



US and Soviet seismologists informally gather in Moscow in 1982 during a project facilitated by the US-Soviet environmental agreement. (Photo courtesy of Alexander Ponomarev and David Simpson.)



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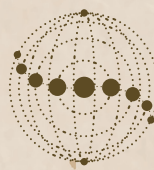


The successes and challenges of US–Soviet scientific communication

Anna Doel

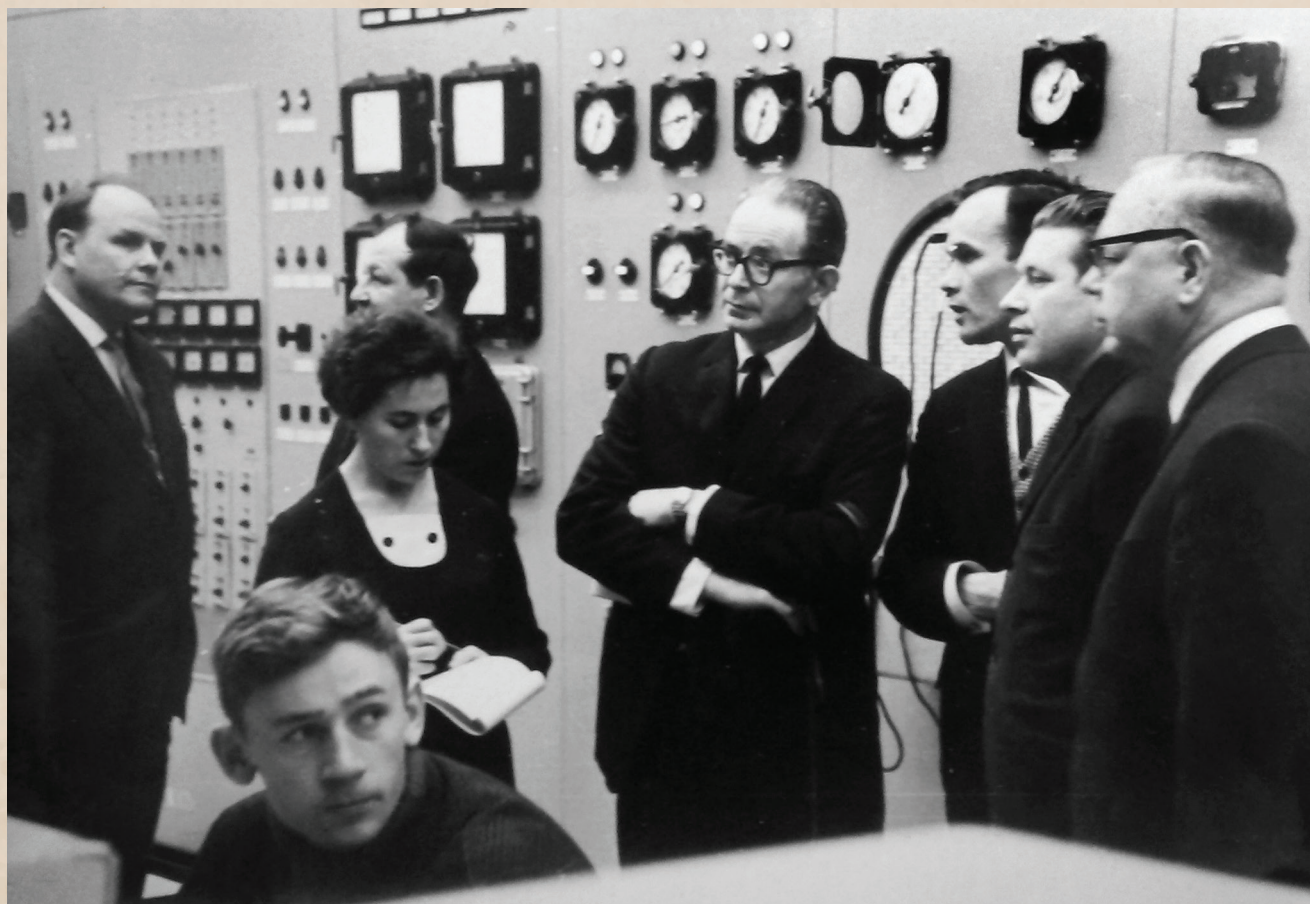
Research exchanges between US and Soviet scientists during the second half of the 20th century may be instructive for navigating today's debates on scientific collaboration.

