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Evolution, Impacts, and Promise of U.S.-Russian Techno-Diplomacy

Glenn E. Schweitzer

Over the past seventy-five years, Russian and U.S. academies of sciences and related organizations have learned a wide range of lessons through cooperation involving tens of thousands of scientists, engineers, and health professionals. When supported by the two governments, science engagement can provide many opportunities for advancing global science while helping guide future diplomacy in positive directions. One very important lesson from past experience is quite simple. Despite recurring blockages in U.S.-Russian collaboration, dedicated and enterprising scientists have become adept at finding innovative, unorthodox ways to advance programs that can benefit science and society alike.[1]

Although the U.S. and Russian science academies have the deepest history of carrying out bilateral cooperative programs, they have been but a small, although highly influential, component of overall collaboration involving U.S. and Russian specialists in many disciplines. As examples of other approaches, in the 1960s the Soviet government invited thousands of Americans to participate in a series of

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international conferences in Moscow and then to visit research centers in many other Soviet cities. Also during that time, the two governments developed a technology exchange program that called for two-week overseas visits to observe unique industrial activities, such as previously cloaked advances in computer development. In the 1970s, the U.S. government took the initiative to promote eleven intergovernmental science and technology agreements. In addition, during the 1970s, U.S.-Russian cooperation in manned spaceflight increased spectacularly.[2]

Then, at the beginning of the 1990s, the Nunn-Lugar Program, the informal name for the Department of Defense Cooperative Threat Reduction Program, and the FREEDOM Support Act, administered by the U.S. Agency for International Development, were approved by the U.S. Congress. This happened while Russian scientists—facing very difficult economic conditions—were casting lifelines toward the United States. By 1994, eight additional intergovernmental agreements were in place, supported by twenty-one memorandums of understanding that enjoyed the status of international agreements.[3] During this same period, under U.S. government leadership, the International Science and Technology Center was established in Moscow to support the efforts of Russian weapons scientists to reorient their research toward civilian applications. Simultaneously, the Department of Energy launched its lab-to-lab program with a similar objective focused on researchers in closed nuclear cities of Russia. In the years that followed, tens of thousands of weapons-oriented Russian researchers redirected their efforts to civilian applications of advanced technologies.

Further expanding this extensive framework for cooperation, the U.S. Department of Energy and the Russian Ministry of Atomic Energy had by the end of the century entered into a dozen additional agreements. Moreover, the U.S. Civilian Research and Development Foundation had been established with a variety of science-oriented programs based on U.S.-Russian collaboration. All the while, the International Research and Exchanges Board had for several decades mobilized leading members of the U.S. social science community to become engaged in collaborative research programs with Russian colleagues.[4]

In the private sector, a number of U.S. advanced technology companies became well rooted in Russia, and a few Russian industrial firms developed a presence in the United States. Cross-border investors found opportunities in both countries to get involved in innovative industrial activities. Finally, many U.S. universities expanded their collaborative programs involving science-oriented faculty members and graduate students, and a number of leading Russian universities initiated special programs to attract visiting professors from the U.S. and other countries for periods of three years or even longer.

This article focuses on a small number of important collaborative activities, with a particular emphasis on their scientific and political payoffs. Some of these activities provide insights into cooperation not previously highlighted either in my own manuscripts or in the writings of others. A few add details to the already documented base of experience that again deserves priority attention as U.S.-Russian relations trend downward, with potentially dangerous security and political consequences.

Most of the following examples of collaborative efforts are based on my experiences and observations during my (1) assignment by the Department of State as the first science attaché at the U.S. embassy in Moscow (1963–66); (2) tenure as the lead American official in Moscow and then the first executive director of the international team that carried out the U.S. launch of the International Science and Technology Center in Moscow (1992–94); and (3) service as the director for programs in Eastern Europe and Eurasia at the National Academies (1985–92) and (1994–present).

Selected Programs of the U.S. National Academies

The programs discussed here cover several decades of U.S.-Russian relations.

