases are here considered: a) the EU scientific diaspora in third countries, b) the EU scientific diaspora within Member States and c) the scientific diaspora of third country nationals present in the EU. Scientific diaspora associations play an important connecting role between EU researchers hosted in a third country and the EU. Similarly, scientific diaspora networks of specific EU Member States within the EU itself are an important link between their host country and their home country and can help strengthen pan-European scientific collaborations.

Embassies can play a pivotal role in encouraging and maintaining such networks. Member State embassies should coordinate with EU missions, where available, to identify interested parties and facilitate the establishment of new science diplomacy networks and assist in coordinating existing ones where needed, in close cooperation with relevant NGOs such as scientific professional organisations[92].

Such 'bottom-up' initiatives should be encouraged through appropriate funding schemes. Assistance and seed-funding by EU delegations and Member State embassies in third countries could also be provided where such associations do not yet exist or where they need support, while being mindful of not acting in a 'top-down' manner. EU scientific diaspora abroad could provide, for example, advice about their host country. One pilot expert group could be launched with the EU scientific diaspora in China.

It is also important to acknowledge the population of third country nationals in the EU research community itself. These researchers provide a direct link with their home countries and can help develop international collaboration or assist in understanding the respective research landscape. This can be particularly important for EU scientists working in, or on, specific third countries. Last but not least, they have the potential to become ambassadors for European values when returning to their home countries.

Action 7.4 (medium- to long-term)

Allocate specific funding to assist in the creation and sustained operations of European scientific diaspora associations in third countries (*to be implemented by European Commission, EU delegations and/or Member State embassies*).

92. An example of such a programme is CONNECTS-UK (https://connects-uk.org/), an EU-funded (Horizon Europe) initiative aiming at bringing together the communities of EU researchers in the UK and to strengthen EU-UK relations, amongst other objectives.

Recommendation 8:

Train and empower Europe's current and future science diplomacy professionals

Science diplomacy is entering a more competitive phase, with new challenges and new players, with many countries around the world investing in their science diplomacy capacities. If the EU and its Member States are to be at the forefront of science diplomacy, they need to develop significantly their human capacity in this realm. For the European Union and its Member States, capacity-building will be essential (1) from a scientific perspective: to develop the academic potential and adequate career paths, taking into account gender considerations, and retain Europe as a hub for excellent science diplomacy research; (2) from a diplomatic perspective: to better understand the increasing significance of scientific-technological developments on international relations and help current and future diplomats to navigate these both in headquarters and duty stations abroad; (3) to support the necessary trust-building between the academic and diplomatic communities (e.g., for better and targeted policy advice).

There is a lot that actors in the EU can build upon since very good work has been initiated in the realm of science diplomacy research and education, including through past EU Research and Innovation Framework Programme projects. However, significant gaps remain, and momentum needs to be regained. It is necessary to further advance and consolidate learnings, to develop best practices, and to ensure long-term quality. To build and maintain excellent capacities for science diplomacy in Europe also requires adequate international touchpoints. Here different stakeholder groups and networks need to be activated to intensify global outreach. Some key structures like the EU Science Diplomacy Alliance are already in place which should be further supported and capitalised on, given the key expertise and diverse communities of knowledge and practice they encompass.

Short- to medium-term	
Action 8.1	Map existing science diplomacy training offers with a view to identifying gaps
Action 8.3	Offer preparatory training on EU science diplomacy for all approved EU-funded research projects with an international dimension
Action 8.5	Propose a targeted MSCA Science Diplomacy Doctoral Network project to stimulate the interest in science diplomacy among MSCA scholars and alumni and beyond, and consider developing also Erasmus+ activities on science diplomacy
Medium- to long-term	
Action 8.2	Develop a joint European competency framework for science diplomacy and create/adopt recognised training certificates
Action 8.4	Include science diplomacy modules in the curricula of diplomatic academies, including the EU Diplomatic Academy, and provide science diplomacy training to diplomats
Action 8.6	Create science diplomacy courses/curricula under the EU umbrella and establish dedicated chairs or professorships

Formalise the science diplomacy training environment

Many science diplomacy related education and training activities have already been developed and implemented in recent years. When assessing previous and current approaches to capacity building in the field of science diplomacy there is still, despite numerous excellent offerings, a wide dispersion and a lack of established networks due to the innovative nature of the topic. Hence, a mapping of existing educational, professional and lifelong training activities in science diplomacy throughout the education/training ecosystem is needed, as it can be difficult for stakeholders to find tailored offers.