I've given many talks in the past 10 years about the history of academic exchanges and collaborative research between the US and the USSR. Often, at least one audience member, usually a scientist, shares personal recollections with me. When I mentioned my research to a young postdoc, she said that her father, a plasma physicist, had participated in the exchanges and that stories about his trips to the USSR had become family lore. Hundreds of researchers from various disciplines—including high-energy physics, mathematics, Earth sciences, and astronomy—have shared memories of exchanges in conversations, oral histories, memoirs, photographs, and archival records. (To learn about one US-Soviet radio astronomy collaboration, see the recent *PHYSICS TODAY* article "From radio with love: A Cold War astronomical collaboration" by Rebecca Charbonneau.)



Launched in the late 1950s, a state-approved, academy-administered exchange program brought US and Soviet scientists face-to-face. It continued to evolve with the times and survived several crises in bilateral diplomatic relations, proxy wars, scattered budget cuts, the collapse of the Soviet government, and the sociopolitical upheaval of the Russian "wild nineties."

Despite the longevity of the exchange program, many factors stood in the way of collaboration: ideological differences, mistrust, profound disagreements, and prejudices, among others. Polarization of opinions and calls for a reduction or cessation of exchanges emerged more than once in the scientific communities of both countries. The most productive decades of the US-USSR scientific exchanges and collaborations, the 1970s and 1980s, also



HERBERT ISBIN (center), a nuclear scientist who worked primarily at the University of Minnesota, visits a Soviet atomic power station in the city of Voronezh in 1966 with academician Victor Spitsyn (far left). (Photo courtesy of the University of Minnesota Archives, University of Minnesota Twin Cities.)

Frank Press, a geophysicist and an adviser to four US presidents, helped lead the development of science exchange programs between the US and USSR. As he recalled in an interview,

I had a Russian friend, Professor V. I. Keilis-Borok—Volodya we called him—who I wrote several papers with. And he introduced me to one of the world's great mathematicians, a man named [Izrail Moiseevich] Gelfand. They introduced me to a lot of techniques in computer learning and prediction that I used subsequently in my other work. I learned that technique from them. That was a very valuable contribution.¹⁷

(Photograph by T. Polumbaum, courtesy of the AIP Emilio Segrè Visual Archives.)



included heated discussions in the US scientific community over the USSR's invasion of Afghanistan in 1979. Those debates resemble, in some ways, the current ones of whether to expel Russian scientists from the global professional community because of Russia's aggression in the mid 2010s toward Ukraine and the more recent 2022 invasion.

Beginning of an era

At the onset of the Cold War, scientific dialogue between US and Soviet academic communities was scarce. To arrange a consultation with a Soviet colleague on the other side of the Iron Curtain, a US scientist first had to identify a potential match. One of the few means of doing so was to study Soviet scientific publications in the library. A book and journal circulation program between university and research libraries began in the mid 1950s.¹

Once a collaborator was found, the university, the State Department, the colleague's respective employer, and the Soviet state authority all had to approve of the rendezvous. Correspondence by intercontinental mail could take months, and the response did not necessarily come back positive. At any stage, the process could be stonewalled because of suspicions of intellectual espionage or fear of fraternization with the enemy and defection. Furthermore, national airlines didn't always fly to the cities where professional meetings were held, and entry visas were not necessarily issued for visits by nondiplomatic personnel.

After Joseph Stalin's death in 1953 and Nikita Khrushchev's rise to power, political repression and censorship in the USSR were reduced. In scientific fields, Soviet experts

