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## U.S.–RUSSIAN RELATIONS



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ANALYSIS

# U.S.–Russia Science Cooperation Today

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## Abstract

U.S.–Russian scientific collaboration has a long history of engagement among the two scientific communities that persisted though the times of non-existent or bad relations between their governments. The intergovernmental layer of this cooperation became more prominent during the post-World War II nuclear superpower competition and its fallout after the collapse of the USSR. The current state of the bilateral scientific cooperation reflects the complex impact of the wide-ranging Cooperative Threat Reduction (CTR) and International Science and Technology Center (ISTC) programs that channeled the U.S. and international assistance to uphold nuclear security and safety in the former Soviet Union and support Russian scientists in peaceful pursuit of knowledge within international partnerships. The scientific communities of the U.S. and Russia have pressed for continued and increased engagement while the governments on each side qualify their support in line with their respective domestic and international political agendas.

## The Strong Role of the State

U.S.–Russian scientific collaboration is part of the global fabric of modern science with complex ties among individuals, research teams, institutions, national academies, networks, grant makers, and international mega projects like The Large Hadron Collider or ITER. At the same time, the bilateral intergovernmental aspect of this relationship is more prominent due to the legacy of the 20th century superpower nuclear competition and its fallout after the collapse of the USSR. Appreciation of this aspect is helpful to understand the recent dynamic in the bilateral scientific cooperation.

Another essential factor, in our mind, is the continuing decline of Russia's science and technology (S&T) power relative to that of the U.S on the long-term historical trajectory. In 2020, the disparity is huge. In terms of resources, in 2017, U.S. R&D expenditure was 2.74 percent of its GDP of $19.485 trillion; it was 1.11 percent of national GDP of $1.578 trillion for Russia[1]. If the U.S. today is facing a fast-growing challenge to its R&D world leadership[2], it is not coming from Russia. In terms of international integration, Russia is among the countries that show relatively low collaboration rates—in 2018, 23 percent of all articles by Russian scientists in the Scopus database were co-authored with international colleagues. It was 39 percent for the U.S.[3] In 2017, 24 percent of all collaborative international publications by Russian scientists were with U.S. co-authors, ahead of collaborators from any other country. The share of collaborative publications with Russian co-authors in the U.S. was below 3 percent. In terms of structural diversity, the Russian R&D sector is generally more dependent on federal budget funding, especially in basic research, while in the U.S. the role of business sector has been growing across all types of R&D, including in basic research.

Yet, historical and cultural aspects of the U.S.–Russian scientific cooperation suggest that similarities may be as important as disparities. They can highlight relative strengths and point to areas of complementarity.

## Long Historical Similarities

Going back all the way to the 18th century, parallels have been observed between the two towering scientific giants of their time, Mikhail Lomonosov and Benjamin Franklin. Proof of their direct correspondence has yet to be discovered by historians, but they did engage in communication by referencing each other's ideas. They constitute a pair of genius twins, where Lomonosov may be introduced as "the Russian Franklin", and vice versa. More recently, parallels have been gleaned in the history of nuclear race between the United States and the Soviet Union in the life paths of the two scientists leading their nation's bomb programs, Yuli Khariton and J. Robert Oppenheimer.[4] In between these historic epochs, from the late 18th through the mid-20th century, American

1 Science and Technology Indicators in the Russian Federation: 2019: Data Book. National Research University Higher School of Economics.—Moscow: HSE, 2019. https://www.hse.ru/data/2019/05/07/1502498137/in2019.pdf; U.S. R&D Performance and Funding. the State of U.S. Science and Engineering 2020, https://ncses.nsf.gov/pubs/nsb20201/u-s-r-d-performance-and-funding

2 The State of U.S. Science and Engineering 2020, https://ncses.nsf.gov/pubs/nsb20203/conclusion

3 Publications Output: U.S. Trends and International Comparisons, https://ncses.nsf.gov/pubs/nsb20206/international-collaboration

4 David Holloway (2005). "Parallel Lives? Oppenheimer and Khariton", Reappraising Oppenheimer: "Centennial Studies and Reflections", University of California, Berkeley: 115–128.

and Russian scientists engaged in academic correspondence, collaborations, expeditions, and reciprocal visits. Scientific ties were being built in astronomy, geography, geology, physiology; and institutional relations matured between university networks, national academies, and private firms. As shown by Glenn Schweitzer,[5] scientific contacts continued even in the absence of diplomatic relations in the 1920s. After WWII, they started to rebound in the early 1950s when the bilateral relationship was all but consumed by the Cold War.

Gerson Sher, historian of U.S.–Russian scientific cooperation, further shows that the cooperation developed in several stages. During the "Deep Cold War" period, it was channeled through a program of exchange visits between the U.S. National Academy of Science and the Academy of Sciences of the USSR. The period of détente in the early 1970s introduced an era with a top-down approach including bilateral intergovernmental agreements, high-level joint commissions, and elaborate processes.[6] The 1975 Apollo-Soyuz Test Project, when astronauts from the two nations docked their spacecrafts in orbit, exchanged a historic handshake, and proceeded to perform joint experiments signified the enormous promise of peaceful collaboration and pooling intellectual and technological resources in the exploration of space. The perestroika period produced a truly unprecedented peak of cooperation in the form of the 1988 Joint Verification Experiment that brought nuclear weapons scientists and engineers from the two countries to each other's nuclear testing sites to compare on-site methods of nuclear explosion yield measurement. This unique experience formed connections that later evolved into enduring collaborative relationships.[7]

## The Era of Assistance

The defining feature of the next period of the U.S.–Russian scientific cooperation, starkly expressed by Gerson Sher, was that the "previous doctrines of equality, reciprocity, and mutuality of benefit were supplanted with an entirely new notion—assistance". The U.S. government was beset by grave concerns about the perceived dangers of proliferation of nuclear and other weapons of mass destruction (WMD), theft of fissile materials, and leakage of WMD expertise resulting from the economic and social collapse in the former Soviet Union (FSU). The Nunn-Lugar legislation that forged the Cooperative Threat Reduction (CTR) program became the umbrella for a variety of programs designed to dismantle weapons, secure materials and facilities, and redeploy human capital in Russia and other FSU countries. These programs often involved scientific collaboration as the implementation mechanism. These collaborations strictly depended on the intergovernmental agreement framework and involved thousands of Russian R&D workers in international scientific practices.