A competency framework should address the missing key structural elements of education and training in science diplomacy to provide more coherence and strategic orientation. It could ensure that all training activities will contribute to commonly agreed learning outcomes and to the strategic goals of the EU, thus providing coherence and strategic guidance. Corresponding EU-wide recognised certificates can support continuous quality management and assurance and deepen the current and future impact for lifelong science diplomacy training and its successful implementation in academia, diplomatic services, and business (including SMEs), especially if they are sustainably integrated into the future establishment of the EU concept for micro-credentials[93] to certify the learning outcomes of short-term learning experiences in the context of lifelong learning.

Action 8.1 (short- to medium-term)

Map existing science diplomacy training offers with a view to identifying gaps and assessing the role of different stakeholders such as diplomatic academies and universities in training development and delivery as well as of target groups and their access to the training (*to be implemented by European Commission by funding mapping activities; higher education institutions / universities and other training providers on all levels through engaging in the mapping activities*).

Action 8.2 (medium- to long-term)

Develop a joint European competency framework for science diplomacy based on existing competency frameworks, e.g., those developed by JRC (Science4Policy, Innovative Policymaking) and DG RTD (ResearchComp) as well as other providers, and **create and adopt recognised certificates** based on the competency framework (*to be implemented by European Commission, Member States, training providers and science diplomacy stakeholders*).

93. See Council Recommendation on a European approach to micro-credentials for lifelong learning and employability (https://data.consilium.europa.eu/doc/document/ST-9237-2022-INIT/en/pdf)

Tailor science diplomacy training to the different target groups throughout their professional careers

Different sets of actors perform science diplomacy and there is a need for providing targeted training activities that show a clear benefit for the work of these actors, thereby supporting decision-making processes as well as international science and technology relationship management. Such training should form a fleet of science diplomacy professionals bridging the world of science, policy and diplomacy, but also the private sector.

For example, **diplomats** dealing with science and technology related files need targeted training on long-term aspects (e.g., climate change, international STI frameworks) as well as short-term challenges (e.g., current conflicts and their impact on STI relations, emerging STI developments with science diplomacy relevance). **Scientists** dealing with strategic research fields may need dedicated training, e.g., on research security, on the diplomatic implications of their collaborations, or specific digital skills for better horizon-scanning, while **scientific advisors** involved in specialised negotiations may need targeted information combining state-of-the-art scientific knowledge and the related science diplomacy dimension. In addition, knowledge with regard to different cultural aspects is of importance, thus studies on cultural and interpersonal behaviour, gender equality, as well as protocol should be included in the training.

There are already a number of training courses available in science diplomacy that could be capitalised on, but training needs are not static and call for adequate responses from the training providers. The creation of training centres could help bundle resources, target different stakeholder groups, avoid duplication and make resources and materials (such as guidelines on cooperation) available on a larger scale. In order to be attractive, training should not only be provided by academic scholars, but also by practitioners of diplomacy.

Action 8.3 (short- to medium-term)

Offer preparatory training on EU science diplomacy action for all approved EU-funded research projects with an international dimension (including ESFRI/ERIC-type research infrastructures), This would ensure that the project managers are aware of and align with the European Framework for Science Diplomacy, rather than develop their own science diplomacy practice (*to be implemented by European Commission, consortia of EU-funded projects, training providers*).

Action 8.4 (medium- to long-term)

Include science diplomacy modules in the curricula of diplomatic academies, including the EU Diplomatic Academy, and provide science diplomacy training to diplomats prior to being posted abroad as well as throughout their careers, including "shadowing" schemes where individual scientists and European diplomats shadow each other's work for a limited period (*to be implemented by diplomatic academies, EEAS and EU delegations as well as Member States ministries of foreign affairs and embassies*).

