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The Invisible Pillar of Transatlantic Cooperation: Activating Untapped Science & Technology Assets

Cathleen Fisher

COOPERATION in science and research is embedded in the transatlantic relationship. And yet, ironically, it is politically and diplomatically underused and often considered marginal—or ignored entirely—by the transatlantic policy community. This should change.

Science and technology (S&T) is and will be important to the security and prosperity of both the United States and Europe. As outlined in the U.S. National Intelligence Council's report *Global Trends 2030*, the nexus of food, water, energy, and other resources, in connection with climate change, is likely to have broad global impact over the coming decades. In addition, technological innovations related to the accumulation and use of data, advanced manufacturing, resources, and health could transform economic, political, and military activities around the world.[1] The economic interface between Europe and the United States and the reliance of both economies on science and technological innovations also compel both to deepen S&T cooperation. This is especially true when it comes to the great emerging challenges of our time—energy and climate change, urbanization, resource scarcity, and aging societies, to name a few—all of which demand scientific cooperation and effective integration of scientific perspectives into policymaking processes.

Cathleen Fisher is president of American Friends of the Alexander von Humboldt Foundation.

Now more than ever, it is time to give S&T cooperation a more central role in the transatlantic relationship.

The U.S.-European partnership is foundational for U.S. foreign policy. The transatlantic relationship is a proven alliance based on common values, dense economic and institutional connections, and a long history of cooperation in service of mutual interests. Mirroring the close political relationship, scientific collaboration across the Atlantic is extensive, reflecting a shared commitment to the highest standards of scientific inquiry and integrity and excellence in science and research.

At a time of drift in the transatlantic relationship, the partnership between the United States and Europe needs a new sense of purpose, value, and relevance. Strategic transatlantic cooperation on science and technology could yield tangible benefits to both parties by delivering better policy and good science. It would provide a stabilizing pillar for transatlantic relations during a period of fundamental and rapid change in the relationship and the global system. The successful "mainstreaming" of scientific cooperation in transatlantic relations also might offer useful lessons on how to more fully integrate S&T into U.S. foreign policy.

While government agencies play an important role in this process, alone they are insufficient to effect a successful realignment of transatlantic ties. Nongovernmental organizations (NGOs)—think tanks, scientific associations, universities, and other organizations engaged in research, dialogue, and cooperation across the Atlantic—could contribute significantly to a strategic realignment of transatlantic policy and transatlantic S&T collaboration.

To achieve this goal, governments and NGOs will need to bridge the gaps between the worlds of transatlantic science and transatlantic policy and overcome the impediments to better integration of S&T into transatlantic policy cooperation. Clearly, there are actions that NGOs—leveraging their unique strengths—can take to ensure that transatlantic S&T expertise and networks are more effectively integrated into U.S. engagement with Europe.

International S&T Cooperation—Integral to Transatlantic Relations, but Marginal in Transatlantic Policy

Transatlantic S&T collaboration and transatlantic policy cooperation thrive in parallel, but separate, worlds. Most scientific collaboration across the Atlantic is bottom-up—driven by the creative enthusiasm of researchers and the desire of individuals, institutions, or companies to advance discovery and knowledge or enhance their competitiveness. For its part, with the exception of the environment and climate, the transatlantic policy community generally pays too little attention to the S&T content of issues on the U.S.-European agenda and overlooks the potential contribution of U.S.-European scientific cooperation to transatlantic relations.

These parallel realities represent lost opportunities.

On the research side, according to the U.S. National Science Board, the United States and the European Union (EU) member states continue to be world leaders in research and development (R&D), accounting for nearly 55 percent of R&D expenditures worldwide in 2010. The strength of their respective scientific establishments makes U.S. and European scientists attractive partners for each other and for scientists in other parts of the world. The types of S&T cooperation across the Atlantic can vary and include full-blown collaborative projects, nationally funded research projects that include transatlantic and other international partners, and foreign research stays and informal exchanges. Although information is fragmented and incomplete, bottom-up scientific collaboration between the United States and Europe appears to be both extensive and broad ranging.