A unique role in the international socialization of Russian science belongs to the International Science and Technology Center (ISTC). It started operation in early 1994 as a consortium of funding partners and recipient states with the mission of "cooperative Chemical, Biological, Radiological and Nuclear (CBRN) risk mitigation by supporting civilian science and technology partnerships <…> to redirect expertise to peaceful R&D fields."[8] From 1994 to 2014, competitive grants were awarded via a merit-based participatory selection process to 2033 collaborative projects that Russian scientists carried out with American, European, Japanese, and other international counterparts. ISTC supported the livelihood of dozens of thousands of scientists in Russia. Its most lasting impact was the internal transformation and international socialization of Russian science. Lev D. Ryabev, a high-ranking Russian ISTC official, credited the Center for fostering "an environment in which any research specialist or engineer could execute his/her proposal in the form of a project, put together a team and demonstrate his/her leadership skills" and "integration of scientists into the international scientific community."[9] 60,968 scientists from Russia participated in ISTC projects by the end of 2014.

In 2010, the Russian government signaled that the era of assistance was over. In August 2010 President Medvedev decreed Russia's withdrawal from the ISTC Agreement; the ongoing projects were to be completed by 2015[10]. In late 2012 Russia notified the United States that it was not planning to extend the CTR umbrella agreement due to expire in June 2013. In December 2014, the Material Protection, Control and Accounting (MPC&A) Agreement that covered a major area of

5 Glenn Schweitzer (2004). Highlights of Early U.S.-Soviet Scientific Relations (1725–1957). Scientists, Engineers, and Track-Two Diplomacy. A Half-Century of U.S.-Russian Interacademy Cooperation.

6 Gerson S. Sher (2019). Science Knows Boundaries: Reflections on Sixty Years of U.S.–Former Soviet Union Scientific Cooperation. Science and Diplomacy. http://www.sciencediplomacy.org/article/2019/science-knows-boundaries-reflections-sixty-years-us-former-soviet-union-scientific

7 Joint Verification Experiment, https://lab2lab.stanford.edu/lab-lab/joint-verification-experiment

8 ITSC Facts Sheet, http://www.istc.int/en/fact-sheet

9 Lev Ryabev (2014). International Science and Technology Center. 21 Years in the Russian Federation. International Science and Technology Center Annual Report 2014, http://www.istc.int/upload/files/2znjeu3iwfwgsowc00o4.pdf

10 Glenn Schweitzer (2013). Containing Russia's Nuclear Firebirds: Harmony and Change at the International Science and Technology Center. Appendix C and Appendix D.

collaboration in nuclear materials security was terminated with little notice extended to the American side. The underlying intent of these steps was not to curtail Russia's ties with the global scientific and R&D community but rather to restructure these ties in a restored capacity of equal partnership rather than as a recipient of assistance channeled according to the funding party's interests. CTR and ISTC, however beneficial for Russia in many important ways, were associated with the traumatic experience of being on the recipient end of assistance.

## Building a Relationship Based on Equality

At the same time, the Russian government valued its relationship with the United States in such prestigious S&T areas as fundamental science, nuclear energy, and outer space. It kept alive key bilateral agreements signed in the early 1990s—and pursued new ones. The 1992 U.S.–Russian Agreement on Cooperation in the Exploration and Peaceful Uses of Outer Space was extended in 2002, 2007, and 2011 (currently to expire in December 2020). The 1993 U.S.–Russian Agreement on Scientific and Technical Cooperation was extended in 2005 and 2016.[11] In September 2013, a long-awaited Agreement on Cooperation in Nuclear- and Energy-Related Scientific Research and Development was signed in Vienna by the heads of Rosatom and the U.S. Department of Energy (DOE). The point was made that the United States and Russia were equal partners under the Agreement, with each country bearing its own cost. The document enumerated facilities and installations in Russia and the U.S. "that may be used to conduct cooperative activities," thus authorizing site access to each other's nuclear weapons laboratories and major nuclear energy scientific and R&D centers.[12]

The scope and the depth of cooperation under CTR and ISTC, with dozens of thousands of participants on both sides, a shared sense of the importance of many projects, and the sheer excitement of doing science together built strong ties between scientific communities on both sides. It was the sentiment "on the ground" that pressed for the 2013 Rosatom-DOE agreement. Nuclear S&T communities in both countries pushed for the opportunity to renew collaborations in civil nuclear energy, thermonuclear fusion, high-energy density physics, pulse energy, material science, and other areas of fundamental science and applied research. Alerted in 2010 about Russia's impending withdrawal from ISTC, another part of scientific community represented by the U.S. National Academies and the Russian Academy of Sciences initiated a joint study of U.S.–Russian bilateral engagement in the biological sciences and biotechnology. They set up a joint committee to assess the past cooperation (which they called bioengagement) and suggest a path forward. The report they produced in 2013 detailed the infrastructure of the cooperation, its stakeholders and participant organizations, its scientific achievements, benefits, opportunities and difficulties as well as recommendations for future engagement. The report made a forceful case for expanding the U.S.–Russian bioengagement: "The stakes are significant, the established base for collaboration is unprecedented, and many of the potential payoffs from future joint efforts are clear."[13] To follow with action, in 2011 the Russian Foundation for Basic Research (RFBR) and the National Institutes of Health opened a bilateral co-funding program of Collaborative Research Partnerships (CRP) on the Prevention and Treatment of HIV/AIDS. In 2013, they started a CRP on Cancer, with both programs still running in 2020.[14]