The Early Years

In 1959, the U.S. and Russian academies established a formal program of scientific cooperation that called for a specific number of annual exchange visits by leading scientists.[5] From 1961 to 1979, ten additional agreements continued to guide the program but with increasing flexibility in the number of visits. Then, the duration of agreements was extended—eventually to five years—with eight more agreements that will continue to provide guidance through 2023. Short-term visits by individual scientists for several weeks characterized the earliest agreements, with the annual number of person-months of visits reaching 167 in each direction in the mid-1970s and then declining to 50 in the 1980s due to budget reductions by the financial sponsor on the U.S. side—the National Science Foundation—which decided to explore other approaches as well. In recent years, the interacademy agreements have not been based on quotas for visits, but instead have highlighted topical areas of mutual interest that could be pursued.

Of particular note, in 1964 the Nobel Prize in Physics was awarded to the American Charles Townes and the Soviets Nikolay Basov and Alexander Prokhorov for their parallel work in laser electronics. This cross-border achievement was quickly recognized in Russia as the gold standard for exchanges of individual scientists. The award was mentioned at many international scientific meetings held in Moscow during the mid-1960s.

Also in the 1960s, the two academies began to organize workshops on frontier topics in mathematics, physics, earth sciences, and other disciplines. By 1981, twenty-three workshops had been held.[6] Since that time, more than fifty additional workshops on a variety of scientific topics have followed.

From the vantage point of Washington, the objectives of the exchange program have been to (1) improve world science, (2) build U.S. science, (3) keep abreast of Russian science, (4) support development of the world scientific community, and (5) foster solutions to global problems, including political, economic, social, and security challenges. Russian counterparts have added to this list the opportunities to (1) keep apprised of the latest advances in civilian science and (2) obtain additional resources to carry out their personal research interests.[7]

Four particularly important interacademy activities are as follows:

International Security and Arms Control

In 1981, the two academies established parallel committees—referred to as the American CISAC and the Russian CISAC[8]—to carry out a series of meetings dealing with scientific and technical issues concerning international security and arms control.[9] More than sixty meetings have occurred since, often supplemented with visits to government ministries and facilities or linked to preparation of joint reports requested by various governmental organizations on both sides. These committees have addressed a wide range of topics, including the importance of strategic stability, difficulties in finalizing the treaty prohibiting underground nuclear testing, the capability and reliability of anti–ballistic missile systems, the necessity of extending the international agreements to prohibit development and deployment of various missile systems, and violations of commitments under the Biological Weapons Convention.

The high level of participant expertise in these meetings and related activities, the steadfast commitments of the Russian and U.S. academies and participants in obtaining financial support for dialogues and other activities, and the interest of both governments in experts' views attest to the significance of the effort. Of special note is the role the committees played in preparations for the 1986 meeting between Soviet leader Mikhail Gorbachev and U.S. president Ronald Reagan and in considering the views expressed and commitments made by the governments at the summit. For many months before and after the historic meeting, members of both the American and Russian CISACs committees engaged in discussions on a variety of technical issues with government representatives from both sides.

Abuse of Human Rights in Russia

The U.S. government's long-running concern over human rights abuses in the USSR intensified into the 1980s—particularly, outrage about treatment of Soviet scientists, primarily Jews, who had been imprisoned for political reasons (the dissidents) and others who had been denied exit visas (the refuseniks). Especially troubling to the U.S. National Academy of Sciences was the detention in the city of Gorky (now Nizhny Novograd) of Andrei Sakharov, who belonged to the U.S. Academy as a foreign member. Some academy members urged suspension of exchanges. In response, the two academies amended the interacademy exchange agreement to call for regular discussions of "the environment affecting cooperation," a provision clearly understood to include consideration of human rights issues.[10]

In 1988, at a press conference in Moscow following discussions between U.S. and Russian counterparts, the president of the Russian academy became the first Soviet official to acknowledge publicly that the Soviet government's record on human rights was not satisfactory and that some scientists had received inappropriate treatment.[11]

Concerns of Scientists during the USSR Breakup

At the request of the White House, in early 1992 the National Academy of Sciences brought together more than 100 policy officials and technology specialists from the U.S. science community to consider how to reenergize Russia's rapidly declining research capability. The discussions covered a broad array of topics. A number of recommendations called for immediate action, including the following:

- Adopt a broad definition of "weapons scientists" who would be eligible for financial support through the soon-to-be-established International Science and Technology Center in Moscow. (An expansive definition was promptly adopted.)
- Provide new funding for cooperation with Russian colleagues through the extramural programs of the National Institutes of Health, National Science Foundation, and Department of Defense. (Several departments and agencies immediately enacted this recommendation.)
- Endorse a congressional initiative to establish a research foundation to support science in the former Soviet Union. (Several years later, the U.S. Congress established the Civilian Research and Development Foundation.)[12]

Responding to the Conflict in Chechnya and to 9/11

In 1999, several members of the Russian academy proposed that they join with U.S. experts who shared their concerns about intense ethnic-based violence in Chechnya that was spreading to nearby regions and even to Moscow. Ten "hot spots" located within the country had been identified by the government as susceptible to violent extremism. For six years, members of a special interacademy partnership traveled extensively within Russia, with a focus on events in Chechnya and several other hot spots. At a capstone conference in Washington, a landmark report consolidated the findings during the many consultations and field visits in various Soviet/Russian provinces. The findings served for a decade as a major reference for researchers in a number of countries confronted with ethnic animosities.[13]

Also of interest were several other interacademy activities, including:

- Suggestions for refinement of a UNESCO report on restructuring the education system in Chechnya
- Establishment of a Chechen heritage exhibition in a reconstructed corner of a burned-out Grozny apartment complex; the exhibition was financed and guided by the academies while being built by schoolchildren
- Purchase of equipment for a wrestling center at the Teachers College in Grozny where restless young men could burn off their energy rather than patrolling the streets armed with Kalashnikovs

During a separate, well-coordinated effort just before the attacks of September 11, 2011, another interacademy project began to analyze the roots of the terrorist strikes that had expanded across the globe. This project consisted of five workshops over a period of five years, with related visits to terrorism-prevention and response facilities in both countries receiving high priority. The focus was primarily on countering terrorism that employed dangerous forms of weaponry. Of course, chemical, biological, radiological, and nuclear terrorism were high on the list of concerns; but electromagnetic-incited disruptions of circuitry, cyberattacks, and food poisoning within large marketplaces were also considered.

Two events associated with both intensification of violent extremism and outbreaks of terrorism were the devastating gas and firearms attack in October 2002 at the Dubrovka Theater in Moscow and the September 2004 bloodbath at the school in Beslan in the North Caucasus. The academies in both countries undertook a number of activities to improve understanding of the root causes of these two attacks. Results of their investigations were captured in a major publication of the National Academies that clarified little-known aspects of the attacks, which were described in detail by representatives of the Russian security services and the government's analytical centers.[14]

After a decade-long lapse in sustained attention to both violent extremism and terrorism, the two academies resumed interest in joint efforts to deal with brutal attacks on innocent populations. Since 2015, four bilateral workshops, augmented by specialists from particularly susceptible regions including the Middle East and North Africa, have addressed violent extremism. Fortunately, concerns over the misuse of biological capabilities have maintained their priority position in interacademy meeting agendas.

Preparing for the Handshake in Space

Having reviewed joint U.S.-Russian programs involving the national science academies as well as other organizations, I will now step back several decades to comment on cooperation in exploration of outer space.

Promoting Embassy Priorities

In 1963 in Moscow, Ambassador Foy Kohler was frustrated by the absence of discussions between senior embassy officials and key participants in the Soviets' manned-space program. He was unaccustomed to not being well informed about recent developments, particularly when diplomatic counterparts speculated that a Soviet cosmonaut would soon be walking on the moon. Then the embassy unexpectedly received from NASA a new documentary film featuring the geology of the back side of the moon.

The ambassador often invited Soviet officials and other important leaders in Moscow to his residence—Spaso House—to view popular Hollywood films provided by the Department of State, followed by informal discussions. Occasionally, low-level Soviet officials with questionable responsibilities attended, but senior officials certainly could not justify time off for such "frivolous" activities. However, by leading off with the documentary about the moon geology, though, with footage of airplane acrobatics, the host gave Soviet space program leaders and even several cosmonauts reason for an early evening out. Three such double-feature successes were recorded over a twelve-month period.