A few examples illustrate the breadth of S&T collaboration across the Atlantic. The number of articles coauthored by U.S. and European researchers comprises a significant share of each country's international coauthored articles. According to the National Science Board, in 2010 U.S. coauthors accounted for nearly a third (32.3 percent) of UK-coauthored articles, 30.4 percent of German-coauthored articles, and 27.5 and 33.4 percent of French- and Italian-coauthored articles, respectively. U.S. authors, in turn, most often coauthored articles with colleagues from the United Kingdom (14.1 percent), followed by China (13.7 percent), Germany (13.3 percent), and Canada (11.8 percent). The National Science Foundation collaborates with thirteen European states, as well as other nations, in the Materials World Network (cooperative materials research). Six European states either participate or have participated in the past in the International Collaboration in Chemistry, which is run by the U.S. National Science Foundation (NSF). The EU's 7th Framework Program for Research and Technological Development from January 2007 through June 2012 funded more than 220 collaborative research projects in which more than 270 U.S. researchers and research institutions participated, with particular emphasis on health, information technology, and environment and climate change.[2] In 2012, the institutes of the Max Planck Society collaborated on more than six hundred projects with U.S. scientists, spanning research in chemistry, physics, technology, biology and medicine, and human sciences. The Max Planck Society also hosted more than five hundred scientists from the United States.

Bottom-up flows of talent across the Atlantic continue to be substantial as well. According to a study by the Council of Graduate Schools, most international joint and dual degree collaborations involving U.S. universities include partnerships with European universities. Some 17 percent of doctoral collaborations of U.S. institutions are with partners in Europe, compared to 5 percent with South Korea and 3 percent with China. At the master's level, collaborations with European partners account for fully 36 percent of U.S. partnerships. Outside of structured degree programs, U.S. graduate students in science, technology, engineering, and math (STEM) fields may have opportunities to participate in international collaborations in Europe through the NSF's Partnership for International Research

and Education (PIRE) program. Between 2005 and 2012 at least half of PIRE awards to U.S. grantees involved collaborations with at least one European research partner in addition to other international partners.

Despite the contraction in academic opportunities at many U.S. public research universities, thousands of European postdoctoral students come to the United States each year, drawn by the excellence of U.S. research institutions and universities, career opportunities, and an entrepreneurial culture that tolerates failure and rewards risk taking. Across the Atlantic, funding agencies both at the EU and member-state level offer a variety of research opportunities to postdoctoral students from the United States. Germany's Alexander von Humboldt Foundation, for example, awards roughly eighty fellowships a year to the best early career and more established U.S. scientists and scholars to pursue research in Germany. To encourage even more mobility across the Atlantic, in July 2012 the NSF and the European Commission announced an agreement to provide NSF-funded early career U.S. scientists with the opportunity to collaborate with European scientists supported through awards from the European Research Council.

In addition to bottom-up scientific collaboration, the United States pursues numerous official scientific dialogues, both with individual European states and with Europe-wide institutions. The United States has completed and/or implemented bilateral scientific cooperation agreements with seventeen member states or acceding member states of the EU, as well as a separate bilateral S&T agreement with the EU. The United States also participates in three joint U.S.-EU task forces or working groups on energy, biotechnology research, and measures to combat antimicrobial resistance.[3]

Mirroring the dense web of bottom-up scientific collaboration is an extensive transatlantic network of (national and sub-national) government agencies, think tanks, technical and scientific associations, and other NGOs engaged in policy dialogue across the Atlantic. The latter include both geopolitically focused NGOs, such as the German Marshall Fund and the Atlantic Council, and technical NGOs with deep functional expertise in a given area, such as the World Resources Institute. The topics of transatlantic exchanges have broadened considerably over the last three decades, as reflected both in the agendas of official summits as well as the projects and activities of leading transatlantic NGOs.