## Chilled Relations After 2014 Hostilities in Ukraine

The intergovernmental layer of the cooperative framework did suffer after 2014. The 2013 Agreement was suspended within a few months of entering into force along with other ostentatious rollbacks in nuclear cooperation. In the years since, both DOE and Rosatom, in a tit for tat fashion, withheld authorization for the vast majority of conference visits and joint seminars that had previously been a staple in the U.S.–Russian nuclear cooperation, let alone any new research collaborations. However, at the same time, the two governments chose to quietly preserve other standing scientific cooperation agreements and allow the scientific community to stay the course in a broad range of collaboration areas. The national academies stepped up to continue running the mill of cooperation through inter-academy agreements, mem-

11 The Russian Foreign Affairs Ministry runs the web archive of Russian–U.S. bilateral agreements at https://www.mid.ru/ru/foreign_policy/international_contracts/2_contract

12 The Agreement between the Government of the United States of America and the Government of the Russian Federation on Cooperation in Nuclear- and Energy-Related Scientific Research and Development https://www.state.gov/wp-content/uploads/2019/02/14-124-Russian-Federation-Atomic-Energy.pdf

13 The Unique U.S.-Russian Relationship in Biological Science and Biotechnology: Recent Experience and Future Directions. National Academies Press, 2013. https://www.ncbi.nlm.nih.gov/books/NBK201554/pdf/Bookshelf_NBK201554.pdf

14 U.S.-Russia Bilateral Collaborative Research Partnerships on Cancer (R21). Funding opportunity announcement, https://grants.nih.gov/grants/guide/rfa-files/rfa-ca-16-015.html; Paul Pearlman & Sophia Michaelson (2017) NCI supports 10 New Bilateral Collaborative Research Partnerships on Cancer, https://www.cancer.gov/about-nci/organization/cgh/blog/2017/bilateral-partnerships

orandums of understanding, joint committees, grant programs, etc. In 2019, they formally concluded the most recent inter-academy cooperation agreement for the next five-year period and pledged to "devote special efforts <…> to continue to decrease the impediments to cooperation."[15] The U.S. National Science Foundation (NSF) and RFBR awarded grants to collaborative projects, though statistics to assess their relative share or trends are not immediately available. On the RFBR side, a big number of grant applications seems to have been for conference participation, while on the NSF side, awarded grants have involved research collaborations in geo- and climate sciences, physics, and socio-economic studies.

Under chilled intergovernmental relations, much in cooperation depends on the agency of the scientists themselves. "Unmediated by formal exchange or bilateral programs," [16] cooperation among U.S. and Russian scientists has the potential to develop more organically, following the patterns of scientific cooperation worldwide. The anti-Western and anti-U.S. mindset exists in certain parts of the Russian government and may complicate the conduct of cooperation activities. Anti-Russian attitudes may likewise influence choices of U.S. agencies or institutions. On the Russian side, however, a number of beneficial factors also exist. Declared policy priorities include reclaiming the international prestige of Russian science. A slew of programmatic documents on S&T policy have set the goals of greater international scientific integration and enhancing the international footprint of Russian science. The 5-100 program that the government launched in 2013 stimulates twenty-one participating universities to increase their standing in top international academic rankings through attracting international faculty, increasing enrollment of international students, creating research collaborations and publishing in quality journals. Participating universities may use the program funds to support academic exchanges and collaborative research projects. One such exchange initiative for young nuclear professionals between the Moscow Engineering Physics Institute (MEPhI) and Stanford University is funded through the 5-100 program on the Russian side. Russian universities actively encourage and facilitate international engagement by their graduate students and faculty. This grassroot international engagement through participating in international fellowships and grant competitions effectively advances Russia's integration into the globalized R&D networks. As an example, the Moscow Institute of Physics and Technology (MIPT) recently announced that its DREAM team of graduate students working at MIPT Neural Networks and Deep Learning Lab[17] competed in Amazon's Alexa Prize Socialbot Grand Challenge and was the only international team that reached the semifinals.

Hopes have been expressed that the current crisis caused by the global COVID19 pandemic will lead to a reassessment of the hierarchy of priorities for nations and the world as a whole. The next potential threat may be altogether different and come from a stray asteroid. The U.S.-Russian scientists have done collaborative work in the past both in infectious disease and in planetary defense. At the moment, the governments of the U.S. and Russia have the option to extend a firmer and more consistent support to existing cooperation and institute joint efforts in solving the crisis, though the prospect for this is not strong. Cooperation on the ground will continue and it remains to be seen whether it is able to self-organize and play a role in dealing with the pandemic.

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15 Agreement on Cooperation in the Fields of Science, Engineering, and Medicine between the U.S. National Academy of Sciences, National Academy of Engineering, Institute of Medicine and the Russian Academy of Sciences. March 12, 2019. https://www.nationalacademies.org/_cache_1ce1/content/4885770000059264.pdf

16 Gerson Sher (2019). Op. cit., http://www.sciencediplomacy.org/article/2019/science-knows-boundaries-reflections-sixty-years-us-former-soviet-union-scientific

17 DREAM Team http://deeppavlov.ai/dream_alexa

ANALYSIS

# U.S.–Russia Space Cooperation: Eroding Interdependence Followed by Symbolic Partnership

By Pavel Luzin

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## Abstract

The current phase of U.S.–Russia space partnership is coming to an end as American companies begin to produce spacecraft for the U.S. to return to manned space flight and reduce dependence on Russian rocket engines. In the new era, both countries may seek to continue this relationship, even if its main benefit is symbolic rather than economic or technological.

## A Fraying Post-Soviet Partnership

In 1992, almost three decades ago, the United States and Russia established a partnership in outer space. During the better years, the partnership included manned expeditions to the International Space Station (ISS), sales of Russian rocket engines to American companies, cooperation in space exploration, common commercial launch projects, and supplies of American-made components for Russian satellites.