Responding to an Emergency Situation in Space

In 1964, I was the recipient of a "flash" cable from the State Department to the embassy in Moscow at 4 a.m. on a Sunday. The department ordered us to immediately instruct the Soviet government at the highest level possible to cease emitting radio signals that were interfering with the flight of Gemini 4 over the east coast of Russia and "endangered the lives of the astronauts." NASA had not announced in advance to the Soviets or anyone else the frequencies being used due to concerns that amateur radio operators might disrupt the flight; and it was imperative that the Soviet surveillance systems on naval ships and along the border with China immediately change frequencies. Fortunately, as a result of contacts established with Soviet space officials, we had four relevant telephone numbers that I could try. Within two hours, a senior Soviet official was contacted at his dacha, and he took steps to change the frequencies being used by the Soviet defense authorities.

Learning to Walk in Space

In 1965, a film of the first space walk by cosmonaut Alexei Leonov was being shown at government-controlled venues in Moscow. I mentioned to my tennis partner Frank Bourgholtzer, who was the NBC correspondent in Moscow, that it would be useful for American astronaut Ed White to see the film, which was more of a tumble than a walk. White was scheduled for his space walk in three months, and he might be able to avoid some of the tumbling if he had a better appreciation of the challenges outside the capsule. Bourgholtzer immediately replied that the film would have considerable public appeal, and NBC would probably be interested in obtaining the rights to show it on television. With the help of our new contacts within the Soviet space agency, Bourgholtzer purchased the film, and it was promptly shown to the American public with an advance copy sent to White.[15]

Emphasis on Early Career Researchers

As the political transition in Russia unfolded in the early 1990s, several organizations initiated programs to support very promising early career Russian scientists.

Howard Hughes Medical Institute

For more than a decade beginning in the early 1990s, the Howard Hughes Medical Institute, based in Chevy Chase, Maryland, awarded competitive grants to outstanding early career Russian researchers who had already contributed to international advances in biology.[16] Often the investigators carried the reputations of entire institutes on their shoulders and became rallying points for grants from many sources. I was not surprised when one scholar informed me that she had been awarded grants from five additional sponsors that she generously shared with her team members.

The formula for success included: (1) searches for major scientific breakthroughs, (2) long-term grants averaging $100,000 per year for five years, and (3) opportunities to participate in annual scientific conferences in the United States and Europe. Decent pay, participation by rising superstars, and a strict limitation on time spent abroad were good responses to the brain drain—at least for a few years. Also of importance, research opportunities in the civilian sector freed grant recipients from having to seek support from the Russian military complex.

Engelhardt Institute of Molecular Biology

For decades, Moscow's Engelhardt Institute had defied pressures to keep its activities under wraps, with the director welcoming visits by young scientists from the United States and other countries.[17] In 1995, an ambitious five-year program that involved cooperation with the Argonne National Laboratory, based in Illinois, began. It focused on development of biochips rooted in three-dimensional microarray technology. A compelling reason for the research was that biochips could permit fast and inexpensive biomedical tests for pinpointing the nature of a patient's disease and thereby contribute to selection of appropriate treatment. Motorola and Packard Micro-Science licensed the results of some of the applied work. The Russian team, including several early career investigators, returned home to a strengthened institute in Moscow at a time when financial resources were scarce. They helped ensure that important skills were being applied for peaceful and not military purposes.

U.S. Agency for International Development

A less successful program was launched by USAID in the late 1990s.[18] It brought to the United States 150 promising researchers in various fields of importance to the Russian government for one-year stints aimed at rapidly upgrading their research and application skills. More than one-half were under age forty. The program initially demonstrated success in honing skills, with most participants returning to Russia. But in time, few were content with building long-term research careers in their chaotic home country, and found ways to remain in the United States.

Small Teams of American and Russian Young Investigators

Also in the 1990s, the National Academies, with support from the U.S. Department of State's Title VIII appropriation, mobilized Russian and American teams of eight to ten researchers in selected fields for two-week exchange visits in both directions.[19] Most participants had recently received their doctorate or *kandidat* degree.