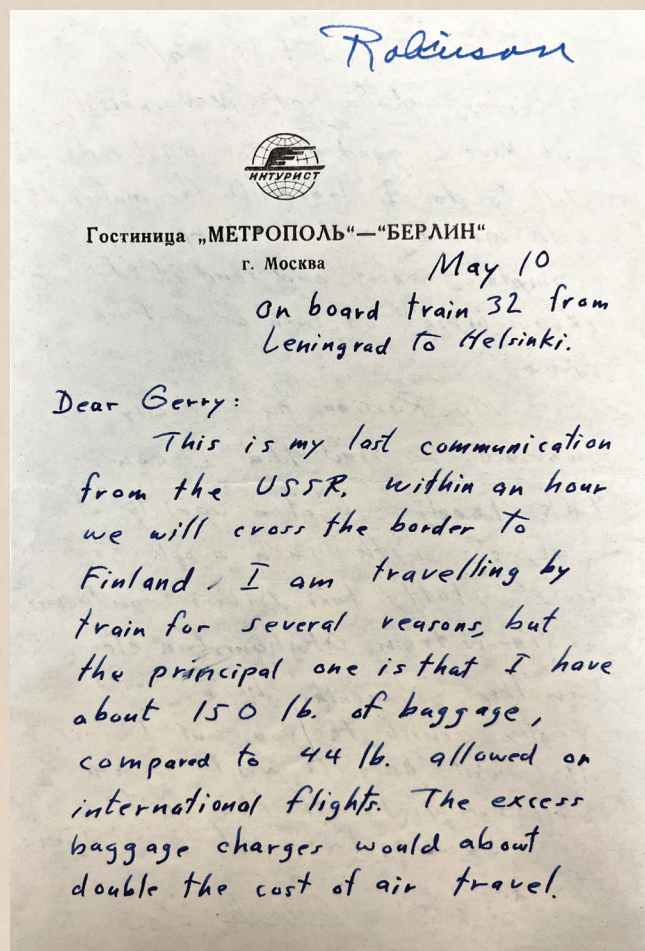
joined international unions, and the USSR participated in the International Geophysical Year, which took place from July 1957 to December 1958.² (See the article by Fae Korsmo, *PHYSICS TODAY*, July 2007, page 38.) New opportunities for US and Soviet researchers to communicate unfolded with the 1958 Lacy–Zarubin agreement. It opened the two countries to various cultural exchanges, and one clause in the agreement allowed for science-related activities. The agreement created a state-supported diplomatic foundation for the US–USSR interacademy program.³

The first, largest, and longest-running academic exchange between a Western and an Eastern country began in 1959. The exchange between the US National Academy of Sciences and the Academy of Sciences of the USSR was launched after their respective presidents, Detlev Bronk and Alexander Nesmeyanov, signed the first of many memoranda of cooperation.⁴ The interacademy program became a communication channel through which most scientific contact was managed. The program was a new, unprecedented financial and bureaucratic concept of science cooperation.^{5,6}

Nuts and bolts of communication

The interacademy program's first decade, from 1959 to 1970, was a bumpy ride. Ideological differences, blocked visas, diplomatic rifts, and bureaucratic hindrances instigated by the State Department and Soviet authorities repeatedly threatened to limit the program or inhibit the productivity of research collaborations.

In the US, Congress and the news media routinely questioned the validity of the exchanges and whether government



THE FIRST PAGE of a handwritten letter sent in 1968 by Clark Robinson, who was on his way back to the US from the USSR, to Gerald M. Almy, the head of the physics department at the University of Illinois Urbana-Champaign. A nuclear physicist at the university, Robinson spent seven months in Novosibirsk working on R&D for electron accelerators. (Photo courtesy of the University of Illinois Urbana-Champaign department of physics.)

should fund the programs. A major concern was that any exchange would be a one-way street of the US science community continuously supplying knowledge and know-how to the science community in the USSR but getting nothing in return. Officials of the National Academy of Sciences and interacademy program participants routinely made public statements and gave testimonies at congressional hearings to defend the program and provide evidence of the mutual benefits of exchange.

A recurring sticking point in an exchange was for everyone involved to approve candidates for visits and agree on acceptable research topics. Cold-climate research, for example, would have given US scientists access to data and locations in the polar regions bordering Soviet military facilities, including missile launch sites and radar-monitoring installations. When the US Public Health Service put cold-climate research on its approved list in 1959, a participating US ge-

ologist, Wallace Atwood, wrote to Bronk that “the Soviets froze up like permafrost.” Ultimately, cold-climate research was not approved for joint exploration.⁷

Gradually, the program expanded from 20 visits per year by a small group of participants to hundreds of visits per year by a vast multidisciplinary network of contacts. In 1966, for example, about 200 US scientists attended the second International Oceanographic Congress, which was held in Moscow.