The United States sought to maintain American global leadership in space activity by cooperating with its former adversary, giving Russia additional opportunities to modernize and pursue a democratic transition, and preventing the proliferation of Soviet missile technologies through the involvement of Russian engineers and factories in joint space projects. For its part, Russia needed to become one of the main American collaborators in outer space because this partnership maintained Russia's great power status in international relations (as a UN Security Council permanent member and in the area of nuclear arms) and provided support for carrying out market reforms in the national space industry.

Even though American companies had withdrawn from the International Launch Services and Sea Launch joint ventures before 2014, when Russia launched its aggression against Ukraine, and subsequent American sanctions barred electronic supplies for Russian-made satellites, Moscow still remains an essential partner for Washington in outer space. Ironically, despite the ongoing confrontation, the partnership with the United States seems to become even more important for the Russian side. Nevertheless, the main issue here is how will bilateral cooperation develop in the coming years?

## The End of Russia's Monopoly in Manned Spaceflights

The delivery of astronauts to the ISS fully depended on Russia for nine years. However, Russia's monopoly on manned space flight will come to an end in 2020, when the first manned flight of the Dragon spacecraft, developed by the American company SpaceX, will finally take place. Later in 2020 or in 2021, Boeing's CST-100 Starliner manned spacecraft also will begin operations. Even if these missions are delayed temporarily, the eventual launches will become a turning point for the space station project by allowing the U.S. to resume manned spaceflights. This development will have a profound impact on Russia's space industry and, consequently, its civil space program.

The problem is that Russia's long-running leadership in manned space flight led to neither deeper space cooperation with the United States and other foreign partners, nor the further development of Russian space capabilities. For instance, in 2019 three launches of the manned three-seat Soyuz spacecraft brought four American astronauts and one Italian to the ISS.NASA paid for each astronaut and that year the cost was $86 million for each spot. Russia earned $430 million in 2019 for delivering its partners to the space station. Moreover, the U.S. has been paying Russia for Soyuz seats since 2006, even before it retired the Space Shuttle in 2011. Hence, Russia's total revenue from these contracts during 2006–2020 reached $3.9 billion with the sale of 70 seats.

For reference, in 2019 the Russian government planned to spend almost $1.67 billion for the federal space program that includes manned and unmanned space exploration, and R&D related to civil space activity. However, due to some financial and programmatic delays, the actual spending was just under $1.4 billion. At the same time this figure does not include spending for the launch sites (almost $983 million was planned, but only $358 million actually spent), GLONASS satellite navigation system ($437 million as planned, with $421 million spent) and military space program (estimated to be $1 billion) that are financed through separate programs. Consequently, it is evident that the deal with NASA for seats in Soyuz provided Russia's space industry with significant financing. Over time, that significance increased as Russia raised the price of the

Soyuz seat from $21.3 million in 2006 to $86 million in 2019, and the exchange rate dropped from 27.17 rubles per $1 in 2006 to 64.66 rubles per $1 in 2019.Also, the role of the current model of U.S.–Russia cooperation in the ISS hardly may be overestimated if we take into account that Russia's government paid about $70 million for manufacturing each Soyuz spacecraft and launch vehicle in 2019.

Despite this favorable environment, Russia has many problems developing new spacecraft and launch vehicles to replace the old-fashioned Soyuz. Moreover, during these years, Russia's space industry did not establish any new ties with American companies. If in previous decades, Russia's contribution to the U.S.–Russia partnership were experience and technologies for long-term manned missions in Earth orbit, currently it is not clear what Russia can contribute to future bilateral and multilateral cooperation in manned spaceflights by the end of the ISS era. Nevertheless, for the near-term, as long as the ISS remains in orbit, Russia is hoping to provide touristic flights to the space station to recoup its lost business.

## The Decreasing Role of Rocket Engine Supplies

The situation is nearly identical in terms of rocket engines supplies to the United States. Since the end of the 1990s, the Russian company Energomash (a subsidiary of the state-owned corporation Roscosmos) supplied 116 RD-180 rocket engines for the Atlas V heavy launch vehicle that is mainly used for U.S. national security programs. In 2020, 6 more engines will be supplied. As of April 2020 88 launches had taken place, so United Launch Alliance, the American manufacturer of the Atlas V, should have 28 engines in storage. The stored and any newly purchased engines will last until the Vulcan, the new American heavy launch vehicle, replaces the Atlas V.

The importance of this contract for Russia's company is more evident if we look at the numbers. For instance, 11 of the 18 engines manufactured by the Energomash plant in 2018 were RD-180s, and the actual price of these engines was an estimated $15 million per unit. These sales provided more than half of the company's revenue in 2018: $319 million. However, the cooperation between Energomash and ULA is coming to an end, so Energomash is only manufacturing six RD-180 engines each year in 2019–2020.Consequently, the company is losing a crucial part of its revenue.

The second main customer of Energomash engines is Northrop Grumman, which uses the RD-181 engines for its Antares launch vehicle. This launch vehicle powers Cygnus unmanned spacecraft to the ISS for commercial resupply missions. The Russian company supplied 22 of these engines in 2014–2019 (14 of them have been used as of April 2020), and the annual manufacturing of RD-181 increased to 5 units in 2018–2019. While cooperation with Northrop Grumman definitely will continue in the coming years, there is not much room for additional RD-181 sales. Therefore, Roscosmos needs either to find new foreign customers for its engines (the most probable are China and India), or to cut production at one of its key companies and reduce the economic inefficiency of the entire corporation.

With these changes, the interdependence in space activity between the United States and Russia is weakening, and the ISS remains the only source of bilateral cooperation. The original motivations driving space cooperation between the two countries has changed. The Americans no longer subscribe to the illusion that Russia is making a democratic transition and worry less about the proliferation of Russia's missile technologies due to the changes in global security environment: previous troublemakers like Iraq's Saddam Hussein and Libya's Muammar Qaddafi have left the stage, while the remaining rogue leaders apparently have their own missiles. Russians are no longer interested in market reforms, and the country's policies are trending toward political and economic self-isolation. In this environment, deeper economic cooperation between Russian and American space companies is off the table.