The concept emphasized collaborative investigations at home and abroad in addressing specific areas of mutual interest, while setting the stage for continuing cross-ocean efforts in pursuit of common research goals. The topics included limiting pollution while extracting new oil resources, biodiversity, forestry, Arctic challenges, and emerging approaches to economics research.

Opening of Siberia: The Scientific Dimension

One of Soviet premier Nikita Khrushchev's notable achievements was to establish a scientific base near Novosibirsk to help exploit the economic potential of the lands east of the Ural Mountains. He supported the creation of many new research institutes. The young scientists who moved to a small academy town, Akademgorodok, to start their own laboratories were proud to show visitors their achievements. For example, in 1964 they demonstrated to U.S. science leaders the world's most powerful research "cannon" for beaming jets of water to test the properties of metallic targets—an advanced accelerator that used the principle of colliding beams of nuclear particles.

Fifty years later, more than 100,000 people lived in the academy town speckled with both research institutes and innovative technology companies. It had become a hub for U.S.-Russian collaborative activities, although very few of the visiting American scientists extended their stays beyond one or two weeks at this remote location. More than two dozen institutes—including world-famous centers for catalysis, nuclear physics, biological research, and economic analysis—together with Novosibirsk State University, the third most prominent university in Russia, had elevated innovation and commercialization to a major Russian success story. At the same time, the university was regularly attracting top talent from some of Russia's most isolated eastern towns and villages to a center of learning and research that helped propel them to professional success.

In September 1992, I was the sole American attendee at the twentieth-anniversary celebration for a research center, called Vector, in the small town of Koltsovo.

Known by some in the West as a secret center of the nation's biological weapons complex, Vector eventually opened up for scientists from many countries. Indeed, some of its partners from Russian military research institutions participated in the anniversary celebration. They indicated strong support for recognition of Vector as a leading research center for evaluation of highly dangerous biological agents that would no longer be considered for nefarious purposes. U.S.-financed research projects soon became common at Vector; and American visitors were welcomed, at least for more than a decade, as long as they complied with safety requirements. Unfortunately, during the past few years Vector has been less eager to share the results of its activities—perhaps in response to the downturn in U.S.-Russian political relations, as well as the leadership change at Vector.

Interest of U.S. Multinational Companies in Russia

During the 1920s and 1930s, the USSR invited hundreds of American engineers to assist in building the country's industrial base. For example, the Ford Motor Company provided engineering expertise for construction of the Volga automobile plant in Gorky; and several large hydroelectric plants trace their origins to the involvement of U.S. engineers. Thus, it was not surprising when in the 1990s many multinational engineering firms eagerly sought opportunities to profit in the new Russia. On a personal level, after many nerve-rattling rides on overloaded and creaking elevators in Moscow, St. Petersburg, and other Russian cities, we all could relax when the Otis Elevator sign was on display in high-rise buildings. I have focused the discussion below on companies with important activities that I have personally observed over the years.

Boeing Company

Boeing stands high on everyone's list of U.S. companies that have helped sustain and advance Russian technologies in recent years. Beginning in 1993, the company established strong relationships with several top-ranked Russian universities and research institutes. Boeing opened a technology research center that evolved into a well-equipped computer-design hub in downtown Moscow, where both seasoned Russian researchers and outstanding students addressed technical challenges of keen interest to Boeing research teams in Seattle. The initiatives taken by the Russian researchers and the linkage to Seattle have been keys to success of this collaboration.

Westinghouse Electric Company

In the aftermath of the Chernobyl disaster and the Soviets' decision to abandon plans to build upgraded versions of the destroyed RBMK nuclear reactors, the Westinghouse Electric Company partnered in the 1990s with the Russian nuclear research institute NIKIET. For a number of years, Westinghouse maintained an office within NIKIET, with a focus on designing a new type of pressurized water reactor that could be refueled while continuing to operate. Although the new design was not fully developed and implemented, Westinghouse has stayed engaged in Russia by carrying out safety upgrades within the country's nuclear power complex and ensuring appropriate fuel for the new line of Russian water-water energetic reactors, known as VVERs.