Develop science diplomacy career paths and bringing the young generation on board

While it is necessary to develop human capacity in science diplomacy, there are currently too few academic pathways that enable the training of academic experts in science diplomacy at a doctoral level or allow for the blending of competences across disciplines, in STEM as well as social sciences and humanities. This calls for more funding for science diplomacy PhDs (new PhD research topics, and/or selective courses in existing PhD programmes) underpinned by a baseline (quantity and framework conditions) of currently funded PhDs in science diplomacy, and targets to be reached in a certain timeframe.

Currently, career perspectives and career paths for science diplomacy scholars are rather vague, as the field is not yet well established. But one should not be naïve: without career incentives (taking into account gender specific aspects) and institutional backing, the majority of scientists will never engage in a systematic way in roles as described throughout this report, e.g., as part of expert groups or as advisors for policy. In order to mobilise researchers for taking up roles in diplomacy, support is needed from universities[94]. They need to pass the message that they encourage researchers to be active in science diplomacy. A growing community of science diplomacy-savvy scholars in all fields of science is indeed needed to be able to appropriately respond to emerging science diplomacy challenges: this will require a diversity of expertise to be deployed within academia and beyond. Developing career paths is strongly linked with increased opportunities for academic research in the field of science diplomacy, which will be tackled in recommendation 9.

Action 8.5 (short- to medium-term)

Propose a targeted MSCA Science Diplomacy Doctoral Network project to stimulate the interest in science diplomacy among MSCA scholars and alumni and beyond and contribute to strengthening the science base as well as seeding a future practitioners' network. In addition, **consider using Erasmus+ actions as appropriate** (*to be implemented by higher education institutions / universities, research-performing organisations, governmental sector, and science diplomacy related NGOs by jointly forming consortia*).

Action 8.6 (medium- to long-term)

Create science diplomacy courses/curricula under the EU umbrella: The creation of an EU label M.A. and/or PhD degree – funded, e.g., through the European University Alliances and other mechanisms – can contribute to the creation of a basic understanding of the expertise needed for science diplomacy. **Establish dedicated chairs or professorships** to further raise the attractiveness of the field (*to be implemented by higher education institutions / universities, diplomatic academies and other training providers by developing and implementing respective courses; EU and Member State level support through funding such activities*).

94. On the role of universities in science diplomacy see also the European Strategy for Universities (COM(2022 16 final)

Recommendation 9:

Advance the frontiers of science diplomacy through research and the development of innovative approaches

For the EU and its Member States, it will be essential that Europe remains a hub for excellent science diplomacy research, in order not to be dependent from advances elsewhere. The science diplomacy projects funded under the Horizon 2020 programme came to an end several years ago. One of the main challenges is that, while EU funding has dwindled after this initial phase, Member States funding agencies and higher education institutions / universities are not yet providing the necessary funding or incentives to fully enable the European science diplomacy scholarly community.

Funding and enabling the best research would not only help further develop this community and support a level playing field within and beyond the EU for science diplomacy, but it would also allow to make much needed breakthroughs in research on science diplomacy in view of the paradigm shifts described in chapter 4, allowing the EU to be a global research leader in this field. Furthermore, this very research would also be helpful for EU science diplomacy itself as it could help current and future diplomats as well as policymakers to navigate the increasing repercussions of scientific and technological developments on international relations, while responding to geopolitical challenges.

Indeed, this would provide a solid evidence base for foreign and security policymaking, especially in strategic fields where empirical data and expert support are needed to pursue the political priorities of the EU. This could be done through innovative approaches, such as co-production between scholars and diplomats, including civil society and business actors as relevant. Finally, the development of international collaboration in science diplomacy would help increase our understanding of global issues and enable the development of science diplomacy strategies to better address them.