Nevertheless, both sides continue to pursue foreign political strategies that once led to cooperation. The United States still wants to preserve its global leadership that includes leadership in space exploration. And Russia, or to be precise, the Kremlin, still works to maintain its great power status, thereby giving Russia's current leaders foreign influence which they use to secure domestic legitimacy for their authoritarian governance. The question is how these two contradictory approaches can be realized in bilateral space cooperation?

## Political Prospects for a Bilateral Space Partnership

In the near term, when SpaceX and Boeing start to operate their new spacecraft, Russia proposes manned spaceflights on an exchange basis: some American astronauts will ride to the ISS in Soyuz spacecraft, and some Russian cosmonauts will travel in American ones. Russia is ready to lose the payments it receives for seats in its spacecraft, but is not ready to give up the symbolic meaning of the space partnership with the United States.

Moreover, Russia supports prolonging ISS operations as long as possible. Currently the United States is planning to commercialize the station after 2024, meaning that NASA will decrease its spending for manned operations in low-Earth orbit and increase support for manned Moon missions. If this plan is viable, the Ameri-

can astronauts definitely will continue to participate in maintaining the commercialized station. Therefore, U.S.–Russia ISS cooperation could continue until the day the station de-orbits despite the various disputes and even confrontations in other aspects of the bilateral relationship.

At the same time, if American private companies broaden their activity in the ISS after 2024, there is little chance that Russia will be able to cooperate with them successfully. The political and economic nature of Russia's authoritarianism orients it toward inter-governmental relations with the participation of state-owned companies and joint ventures under the umbrella of bilateral or multilateral international agreements rather than cooperation between private entities. In other words, Russia's key political priority here is keeping the cooperation between Roscosmos and NASA.

For the long-term, Russia wants to be a part of the Gateway project, NASA's manned station in a Moon orbit. There is a high probability for this because the United States is not going to eliminate its space partnership with Moscow. However, the Kremlin insists on a formally equal partnership, the same as during the ISS project, but Washington proposes to make Russia a contractor, which will allow Russian cosmonauts to participate in missions to the station. Besides the political aspect of this issue, the problem is that Roscosmos' subsidiary companies can neither conform to NASA's manufacturing standards, nor compete with American companies in technologies that are necessary for the Gateway project.

To bolster its position during the ongoing bargaining with the United States, Russia is trying to accelerate its efforts in building new manned spacecraft and heavy launch vehicles. These projects seek to allow Russian cosmonauts to achieve Moon orbit and consequently to make Russia's participation in the Gateway inevitable for the Americans. Moreover, the Kremlin holds one more powerful card. For many years, though with a lot of delays, Roscosmos has been manufacturing three orbital modules for the Russian segment of the ISS. These modules may be used not only in low-Earth orbit but also in Moon orbit. Despite the fact that it remains uncertain whether this option is viable, it may turn out that Russia's industrial inefficiency can be converted into a diplomatic tool.

Therefore, the two countries have significant chances for prolonging their space cooperation. Political reasons are the main drivers here. If the United States wants to reduce its dependence on Russia while still leading an international Moon exploration, and if Russia wants to cooperate with the U.S. for the sake of symbolic cooperation, even when there is no economic or technological basis for these ties, Washington and Moscow may find a way to compromise, assuming that there is no new crisis in their relations. Russia may gain an opportunity to become a special part of Gateway with its own module or at least spacecraft, but without equal status and with the option of canceling (undocking) if necessary, and the United States will be able to keep some sustainable political ties with Russia. Maintaining such a relationship may become even more important if Russia's political system begins to adopt significant changes.

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ANALYSIS

# Cold War Legacy of Science Cooperation Offers Hope Today

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## Abstract

Although current political tensions hinder international studies in the Arctic, science partnerships helped tunnel through barriers during the Cold War. One of the most successful models of U.S.–Russian collaboration was the "Environmental Bilateral" agreement of 1972. During an era of political tension, it brought together a multidisciplinary group of top professionals and early carrier scientists in both countries. Acting through science diplomacy, this group communicated sound scientific messages about global climate change to top level policymakers well before the United Nations' Intergovernmental Panel on Climate Change came into existence. Similar models today can help the U.S. and Russia remove obstacles for scientific collaboration and implement the 2017 Agreement on Enhancing International Arctic Scientific Cooperation signed by both countries.

## Addressing Arctic Change Requires All Hands

Political tensions are undermining flourishing international research linking scientists from East and West. Many fields of natural and social sciences have already seen difficulties. Of particular concern are collaborative projects that address topics transecting national boundaries, such as multidisciplinary environmental and geopolitical studies in the Arctic, where the U.S. and Russia are key players.

Understanding the changes taking place in the Arctic is crucial since it is a harbinger of climate change elsewhere. In recent decades, the far north has been warming at about twice the global rate, and some of the climate impacts predicted in theoretical studies have already been observed there (1). More careful work is needed because the common assertion that all climate change consequences are negative does not completely hold up in the Arctic. Regional climate risks exemplified by the damage to infrastructure built upon thawing permafrost come with potential benefits for the economy and some residents of the Arctic or those who would like to work there. These benefits include reductions in heating energy demand, less severe winters and longer warm periods with potential positive implications for public health, tourism, recreation, and northern agriculture; an increase in the water resources of the great Siberian rivers, and a more navigable Northern Sea Route (2). Public perceptions are shaped by these contradictory trends and many individuals do not have a clear sense of the overall picture. The combination of risks and new opportunities raises the question of how best to calculate the net costs of climate change impacts in the Arctic and elevates its role in the geopolitical arena (3).

Challenges presented by the changing climate necessitate scientists from the circumpolar countries to work on evaluating critical climate thresholds beyond which changes become irreversible, balancing risks and new opportunities with the ultimate goal of developing climate adaptation and mitigation policies that meet the targets of the 2015 Paris agreement and secure the sustainability of the natural, built, and human systems in the Arctic. While national policies are normally couched in general terms and imbued with the argot of diplomatic discourse, they currently do not provide a holistic way to address the interests of stakeholders throughout the north.