The ambitious and sometimes curious expansion of the transatlantic policy agenda has not, however, fully integrated science and technology cooperation or expertise in a systematic way. In part, the continued marginalization of science in the transatlantic agenda is a historical legacy. During the Cold War, with the exception of exchanges on nuclear risks and arms control, geopolitical and security concerns largely pushed science and technology cooperation to the margins of "soft" or "cultural" transatlantic diplomacy. Though the world has changed fundamentally, transatlantic policy dialogues, both government-led and nongovernmental, continue to be heavy on "high politics" and thin on actual

scientific expertise. There are some exceptions, as seen in transatlantic dialogues on climate change and energy. For the most part, however, the nongovernmental transatlantic policy community essentially duplicates the "high politics" bias of government agencies.

The fixation on an increasingly daunting and grand geopolitical agenda means ignoring issue areas with substantial S&T contact where U.S.-European cooperation could deliver successful and mutually beneficial outcomes.

For example, both the United States and Europe must plan for the effects of extreme storm events and rising sea levels, as well as the other related social and economic effects of climate change. The Netherlands has introduced multiple, world-class technical and policy innovations in the areas of flood mitigation, storm water modeling, and integrated river basin management. An integrated, transatlantic dialogue involving government agencies at the national and sub-national level; geopolitically and technically focused NGOs; and universities, companies, associations, and individual researchers, could help determine which of these innovations could be successfully transferred to the environmental, political, and legal landscape of Louisiana or other threatened regions.

A second example of the potential inherent in a more integrated transatlantic dialogue pertains to an issue of central importance to both the U.S. and European governments: STEM education. In the United States, STEM education and economic development rely more and more on the active integration of community colleges. Unfortunately, at present there are few mechanisms to engage the faculties and staff of U.S. community colleges with their European counterparts.[4]

Obstacles to Mainstreaming S&T in Transatlantic Relations

The marginalization of science in transatlantic relations reflects several larger problems. First, S&T perspectives continue to be inadequately integrated into U.S. foreign policy writ large. The evolving role of S&T in U.S. foreign policy indeed has been the focus of numerous blue-ribbon commissions, task forces, and working groups for several decades. In 1992, the Carnegie Commission on Science, Technology and Government observed that science and technology was "a sidestream or a mere technicality" in U.S. foreign policy. Seven years later, the National Research Council (NRC) noted with concern the reduction in the number of science counselors at U.S. embassies from twenty-two to ten and asserted:

> "Central to strengthening the capabilities of the [State] Department in areas involving STH [science, technology, health] considerations is the need for a change in the orientation of the U.S. Foreign Service and indeed of the entire U.S. foreign policy community, which currently gives relatively little attention to STH considerations."[5]

The NRC, like the Carnegie Commission before it, recommended various measures to strengthen the integration of science and technology into U.S. foreign policy, including the creation of a senior science advisor to the Secretary of State. The establishment of the Office of the Science and Technology Advisor to the Secretary of State in 2000 was an important step forward. However, although the Department of State's 2010 Quadrennial Diplomacy and Development Report embraced S&T cooperation as a "crucial part of U.S. public diplomacy," many structural reforms have not yet been undertaken.[6]

Progress toward the integration of S&T in transatlantic relations may be impeded by two additional factors: the fragmented nature of the scientific enterprise in Europe and the United States, and a lack of consensus in the United States about, or a strategy for addressing, the globalization of science and international collaboration.

On both sides of the Atlantic, a large number of actors in science and technology complicates efforts to chart a more strategic approach to S&T cooperation between the United States and Europe, even in service of "narrower" scientific aims. The EU initiative to create a more coherent "European Research Area" is a bold aspiration that coexists with the reality of twenty-seven individual member states, each pursuing its own national interests with respect to S&T cooperation. The United States has a plethora of actors as well—companies; individual scientists; multiple scientific funding agencies; the scientific academies; and numerous scientific associations, universities, and research institutions. In the absence of a strong U.S. central federal agency to coordinate international research, the U.S. Department of State does its best to fill the void under its existing but limited legal authority. However, the Department of State staff is generally far removed from the details of scientific efforts in the U.S. government and related NGO or academic research activities. Under these circumstances, it is difficult for governments on either side of the Atlantic to implement S&T agreements in a strategic and meaningful way.