Honeywell Company

The Honeywell Company opened its first office in Moscow in 1974. Now with 20 offices and 1,000 employees in Russia, the company continues to expand its long-standing development and design operations related to automation, petrochemical processes, energy efficiency, and operational safety. Design of control systems for inter-linked and widely dispersed operational systems has received considerable attention in recent years. Of special interest in considering the future directions of Russian innovation are the dual responsibilities of several key company personnel who also serve as professors in several of the 50 research laboratories of the Moscow Physics and Technology Institute of higher education, providing opportunities for outstanding young researchers to have practical industrial experiences.

The American Chamber of Commerce in Moscow

For almost three decades, hundreds of U.S. companies have been pursuing business arrangements in Russia, with a large number having headquarters or branch offices in Moscow. They have encountered many common problems in carrying out their operations due to the vagueness of Russian laws, regulations, and accepted practices. They also have had many difficulties in keeping abreast of changes in the commercial environment which affected their operations. Finally, company officials have often lacked awareness of how other companies have coped with unusual problems, and repetition of blunders owing to this lack of awareness has been frequent.

Meanwhile, the American Chamber of Commerce, established in 1994, offers a useful venue for helping companies stay on track. The Chamber is simultaneously a loud voice in protesting unacceptable practices—at times promoted by the Russian government and at other times ignored by the government. One area wherein the Chamber has been a leader in helping U.S. companies operate in Russia is pharmaceuticals. During a visit to the Chamber in the early 2000s, I was amazed at the number of in-depth reports the Chamber had prepared on this topic in advance of an annual meeting that would attract hundreds of specialists from the Russian government and representatives of many interested U.S. companies.

U.S.-Russia Business Council

The U.S.-Russia Business Council, with offices in Washington and Moscow, has for decades worked with both American and Russian firms to advance bilateral trade and investment agendas. The topics of interests include keeping abreast of U.S. and Russian markets, access to key U.S. and Russian government offices and officials, long and short-term sector developments, and attractive niche markets. Members include dozens of U.S. high-tech firms in addition to those highlighted above while Russia is well represented by Lukoil, Rusnano, Transneft, Sberbank, the Skolkovo School of Management, and other important companies and institutions.

Other Activities

Omitted from the foregoing descriptions are several large programs whose members have occasionally asked for my advice. But the purposes, activities, and impacts of these programs have often already been publicized, and the details are set forth in many books, program reports, and U.S. and Russian government documents. Nevertheless, they are worth mentioning here:

- Gerson Sher's new book, *From Pugwash to Putin*, draws on sixty-two oral histories by participants in cooperative activities and on his personal experiences in describing the activities of the Civilian Research and Development Foundation, the Industrial Partners Program of the U.S. Department of Energy, and philanthropic activities supported by George Soros during the early 1990s.[20]
- From 1994 to 2014, the International Science and Technology Center operated in Moscow with the involvement of more than 30,000 Russian scientists, supporting collaboration on a very broad spectrum of activities.[21]
- Since the early 1990s and continuing today, the Department of Energy's lab-to-lab program engaged Russian scientists beyond the reach of any other international program. Many of the accomplishments have been consolidated by a team of specialists at Los Alamos National Laboratory in New Mexico.[22]
- In Russia, more than a hundred major biological research projects were supported by the U.S. Departments of State, Defense, Energy, Health and Human

Services, and others, as identified in a report by the National Academies. A separate report by the academies, known as the "Pathogens Initiative" (1997), describes the rationale for and initial direction of pilot projects that provided specific incentives for the broader program that emerged.[23]

Finally, the U.S. embassy in Moscow, and particularly the Section for Science, Technology, and the Environment, deserves broad credit for successfully organizing and carrying out thousands of exchange activities over many decades.

What's Next?

The scientific value of long-term U.S.-Russian cooperation in addressing global problems can be substantial. Short-term gains and losses from exchanges, however, remain a dominant factor in political decisions to proceed with specific exchange activities. Science exchanges will continue to be turned off as one country develops policies that conflict with interests of the other. They will be turned on as summits approach and as leaders seek to gain recognition as peacemakers.