Developing broad encompassing policies based on strong evidence of changing Arctic conditions will not be easy. The situation calls for multi-national and multidisciplinary teams that integrate the wide diversity of what we know about Arctic conditions with implementable policies designed to promote the interests of the indigenous and settler populations of the far north as well as the younger generations that will inherit the Earth from its current leaders.

## What Are the Difficulties?

Cross-national connections among researchers, civil institutions, and policymakers play a pivotal role in accomplishing this task. During the previous decade such connections were in decline and reached their minimum since the times of the U.S.–USSR Cold War in the 1970s. Many of the well-established links at the institutional level have lapsed or been terminated. Nevertheless, individual contacts between the U.S. and Russian scientists remain in place and they are carrying out scores of joint circumpolar research projects in the Arctic.

Unfortunately, the political and sociocultural settings in both countries do not favor flourishing collaboration or training international students and young professionals. Russia's government is conduct-

ing a broad campaign against "foreign agents" by harassing groups and academics who are accused of taking funding from western partners for alleged intervention into Russia's domestic politics, proposing measures that would complicate contacts between Russian scientists and their Western counterparts, and engaging in high level discussions about limiting Internet access to the domestic "Runet" for national security purposes. In the U.S. President Trump's administration has sought to slash funding for scientific research, tainted legitimate connections with Russia, and undermined popular trust in fact-based analysis. The U.S. continues to impose sanctions on Russia for its actions in Crimea and support of the pro-Russian rebels in southeast Ukraine while Putin claims that his country is encircled by hostile forces.

These restrictions impact all levels of the scientific endeavor, including students, undermining our very capacity to study and address the situation. Arctic experiential education is inherently expensive and best informed with international perspectives. However, limited funds and restricted visas inhibit and discourage student and young professional participation in international courses and research programs. Although these issues have no easy resolution, both countries have an interest in maintaining broad and deep scientific contacts to address global challenges.

## Is the Situation Unique?

A situation in which domestic and international political tensions build barriers hindering cross-boundary connections is more frequent than times of détente. Cold War science left a legacy of tunneling through such barriers, providing a model that can be useful today. At the peak of the Cold War in 1972, the U.S. and Russia signed several agreements, one of which, known as the "Environmental Bilateral" established the joint Commission on Environmental Protection (4). The many scientific activities carried out under Environmental Bilateral auspices culminated in an official communiqué from the 1986 summit meeting between President Reagan and General Secretary Gorbachev in which they called for a joint U.S.–Russia report on climate change. The joint report came out in 1990 as a book entitled *Prospects for Future Climate* (5), and its contents hold up well even now. The document correctly anticipated increasing temperatures, particularly in high latitudes and during the winter, and increasing precipitation in some areas. Another notable document produced by the Environmental Bilateral is the assessment of the climatic consequences of nuclear conflict, the so-called "nuclear winter" scenario. In the early 1980s scientists demonstrated that military ambitions could lead to global biospheric collapse, with no winners (6).

The Pugwash Conferences on Science and World Affairs, launched in 1957, are another success story of how scientists managed to overcome numerous Cold War barriers for cooperation between the West and East and force politicians to start a dialogue on nuclear arms control and disarmament (7). The success of those efforts provides hope for current times.

## What we propose

Although the current political context differs from the 1970s, science diplomacy is still one of the few instruments that could effectively tunnel through the barriers imposed by difficult realities. Science diplomacy does not ignore political problems, but provides a forum for focusing on common challenges. Its benefits far exceed any scientific results.

In practical terms, we call on both governments to remove obstacles for scientific collaboration. This means easing visa requirements and restoring consulates that have closed in recent years. Both sides should restore the professional diplomatic staff that facilitate trade, scientific exchange, and other mutually beneficial interactions between the two countries.

The U.S. and Russia should fully implement the 2017 Agreement on Enhancing International Arctic Scientific Cooperation that resulted from the U.S.–Russian joint initiative within the Arctic Council framework (8, 9). Specifically, they should facilitate access by the agreement's participants to national civilian research infrastructure and facilities and logistical services such as transportation and storage of equipment and material as well as to terrestrial, coastal, atmospheric, and marine areas in the identified geographic areas, consistent with international law, for the purpose of conducting scientific activities. They also should support full and open access to scientific metadata and should encourage open access to scientific data and data products and published results with minimum time delay, preferably online and free of charge. Lowering the obstacles to collaboration will allow scientists to develop their potential to reduce the broader policy conflicts.

The U.S. and Russian agencies responsible for the implementation of the Arctic agreement—the U.S. Arctic Research Commission and the Russian Ministry of Higher Education and Science—should establish a joint working group to identify priorities for Arctic research and potential sources of funding for joint academic projects. This body should consist of authoritative Arctic experts representing both natural and social sciences.

The U.S. and Russian federal governments should support international scientific organizations, professional associations and forums dealing with the Arctic, such as the International Arctic Science Committee, International Arctic Social Sciences Association, Uni-

versity of the Arctic, as well as the numerous related organizations.

Moscow should reciprocate Washington by establishing a program similar to the Fulbright Arctic Initiative that provides grants to both established experts and early career specialists from Arctic Council member nations to carry out collaborative research that will study and analyze the Arctic from a multi-disciplinary perspective. Opening such channels would particularly benefit young researchers in Russia who are often tempted to emigrate because they feel cut off from international developments in both science and public policy.

Likewise, the two governments should encourage ways to work together, such as through the successful Belmont Forum which allows nationally based scientific funders to coordinate research efforts across borders while providing funding to their own scientists. Organizations like the Belmont Forum incentivize interdisciplinary and cross-national collaboration in ways that help to produce areas of agreement in times of conflict.

While scientist-to-scientist contacts cannot resolve the concrete disputes between the U.S. and Russia, they can help to create multiple arenas of contact. Working together to address issues such as increasing resilience to climate change in the Arctic may ultimately provide the basis for other models of conflict resolution.