Adding to the problem is the lack of a consensus in the United States on a national strategy to address the globalization of science—similar to that found in many European countries.[7] Many U.S. colleges and universities embrace the goal of "internationalization," but as yet there is little agreement on what internationalization means. Much of the activity to date has involved the internationalization of education, rather than of research. Debates continue about the appropriate role of governments, funding agencies, companies, scientific associations, universities, and individual researchers in international education and research. With little national or even institutional agreement on the benefits of and approaches to international research collaboration, it is difficult to say how transatlantic S&T cooperation should proceed.

In sum, the barriers to the better integration of S&T into U.S. foreign policy are found in both the foreign policy and scientific communities. The transatlantic policy community thinks strategically when it comes to issues of "high politics"

on the transatlantic agenda. However, it fails to see the strategic importance of S&T cooperation—both to the resolution of big issues on the transatlantic agenda and to the future of transatlantic relations. The S&T community, while aware of the value of collaboration to the production of scientific knowledge, has given little thought to the contribution that S&T cooperation could make to the broader strategic aims of the United States and Europe.

Moving S&T Cooperation to the Center of Transatlantic Relations

Science and technology cooperation should not be considered solely a cosmetic add-on to the transatlantic partnership. Rather, science and technology should be a central pillar of a new architecture of cooperation between the United States, the EU, and the scientific enterprises of the United States and leading European states. To achieve this strategic integration, the transatlantic policy community should make a serious effort to integrate science, scientific expertise, and scientific networks into its activities. By the same token, the S&T community needs to look beyond its scientific aims, and consider how scientists and scientific expertise might be appropriately and strategically connected to policy dialogues, including high-level exchanges such as the Transatlantic Economic Dialogue, the Transatlantic Climate Bridge, or the German Embassy's "Skills Initiative." Much of S&T collaboration of course will be pursued independent of transatlantic policy aims, as will transatlantic policy dialogues with little S&T content or relevance. But many issues on the expanded transatlantic agenda can and should integrate scientific considerations and expertise, including but not limited to discussions of climate change; sustainable development; water, food, and energy; and the impact of technological innovation on the transatlantic and global economy.

Governments alone cannot effect this change. The decentralized nature of the U.S. and European research landscapes, and diversity of the transatlantic policy community, will likely doom government-led, top-down initiatives to failure.

Rather than fighting this fragmentation, a new bottom-up, strategic approach is needed—one that builds on and leverages the diversity of players in transatlantic scientific collaboration and policy. Such an approach would embed S&T cooperation more centrally in the U.S.-European relationship through the creation of a large integrated transatlantic network of networks, which brings together policymakers and analysts, experts on the functional and regional issues that now comprise the transatlantic agenda, and, where appropriate and relevant, scientists and their scientific expertise.

NGOs—both those with a primary focus on geopolitics from a transatlantic perspective, and technical NGOs—can play a critical role in this bottom-up strategy aimed at creating an integrated, networked architecture for transatlantic relations.

The central responsibility falls to the traditional transatlantic institutions, which need to institutionalize science and technology competencies, but some technical NGOs could broaden their international cooperation with European partners beyond pursuit of development aims. Specifically, nongovernmental organizations can perform four critical functions in bridging the gap between transatlantic policy and transatlantic scientific collaboration:

"Thought Leaders" and "Test Beds": First, NGOs can serve as laboratories for integrated transatlantic dialogues. Rather than attempting to further expand their portfolios, leading NGOs in transatlantic relations should seek to form strategic alliances with the organizations that have the closest connections to science and scientists—the academies, the AAAS (American Association for the Advancement of Science, publisher of *Science & Diplomacy),* relevant scientific associations, and technical NGOs with S&T expertise.[8] To encourage such alliances, the foundations and the other funders that support the policy programs of transatlantic NGOs should require grantees to bridge the gaps between science and foreign policy. Foundations that in the past have been path-breakers in linking policy and science, such as the MacArthur Foundation, as well as foundations with strong connections to technological innovators (Hewlett, Google), could provide critical financial and other assistance for policy/scientific exchanges on issues at the nexus of transatlantic policy and S&T. By pooling their respective networks, policy and science organizations can help to identify those issue areas where it makes sense—both for U.S. and European science and for foreign policy—to bring scientists and scientific expertise to the transatlantic conversation. Among the key issues to consider are the vision and the objectives of an integrated transatlantic science diplomacy agenda. What mixture of policy and scientific expertise is necessary for constructive transatlantic dialogues on trade, climate, energy, sustainable development, and policy toward critical regions such as North Africa and the greater Middle East? What outcomes from this dialogue might one expect?

Facilitation and Education: Both transatlantic and technically specialized NGOs can help educate scientists about policy and policy makers about science. Two examples illustrate the potential mutual benefits that might accrue to each. The negotiation of a twenty-first century transatlantic free trade agreement will require a strong and forward-looking understanding of technology and innovation as it pertains to trade. Similarly, current efforts to bolster cooperation between U.S. science agencies and the EU might benefit from a nuanced understanding of how current political and economic developments within the EU might impact scientific collaboration, both within the EU and between Europe and the United States. By providing neutral ground for meetings and facilitated discussion, NGOs can help to enhance the scientific literacy of policymakers and analysts and the political literacy of scientists.

Talent Pipeline: Attracting more scientists to careers in foreign policy, including those able to inform transatlantic policies, remains a difficult challenge. Initiatives such as the AAAS S&T Policy Fellowship or the Jefferson Science Fellowship bring valuable scientific expertise into federal agencies, but the numbers are limited by the relatively small amount of resources available to these programs. Unfortunately, transatlantic NGOs by default tend to draw on promising young professionals with backgrounds in political or other social sciences, such as international relations, area studies, and public policy. While individuals with scientific or technical backgrounds in energy or environment policy can bring valuable perspectives to the table, real S&T expertise, rather than S&T literacy, may be necessary and desirable. To expand the opportunities available to scientists and technical experts with an interest in international policy, transatlantic policy NGOs should offer visiting fellowships to scientists, technologists, and engineers interested in working on U.S.-European projects with strong S&T content and relevance. As NGOs often serve as talent pools for government appointments, the transatlantic NGO community has an opportunity to become an agent of positive change in integrating S&T perspectives in U.S. foreign policy, rather than being part of the problem.

Network of Networks: U.S. and European S&T networks are an underutilized resource in transatlantic relations. This is a missed opportunity, both for transatlantic policy and for transatlantic relations. On many pressing issues, S&T networks are a potential source of scientific expertise and advice for transatlantic policy makers and political leaders. Additionally, U.S.-European scientific networks constitute a robust, but nearly invisible, pillar of the transatlantic relationship. At a time when societal connections across the Atlantic are thinning, the network of scientists and researchers engaged in collaborative and cooperative activities across the Atlantic can help to keep transatlantic ties strong.

The postwar experience of Germany is relevant in this regard. In 1953, the German government, as part of its foreign cultural policy, supported the reestablishment of the Alexander von Humboldt Foundation (AvH) to bring foreign scientists and scholars to Germany. The bulk of the foundation's financial support came initially from the Federal Foreign Office, which viewed research exchange as a way to rehabilitate Germany and its reputation in science and to create lasting goodwill around the world. The Federal Foreign Office's strategic experiment has been a resounding success. The foundation's network of "Humboldtians"—scientists and scholars supported by the AvH—now includes more than 25,000 researchers in more than 130 countries. The majority of the more than 5,000 U.S. alumni, by and large, express positive feelings about Germany; and many have continued to build bridges between the United States and Germany throughout their careers.[9]

Going Forward

Despite repeated assurances of shared interests and values, transatlantic relations today are permeated by a sense of disappointed expectations and uneasy questions about the alliance's future and relevance. Beyond the orchestrated unity of high-level meetings, U.S. and European leaders find it harder to agree on a common approach to both urgent, near-term crises and the grand challenges of our time. To many Americans, Europe seems increasingly unlikely to emerge any time soon as the strong and united partner that the United States seeks and requires. To Europeans, the United States appears paralyzed by mounting debt and political dysfunction that threaten its long-term prosperity and hamper American efforts to exercise continued global leadership.