Scientists will simply have to live with these realities. They need to design their cooperative programs to the extent possible in modules, with each module achievable in a relatively short time frame. This is not easy since research is a continuum of trial and error and depends on steady, incremental advances. After the inevitable pauses in cooperation, succeeding modules may be able to build on earlier efforts without too much loss of momentum caused by foreign policy exigencies. If long-term experiments are critical to advances in a specific field, perhaps research in that field should not be pursued on a cooperative basis.[24]

Several modest steps have been informally suggested by Russian colleagues for the near term:

- Carry out summer workshops in Russia, perhaps as an extension of the well-established one-week Gordon conference program in the United States on specific topics—including various aspects of science diplomacy.[25]
- Organize bilateral workshops on global scientific topics at the Far Eastern Federal University in Vladivostok, which is rapidly expanding its capabilities in many scientific areas.
- Expand U.S.-Russian cooperation in addressing Ebola outbreaks in Africa.
- Demonstrate the advantages of issuing three-year multi-entry visas for participation in science-related activities.

On the much broader stage of cooperation, a variety of scientists in the two countries have joined forces in advocating (1) preservation of arms control agreements, (2) steps to slow the rate of climate change—often focusing on challenges in the Arctic, and (3) realistic and nonthreatening applications of robotics and artificial intelligence. SD

Endnotes

1. Glenn E. Schweitzer, *Experiments in Cooperation: Assessing U.S.-Russian Programs in Science and Technology* (New York: Twentieth Century Fund Press, 1997), 23.
2. Glenn E. Schweitzer, Scientists, *Engineers, and Track-Two Diplomacy: A Half-Century of U.S.-Russian Interacademy Cooperation* (Washington, DC: National Academies Press, 2004), vii.
3. Schweitzer, *Experiments*, 146.
4. Schweitzer, *Scientists*, vii.
5. This section draws from ibid., 1–6.
6. Ibid., 8.
7. Ibid.
8. The acronym stands for Committee on International Security and Arms Control.
9. This section draws from Schweitzer, *Scientists*.
10. Glenn E. Schweitzer, *Techno-Diplomacy: U.S.-Soviet Confrontations in Science and Technology* (New York: Plenum Press, 1989), 249.
11. Schweitzer, *Scientists*, 11.
12. Ibid., 36.
13. National Research Council, *Conflict and Reconstruction in Multiethnic Societies: Proceedings of a Russian-American Workshop* (Washington, DC: National Academies Press, 2003).
14. National Research Council, *Russian Views on Countering Terrorism during Eight Years of Dialogue: Extracts from Proceedings of Four U.S.-Russian Workshops* (Washington, DC: National Academies Press, 2009).
15. Schweitzer, *Techno-Diplomacy*, 168.
16. This section draws from Glenn Schweitzer, *Containing Russia's Nuclear Firebirds: Harmony and Change at the International Science and Technology Center* (Athens: University of Georgia Press, 2013), 95.
17. This section draws from ibid., 96.
18. This section draws from ibid., 97.
19. This section draws from the annual newsletters of the National Research Council, Office for Central Europe and Eurasia, 1992–95.
20. Gerson S. Sher, *From Pugwash to Putin: A Critical History of U.S.-Soviet Scientific Cooperation* (Bloomington: Indiana University Press, 2019). https://www.amazon.com/gp/product/B07T3CFPP9/ref=dbs_a_def_rwt_hsch_vapi_taft_p1_i0
21. Glenn E. Schweitzer, *Moscow DMZ: The Story of the International Effort to Convert Russian Weapons Science to Peaceful Purposes* (Armonk, NY: M. E. Sharpe, 1996).
22. Siegfried S. Hecker et al., *Doomed to Cooperate: How American and Russian Scientists Joined Forces to Avert Some of the Greatest Post–Cold War Nuclear Dangers* (Los Alamos, NM: Bathtub Row Press, 2018).
23. National Research Council, *Controlling Dangerous Pathogens: A Blueprint for U.S.-Russian Cooperation* (Washington, DC: National Academies Press, 1997).
24. Schweitzer, *Techno-Diplomacy*, 158.
25. For the Gordon Research Conferences, see https://www.grc.org.