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ANALYSIS

# Feeling the Bern? Russian Media Reporting on the U.S. Democratic Party's Presidential Primaries

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## Abstract

Did Russia seek to influence voting in the Democratic Party's primaries, and if so, to what end? Would the Kremlin rather have seen Bernie Sanders take on President Donald Trump in November than presumptive Democratic nominee Joe Biden? To answer these questions, this article analyzes reporting by four Russian-state-directed media outlets between October 2019 and March 2020. It finds evidence of a coordinated disinformation campaign against Joe Biden and of narratives designed to undermine voters' confidence in the legitimacy of the primary process. The article concludes that Russia's aversion to Biden stems from his strong commitment to NATO, support for Ukrainian sovereignty and tough line on Russian election meddling. It further concludes that spreading distrust in U.S. democracy was the main aim of Russian interference over and above a preference for a particular candidate. Whether or not Russian media messaging effects U.S. voters, the fact of Russia's meddling itself is a source of disruption and doubt.

## Coordinating Domestic and International Propaganda

Russian trolls are again meddling in U.S. elections, this time targeting the Democratic Party's 2020 primaries. Analysis by Graphika, the data analytics firm used by Facebook to identify disinformation on its platform, finds that operatives for Russia's Internet Research Agency (IRA) are posing as Americans on social media to stoke divisions, spread suspicion and suppress voter turnout. Using similar tactics to those deployed in 2016, Graphika finds that IRA interference aims to help re-elect President Trump and sought to boost Senator Bernie Sanders' campaign for the Democratic Party nomination, while he was still in the running.

My analysis of Russian-state-owned media reporting on the Democratic primaries between October 2019 and March 2020 confirms a pro-Bernie and anti-Biden bias. To negatively frame Joe Biden, Russian government-funded international broadcaster RT and English-language news site Sputnik frequently reference the former vice president's rough language and gaffes, alleged corrupt dealings in Ukraine, and links to Wall Street and the Washington establishment. Bernie Sanders, meanwhile, is sympathetically presented as the alleged victim of socialist fearmongering and Russophobic conspiracies peddled by America's corporate media and Democratic Party elites to undermine support for his populist policies. Hoping to influence American voters, Russia's English-language media portray Biden as a compromised candidate who nonetheless receives establishment backing. Although devoting less airtime to the U.S. primaries, Russia's domestic state-controlled broadcasters NTV and *Pervy Kanal* offer similar narratives to RT and Sputnik, suggesting a choreographed disinformation campaign. Freely available on the internet, news broadcasts by NTV and *Pervy Kanal* are widely watched by Russian speakers in the U.S. who number more than 850,000. It is likely that propaganda concerning U.S. elections and primaries in the Russian-language media is aimed more at this diaspora than at domestic Russian audiences.

## Highlighting Biden's Weaknesses

The Russian media's main line of attack against Biden is to repeat widely discredited claims that he sought the removal of Ukraine's prosecutor Viktor Shokin to shield his son Hunter from an investigation into his work for the Ukrainian gas firm *Burisma*. On NTV, 13 of the 35 stories on the former vice president during the research period use *Burisma* as a bludgeon to beat Biden. On January 31, the channel featured an interview with Shokin in which he suggested Biden could be behind attempts to poison him. RT also gave airtime to Shokin's accusations, including that Biden leveraged $1 billion in loan guarantees to have him fired. In one RT report, Shokin claims Biden "believed that Ukraine was his private property, his fiefdom and that he could do whatever he wanted here." RT further suggested that the mainstream U.S. media are under gag orders not to report on allegations against Biden. On *Pervy Kanal*, Russia's most popular news source, 15 out of 19 news reports featuring Biden included allegations of corruption related to Ukraine. On December 16, the channel's flagship news program *Vremya* broadcast an interview with Trump's personal lawyer Rudy Guiliani accusing Biden of extortion, money laundering and blackmail. Guiliani appeared in two similar *Vremya* reports in October.

The Russian media also highlight Biden's frequent shows of machismo and verbal blunders to cast doubt on his suitability for office. On March 10, Sputnik reported on a fiery exchange between Biden and a potential voter over gun regulation. During the confrontation Biden told his gun-enthusiast interrogator, "You are full of s**t." Sputnik further noted that this was not Biden's first standoff with a voter. In November 2019, the Kremlin-backed news site reminded its readers, Biden called an Iowa voter "a damn liar" for taking him to task over his son Hunter's business activities in Ukraine. The Sputnik report included Tweets from U.S. voters condemning Biden's use of profanity and intimidation. Russia's domestic broadcasters, however, did not cover Biden's macho posturing, an unusual omission given their penchant for sensationalism and scandal. This exception may be explained by President Putin's own use of coarse language and macho displays to bolster his everyman credentials.

Biden's tendency to misspeak is another line of attack used by Russia's media to undermine confidence in his ability to lead. After he seemed to imply that voters should re-elect Trump and forgot that he was running for the White House and not the Senate, Sputnik questioned 78-year-old Biden's cognitive abilities. NTV raised similar doubts when he confused his wife and sister in a victory speech on Super Tuesday. But 77-year-old Bernie Sanders has not been spared similar questions about his age. In a report speculating on his potential running mate, Sputnik recalled that Sanders had a heart attack in 2019. Another Sputnik report unfavourably compared septuagenarians Biden, Sanders and Mike Bloomberg (78) to enfeebled, elderly leaders of the Soviet Union. But their age was not the only attribute used to attack Democratic presidential hopefuls. After winning the Iowa caucuses, Pete Buttigeig was disrespectfully described on NTV as "gay and with an unpronounceable surname." RT, NTV and Sputnik criticised billionaire Bloomberg for seeking to "buy" the Democratic nomination with his self-funded campaign, while repeating President Trump's diminutive for the former New York mayor, who he mocks on Twitter as "mini Mike."