Short- to medium-term	
Action 9.1	Identify research areas in the field of science diplomacy that could be further funded by Horizon Europe and its successor
Medium- to long-term	
Action 9.2	Fund cooperative, research projects (also across borders) through Member State funding agencies within the European Research Area
Action 9.3	Launch joint science diplomacy research initiatives with third countries or regions
Action 9.4	Establish a European journal on science diplomacy

Foster research on and for science diplomacy to strengthen the European Research Area

Research on science diplomacy needs to focus on theory, institutions, processes and practices of science diplomacy as well as on methods to evaluate science diplomacy, assess its impact, and derive strategic lessons. Such research needs to be inter- and transdisciplinary, involving relevant stakeholders including citizens and the private sector through a co-production process. This links back to the necessity of educating the relevant academics and experts, which will only be possible in an academic environment that values the activities of researchers who contribute to knowledge exchange, e.g., with practitioners, policymakers, and the broader public. Potential areas of research might be:

- Definition of science diplomacy, frameworks and values
- Application of international relations theories to science diplomacy
- Evaluation of science diplomacy impact and performance, development of indicators
- Processes of science advice for foreign policy and best practices
- Research on science diplomacy training and education

Science diplomacy also needs to focus on topical knowledge of strategic importance to provide the evidence base and tools for EU decision-makers and diplomats to act in the present and to prepare future diplomatic responses. For example, there is a strategic need to review how threats and opportunities of emerging and disruptive technologies were addressed in the past to improve the future(s) of science diplomacy in the new geopolitical order.

As an illustration, examples of research topics in this realm may include:

- Drivers of technological change triggering shifts in geopolitical power and issues of technological sovereignty of the EU and its Member States
- Paradigm shifts brought about by emerging and disruptive technologies and the related security threats
- Research on strategies to address multi-faceted hybrid threats, including cyber-physical attacks and disinformation campaigns
- Ethical challenges of new technologies like synthetic biology and the role of science diplomacy

As many of the crucial geopolitical challenges the EU is confronted with have important research and innovation components, tackling them requires the best possible integration of science and technology expertise into European diplomacy beyond the diplomatic expertise only. Research for science diplomacy is therefore needed to better integrate scientific evidence and foresight into European diplomacy and policymaking. At the same time, it would also create a "European Method" that could become a benchmark for other countries and attract additional experts. In this context, the recommendations developed under the strategic and operational instruments (recommendations 1-6) need to be underpinned by sound scientific analysis and related advice, e.g., when it comes to the mapping of actors, the impact of emerging and disruptive technologies, implementing foresight and forecasting exercises, etc.

Action 9.1 (short- to medium-term)

Identify research areas in the field of science diplomacy that could be further funded by Horizon Europe and the next EU Research and Innovation Framework Programme based on results of existing or previous EU-funded projects as well as already existing recommendations; **strengthen funding and broaden the scope and number of dedicated calls related to science diplomacy** in the 2026-2027 Horizon Europe Work Programme and in a longer term also for the next Framework Programme (*to be implemented by the European Commission and Member States with the support of European science diplomacy stakeholders*).

Action 9.2 (medium- to long-term)

Fund cooperative, research projects (also across borders) through Member State funding agencies within the European Research Area, facilitating the creation of projects, research groups/networks and education elements in the field of science diplomacy through higher education institutions / universities and research-performing organisations (*to be implemented by Member State funding agencies*).

Foster collaborative science diplomacy research on global challenges and systemic risks with third countries

Fostering a collaborative approach to science diplomacy research must expand beyond the EU and European borders through international consortia to best address global challenges and systemic risks that threaten the well-being and security of humankind and build a more resilient global community. Such collaborations accelerate the development of innovative solutions, promote the sharing of best practices, and ensure that the benefits of research are widely disseminated and applied. These international collaborations can enhance the overall quality, efficiency, and impact of science diplomacy while combining resources and expertise from multiple countries. They also provide a platform for capacity building in developing countries, helping to level the playing field in global science and technology. Therefore, launching joint research initiatives in science diplomacy would be a strategic response to the interconnected and complex nature of global challenges and systemic risks (also from a long-term perspective and in complementarity to the structures to be developed as explained in recommendation 5). For example, collaborative science diplomacy research projects could be focused on understanding:

- Future pandemic preparedness (e.g., research on innovative response strategies, and global cooperation in health crises)
- Cross-sectoral crisis management and global solidarity in crisis response (e.g., examining integrated approaches for managing diverse crises, involving multiple sectors)
- International law and the crisis of the existing international security system (e.g., erosion of disarmament agreements, weakened role of the UN Security Council, etc.)
- Enhanced disinformation resilience (e.g., developing tools and strategies to combat misinformation and disinformation)
- Multilateral cooperation on the global commons (e.g., identifying key barriers to collaboration on the global commons, building shared norms of science for global commons and helping devise concrete recommendations to be considered in future multilateral agreements)

Action 9.3 (medium- to long-term)

Launch joint science diplomacy research initiatives with third countries or regions bringing together diverse perspectives, resources, and expertise to tackle complex, systemic risks that transcend national borders. This could include funding studies focusing on different topics related to the global commons. Such initiatives would not only enhance the scientific understanding of risks but also contribute to building a more resilient and cooperative international community (*to be implemented by the European Commission, higher education institutions / universities, research-performing organisations, and research funders*).

Establish a European journal on science diplomacy

There is currently no European journal dedicated to science diplomacy and currently EU scholars and science diplomats publish in third-country journals (e.g., US, India) or national journals. An EU journal would therefore help put European science diplomacy research in the spotlight and would contribute to knowledge transfer from academia to practitioners.

In the short- to medium-term, an online version could be developed, with a print publication launched in the medium- to long-term. The journal should give a strong emphasis to inter- and transdisciplinary perspectives (e.g., encouraging joint articles by researchers and diplomats).

Action 9.4 (medium- to long-term)

Establish a European journal on science diplomac (*to be implemented by science diplomacy research scholars providing editorial policy and peer review capacity for a science diplomacy journal, European Commission providing initial seed funding for a feasibility study, and scientific publishers providing viable business models for the journal's sustainability*).

Conclusions and way forward

7

This report aims at demonstrating the need for science diplomacy action at the European level and the ways to implement it. It furthermore attempts to 'decode' the multifaceted nature of science diplomacy, namely to capture the prerequisites and benefits of a comprehensive effort to harness the potential of science and technology for foreign and security policy in and for Europe. It also emphasises the importance of diplomacy for preserving spaces for scientific cooperation amidst increasing competition and conflict, thus advancing European competitiveness through research and innovation. Recent geopolitical developments and the grand crises and challenges our nations and humankind face underline further the urgent need for policies in the international domain that are informed by the best possible evidence.

Having a flourishing research base from which to draw upon is not a given. A constant investment into education, research and innovation is a prerequisite for an advanced science diplomacy serving the interests of European citizens.

Thanks to decades of support through the EU Research and Innovation Framework Programmes and national science, technology and innovation policies, the EU and its Member States can draw from a solid foundation of scientists and academic institutions. Linking the latter and their output to foreign and security policy practitioners and entities is not an entirely new endeavour – yet a truly systematic and coherent approach was lacking.

The time has come to elevate science diplomacy to a distinct and visible part of the EU's Common Foreign and Security Policy and Common Security and Defence Policy as well as of European and national science, technology and innovation policies.

The exercise performed through the EU Science Diplomacy Working Groups has been invaluable, as it has shown twofold: First, that there are several spheres of action existing both on the level of the EU institutions and the EU Member States – and, where relevant, the countries associated to the EU Research and Innovation Framework Programme – which will have to be involved, aligned and reconciled. Second, that there is a large, intrinsically motivated, well-informed pool of experts, in academia, research institutions, policy and diplomacy, willing to contribute to building a truly European science diplomacy.

Combining the solid foundation of strong research and innovation systems in Europe, the continued commitment of the EU to invest in research and innovation, and a critical mass of research and innovation existing in the Member States, has the potential to render Europe a global science diplomacy powerhouse.

A key question addressed in this report is how to tackle the current fragmentation, alleviate the tensions existing among these spheres, and foster strategic synergies and coherence between diplomatic and scientific institutions, programmes and individual actors, so that they may effectively contribute to the implementation of overarching European policies, not least the call in the political guidelines of the European Commission 2024-2029 for Europe to be more assertive in pursuing its strategic interests.