As policy experts debate the need for a fundamental overhaul of U.S. government processes and structures, the transatlantic relationship should not be ignored. Science diplomacy can and should be central to one of the oldest and most important foreign relationships of the United States—its partnership with Europe. The strategic integration of S&T into U.S.-European relations, outlined here, could give new relevance to transatlantic cooperation and help build the foundation for the expansive global cooperation that is needed to navigate the dangers and opportunities of the emerging global system. SD

Endnotes

1. Global Trends 2030: Alternative Worlds, the National Intelligence Council (December 2012). This report identified growing demand for food, water, and energy, in connection with the rising middle class, urbanization, and climate change, as one of five "mega-trends" shaping the world out to 2030. Technological innovation was termed a "game changer", which will interact with "mega-trends" to determine the type of world that emerges in the next several decades.
2. BILAT-USA, "Report on the Analysis of U.S. Participation in the 6th and 7th Framework Programmes-second update," December 2010. Although projects spanned a wide range of fields, U.S.-European collaboration in health accounted for nearly 23 percent of FP7 projects with a U.S. partner, while roughly 13 percent focused on informational technology and 12 percent on the environment, including climate change."
3. BILAT-USA inventory of existing cooperation between the United States and the European Union, http://archive.euussciencetechnology.eu/bilat-usa/inventory.html
4. An exception is the "Skills Initiative," a German-American cooperative initiative to explore opportunities for applying Germany's dual system of theoretical and practical vocational training in the United States to meet the needs of advanced manufacturers for a workforce with the requisite STEM skills. See http://www.germany.info/Vertretung/usa/en/07__Climate__Business__Science/02__Bus__w__Germany/skills-initiative.html
5. Committee on Science, Technology, and Health Aspects of the Foreign Policy Agenda of the United States, National Research Council, The Pervasive Role of Science, Technology, and Health in Foreign Policy, Imperatives for the Department of State. Washington, DC: The National Academies Press, 1999. http://www.nap.edu/openbook.php?record_id=9688&page=4
6. The U.S. Department of State's first Quadrennial Diplomacy and Development Review observed: "Strengthening the ability of our people to collaborate with others on science and technology is a crucial part of U.S. public diplomacy." Department of State and United States Agency for International Development, 2010, 62. http://www.state.gov/s/dmr/qddr/.
7. In Germany, for example, the Federal Ministry of Education and Research has been responsible for defining the

country's "high-tech strategy," which directs federal research funds to areas deemed important to Germany's future competiveness, growth, and prosperity—including mobility, energy and climate. See http://www.research-in-germany.de/research-landscape/r-d-policy-framework/2960/high-tech-strategy-for-germany.html.

8. Some organizations are endeavoring to integrate science and policy. For example, Dr. George Atkinson, former science and technology advisor to U.S. Secretary of State Colin Powell, established the Institute on Science for Global Policy (ISGP) at the University of Arizona. The Institute has organized dialogues between scientists and policy analysts and advisors on emergent and persistent infectious diseases as well as on synthetic biology. See http://www.scienceforglobalpolicy.org/Conferences/tabid/64/Default.aspx.
9. In a survey of U.S. alumni of the Humboldt Foundation undertaken in spring 2012, 74 percent of U.S. alumni reported feeling personally connected to the foundation. Some 82 percent of U.S. alumni had visited Germany at least once in the past five years, either for professional reasons (41 percent), personal reasons (9 percent) or both (50 percent). See http://www.americanfriends-of-avh.org/AS2012.pdf.

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