## Seeking to Divide the Democrats

A controversial figure among many Democrats, the Russian media used Bloomberg as a wedge to widen intra-party divisions. His decision to pull out of the race in favor of Biden was presented by RT and Sputnik as part of an establishment stitch-up to deny Sanders the nomination. A Sputnik report on March 9 accused centrist candidates Buttigeig, Bloomberg and Amy Klobuchar of dropping out of the race at the same time to do maximum damage to Sanders. To create a fake sense of "Joementum", RT claimed African American senators Kamala Harris and Cory Booker, who previously accused Biden of racist associations, were pressured by party apparatchiks to endorse him. RT also reported on a purported "leak" that frontrunner Biden planned to appoint Bloomberg and other prominent Wall Street figures to his cabinet. The report included angry social media posts by American voters accusing Biden of subservience to "banksers" from Wall Street's "oligarchy."

Whilst framing Biden as the-business-as-usual choice of Democratic Party elites and their friends in finance, the Russian media presented Sanders as the people's champion, challenging the status-quo. RT noted that many of Sanders' policies are popular, with the majority of Americans supporting his plans for extending Medicare to all, eliminating student debt and raising the minimum wage to $15 an hour. Russia's domestic and international media all condemned Sander's centrist rivals for labelling him a socialist, or even a communist, to demonise his radical agenda.

Reports in the U.S. media of Moscow-backed meddling in the 2020 primaries to help Sanders were widely dismissed as a hoax by their Russian counterparts. On March 7, Sputnik charged America's corporate media with playing on widespread Russophobia in the U.S. to tarnish Sanders by inferring he was the Kremlin's preference to take on Trump. An RT report on February 22 reminded audiences that Sanders was not the only anti-establishment Democratic hopeful smeared by false association with Russia, recalling that Hilary Clinton allegedly accused Hawaii congresswoman Tulsi Gabbard of being a Russian agent. The same report claimed U.S. corporate media owners stood to gain by discrediting Sanders, who was then gaining in the polls, as under his administration they would pay billions more in tax.

Clearly Russia's English- and Russian-language media backed Bernie over Biden, but why might the Kremlin have been "feeling the Bern?" Senator Sanders publicly disavowed any Russian efforts to bolster his campaign, sending a message to Vladimir Putin to "Stay out of U.S. elections." Sanders has also repeatedly warned that Russia exemplifies the global rise of authoritarianism and that Putin is seeking to weaken Western liberal democracy. Any effort by Moscow to promote Sanders, therefore, was more likely aimed at disrupting the 2020 general election and undermining voters' confidence in U.S. democracy than achieving concrete policy goals.

## Advancing Russia's Interests

Yet, there are some policy difference between Sanders and Biden that might have made the former more appealing to the Kremlin than the latter. Despite warning of the threats posed by Russia, Sanders also signaled

he would work with Moscow on arms control, climate change and other issues. Joe Biden, meanwhile, is a more strident critic of the Kremlin, advocating containment over engagement with Russia. The former vice president is a long-time champion of NATO and backs its eastwards expansion. In 2009, he supported the so far unsuccessful ambitions of Ukraine and Georgia to join the alliance. Biden further argues that NATO should send more troops to Eastern Europe to deter Russian aggression and is in favor of extending the sanctions against Russia implemented by the Obama administration in 2014 following Moscow's annexation of Crimea. Biden has also touted sending weapons to Ukraine to help fight against Russian-backed insurgencies in its eastern regions. Sanders, by contrast is against expanding NATO membership and providing military assistance for Ukraine because such moves risk provoking conflict with Russia. Sanders is no friend to the Kremlin, but Biden is a clear adversary. A desire to block Biden from the Democratic nomination, therefore, may better explain Russia's meddling on behalf of Sanders than a genuine preference for the Vermont senator.

Another theory for the Russian media's bias for Bernie over Biden is that Sanders would have been an easier opponent for Kremlin-favorite President Donald Trump to defeat in the general election. The Kremlin may have calculated that Sanders' association with socialism would limit his support among moderate voters. This is perhaps the reason why Russia's media talked up Sander' populist credentials. His radicalism plays well with left-leaning Democrats and gave him momentum in early primary races. But even before the coronavirus crisis placed a premium on stability, Sanders' promises to break the capitalist status-quo limited his potential appeal to the wider national electorate. Although aggregate polling by FiveThirtyEight at the end of March showed that both Sanders and Biden would beat Trump in a general election, in most polls Biden held a stronger lead over the president.

Russia may also have believed that not only would Trump be more likely to beat Sanders, but that a head-to-head with the democratic socialist senator would engender more division and distrust among Americans than a showdown with Biden. By his own acknowledgment, certain over-enthusiastic elements among Sanders' support-base engage in harassment against his rivals, both online and off. If Sanders had become the Democratic nominee, both major party candidates could have been framed as illegitimate for receiving Russian "help" for their campaigns. And even though Biden is his almost certainly his party's pick now Sanders has dropped out of the race, Russia's disinformation campaign will have done its job if Sanders fans stay home on election day, angry at the former vice president for repeating allegations that the Russians "like Bernie." In 2016, by staying home or voting for third-party candidates, Sanders' diehards contributed to Hillary Clinton's defeat, especially in rustbelt states. To increase the likelihood of history repeating itself, Russia's media stoke resentment that Sanders has been cheated out of the nomination by the Democratic establishment, as allegedly happened in 2016. To rub salt in the wounds of Bernie's supporters, Sputnik reported on trending anti-Sanders hashtags on social media following his losses to Biden on Super Tuesday. Calling Sanders an "anti-establishment warrior" the report published on 11 March blamed Biden supporters for sending #ByeByeBernie to number one on Twitter.

Russia's disinformation campaigns against the U.S. rely on deep political discord among Americans. Unwittingly assisted by America's partisan press, Russian propagandists, with relatively little effort, coopt real, vitriolic American voices to spread disinformation and division. Many Americans are too busy fighting among themselves to see they are being manipulated. The purpose of the Russian media's framing of the Democratic primaries has been to plant doubts and conspiracies and have them amplified by U.S. voters on social media. So far, the strategy seems to be working.

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## ABOUT THE RUSSIAN ANALYTICAL DIGEST



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