This report includes a series of recommendations of how European leadership in science diplomacy can be achieved through strategic, operational and enabling instruments, assuming that the first step would be to define strategic priorities around which all relevant parties can be rallied. While not aiming at a thorough analysis, the report also addresses some important crosscutting issues that need to be taken into consideration in both the design and implementation of science diplomacy, such as the role of values and narratives, the relations between science diplomacy and research security, and the need and ability to respond to global challenges and govern global goods and commons.

The stakeholders involved in this process emphasised the importance of acting quickly to leverage the enormous potential of European science and technology amidst rapidly developing geopolitical circumstances. The EU and its Member States should opt for speed in strategically linking what is already there, before establishing wholly new entities that need to establish themselves and gain trust and knowledge. They should promote scientific literacy even more across their administrations and in diplomatic services and incorporate foresight into policy design to stay ahead of developments.

We need to harness the soft and hard power of science and technology to inform, shape and implement foreign and security policy and protect and foster our knowledge and technological base. We need to send a clear message to our partners and competitors that our policy is driven by research and innovation, by evidence rather than unverifiable beliefs, let alone fake information, and that Europe is acting together.

For these reasons, European science diplomacy must become visible and be at the core rather than at the fringes of both, European foreign and security policy as well as research and innovation policy, being a cornerstone of our international engagement.

Science diplomacy is not yet another sectorial "xyz diplomacy" but permeates all fields of diplomacy horizontally. Understanding the nature of science diplomacy is essential to address the challenges our world is facing and will face in the future, which in their majority result from scientific and technological advancements or require their deployment.

Being faced with unprecedented global crises and challenges, Europe must leverage science and technology to engage with nations and other key stakeholders across the world sharing its principles and values, yet also with those who might not: with countries with whom there are tensions or conflicts, but with whom we must still work to achieve or maintain prosperity, peace and safety and to protect our environment. Deployed skilfully, science diplomacy can help prevent or mitigate conflict, support sustainability, economic development and competitiveness, and enhance social cohesion. It can safeguard European assets, while helping less developed nations and communities to develop theirs. This said, geopolitical developments require us to rethink how freely knowledge can and should be shared and how our technological sovereignty can be safeguarded. To some extent, this represents a paradigm shift, which science diplomacy should guide and support.

Our world has entered a phase of rapid technological developments pushing the boundaries of knowledge into unknown territory.

This happens at the same time that the geopolitical world order is under stress, characterised by not necessarily predictable actors outside Europe and across the globe. On top of this, there is a growing awareness that humankind needs to tackle global crises and challenges such as climate change or biodiversity loss. This mix of challenges can only be navigated if science and diplomacy are closely connected. This has also been recognised by UNESCO, which has announced the development of a global framework for science diplomacy, of which the European framework is going to be a cornerstone.

A strategically planned and well implemented European science diplomacy is needed to find answers for today's most pressing challenges, building on the best available science and an open-minded diplomacy, thus contributing to fulfilling political goals and securing a leading position for our continent in a multipolar world. In addition, it should make sure that all relevant actors are heard and be accountable for pursuing scientific development and its deployment based on our shared principles and values.

Our vision for European science diplomacy is for it to become a key instrument in the EU's diplomatic toolbox, fostering peace, European competitiveness, and a safe, sustainable and prosperous future for all by harnessing the power of science and technology in a responsible way.

Annexes

8

The process of developing this report has been coordinated by DG Research and Innovation of the European Commission under the responsibility of **Maria Cristina RUSSO** (until May 2024) and **Signe RATSO** (since May 2024).

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Subgroup 3: *Building positive narratives, recognizing diverse values and fighting disinformation including foreign information manipulation and interference*	• Erika STAËL VON HOLSTEIN, Re-Imagine Europa, Belgium
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This report presents the results of five EU Science Diplomacy Working Groups that were established by the European Commission in order to develop recommendations for a European Framework for Science Diplomacy. The working groups consisted of 130 science and diplomacy experts from across Europe, with each group being co-chaired by a scientist and a diplomat. The recommendations are intended to inform future policy action.

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