Amid the 1970s détente in US-Soviet diplomatic relations, the interacademy program provided a model for joint research. With gentle diplomacy from influential scientists—for example, Frank Press, who later served as President Jimmy Carter’s science adviser—an agreement was added to the 1972 Moscow Summit suite of accords for developing “cooperation in the field of environmental protection on the basis of equality, reciprocity, and mutual benefit.”⁸ The objective of the environmental agreement was to create a collaborative forum for US and Soviet scientists to share data and findings and conduct joint research in geographic and epistemological areas that were previously off limits in the exchanges.

By the late 1970s, the environmental agreement spurred progress in at least four large-scale joint research initiatives: atmospheric physics and climate studies, ecosystems and pollution, geophysics and seismology, and wildlife and plant conservation. New programs, including geological field studies in Central Asia, research cruises in the Pacific Ocean, a comparative study of Lake Erie and Lake Baikal, and the tracking of marine-life migration across the Arctic, were running by 1980.

The interacademy exchanges were well populated with participants who found the experience professionally meaningful and culturally rewarding. The scientists were exposed to unfamiliar research methods, data-processing techniques, and ways of thinking. Sometimes, intellectual partnerships between US and Soviet experts yielded new research fields, such as space plasma physics.⁹ In other cases, they brought clarity to debated research issues, such as earthquake prediction; gave global access to scientific technologies, like tokamaks for nuclear fusion; and resolved a concern that stood in the way of banning nuclear tests (see the article by Frank von Hippel, *PHYSICS TODAY*, September 2013, page 41).

Controversy: To hold or to halt?

Despite the successes, the exchanges had some challenges. David Apirion, a microbiologist at the Washington University School of Medicine in Saint Louis, Missouri, had a monthlong interacademy visit to the USSR in 1980. During his trip, he was jailed for one night for openly visiting individuals who were denied permission to emigrate and for raising the issue at the beginning of his lecture in Kyiv.

Apirion concluded from his trip that full members of the Academy of Sciences of the USSR were “extremely privileged

Laura Greene, a physicist and past president of the American Physical Society, shared in an oral history interview:

Two of my mentors, David Pines and Charlie Slichter, in the '50s, the height of the Cold War between the US and the USSR, with huge stockpiles of nuclear weapons, they broke the rules set by the governments and started working with the Soviet physicists. That diversity beautifully changed the face of theoretical physics.

There are many unsolved problems in correlated electron physics, and only a few are solved. They solved one of them by working together. They were in competition, of course. But these two groups of white men, one raised Soviet and one raised American, provided enough diversity to solve the fundamental mechanism of conventional superconductivity.¹⁸

(Photo courtesy of the AIP Emilio Segrè Visual Archives, gift of Laura H. Greene.)



people (very high salaries, a special car provided with two chauffeurs and many other perks)" and that Soviet science was "highly politicized, and the 'Commissar' or his equivalent, not the Scientist, is supreme." He argued that the Soviet scientific enterprise functioned to maintain secrecy and control. Little valuable information, therefore, could be extracted from it for the advancement of research. In view of that, Apirion asked, "Should we sacrifice our principles and dignity to the Moloch of scientific progress?"¹⁰ Apirion never participated in the exchanges again and condemned them as malign and unethical.

Also in 1980, the US boycotted the Summer Olympics in Moscow because of the Soviet invasion of Afghanistan the year before, and communication with the USSR was discouraged. That put some US scientists, including a group of paleoclimatologists who had already accepted an invitation to attend a bilateral symposium in Siberia, in a tough spot.

The scientific leader of the paleoclimatology group, John Imbrie of Brown University, polled colleagues on whether to join the Siberia trip. Some came down against it. "My decision is basically a matter of principles, but I see a finite physical risk involved," one said. "I had already decided that the time has come to make a small personal protest to Soviet action," responded another. Others had more positive opinions: "I am more scared by the recent war propaganda and anti-Soviet propaganda in this country." "We should keep the personal contacts alive and avoid sinking into a cold war situation again." Although the State Department unofficially offered the paleoclimatologists the option to bail out, four of them attended the symposium.¹¹

Despite the political tension, the interacademy program and the environmental agreement continued. In fact, many US participants refer to the 1980s as the golden age of joint scientific work with the Soviets. Toward the end of the Cold War, for example, US and Soviet scientists jointly studied the recently discovered ozone hole in Earth's atmosphere. In August 1991, a Soviet Meteor-3 weather satellite equipped with a NASA ozone-mapping spectrometer launched from the previously secret military-operated Plesetsk Cosmodrome. The launch came just four days before an attempted coup in the Russian government.

Investments in collaboration

In a recent email, Michael MacCracken, a climate scientist and past president of the International Association of Meteorology and Atmospheric Sciences, shared that "the 1980s were the good old days of communication with Russian (Soviet) scientists." What made that sentiment possible? Someone who knows Soviet Cold War history would be tempted to say that the country's opening to the West, the weakening of its ideology, and the lifting of many travel restrictions must have done the trick. That thinking is reasonable, but the situation is more complex.

US-Soviet scientific exchanges and collaborations were particularly fruitful in the final Soviet decade not only because of sociopolitical reasons but also because organizers and participants had made critical investments. For the two decades before 1980, they established the mechanisms of exchange, created a culture of bilateral scientific work, fostered



EARTH SCIENTISTS from the US and the USSR convene in 1978 at Columbia University's Lamont-Doherty Earth Observatory to participate in a science exchange program. (Photo courtesy of the University of Minnesota Archives, University of Minnesota Twin Cities.)

a safe environment of mutual understanding and trust, and found informal ways to work around restrictive official systems.

The collapse of the USSR brought about new challenges, new rules, and a makeover to scientific collaborations. In the 1990s, Russian academic institutions went into survival mode because of a lack of government funding and the emigration of many scientists. The US scientific enterprise benefited from the brain drain—the talent that was gained created a more competitive academic labor market.

Despite the changes in Russia, many previous ties endured. US collaborators organized informal relief operations for Russian colleagues in need, sometimes in unexpected ways. In 1992, for example, astronomer Stanford Woosley spoke to Irving Lerch, director of international scientific affairs at the American Physical Society, about the American Astronomical Society's plan to send funds, disbursed as small grants, to Russian astronomers. Several representatives of the Russian Academy of Sciences each offered to carry \$10 000 in cash to Moscow after a meeting of the World Space Congress in Washington, DC.¹²

Communication breakdown

Collaboration between US and Russian scientists persisted until Russia annexed Crimea in 2014, and it deteriorated quickly after Russia's invasion of Ukraine in February 2022.

In the US, some have advocated for isolating Russian scientists from Western professional communities—part of a larger diplomatic effort to urge citizens of a militant nation to provoke governmental reform—and for directing resources to Ukraine.¹³ Others have argued for the internationality of science and have urged their communities not to penalize Russian scientists for their government's actions.^{14,15}

Unlike in the 1970s and 1980s, those advocating for cutting off collaborations with Russian scientists have carried the debate this time around. Three years into the Russia-Ukraine war, Russian scientists have been excluded from international forums, and their names have been expunged from coauthored articles. Even as global research teams are ubiquitous, US scientists who have ongoing collaborations with Russian counterparts or who are willing to initiate them are hard to find (see *PHYSICS TODAY*, December 2024, page 20).

Perhaps the lack of support is partially because US and Russian scientists have different motivations to collaborate today than they did in the past. The exchanges during the Cold War gave researchers access to new, previously unavailable global and local data; today, robust global networks have reduced the need for local assistance with data extraction. The urge to join forces and fight against a common enemy—the Cold War's threat to academic freedom and independence—has dissipated.

In the 1990s, a team of US and Russian nuclear physicists

and engineers worked together to prevent disastrous accidents by developing and implementing innovative security mechanisms for the Russian nuclear arsenal. Siegfried Hecker, one of the team's leaders and former head of Los Alamos National Laboratory, later was the editor of a collection of essays about the significance and urgency of that unlikely venture. He called the book *Doomed to Cooperate*, a phrase provided by one of the Russians he interviewed. (For more about the venture, see Matthew Bunn's review of the book in *PHYSICS TODAY*, November 2016, page 56.)

Despite evidence of the success and mutual benefit of US-Soviet programs, the productivity of US-Russian collaborations that were adapted from Cold War bilateral models, and the understanding that diverse teams make for stronger science,¹⁶ exchanges with Russian scientists have diminished. In the present moment, when the prevailing opinions seem to disfavor rekindling scientific collaboration, the historic exchanges may offer some guidance for how to move forward.

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