Science diplomacy in action

American Association for the Advancement of Science (AAAS)
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It is wonderful to be back again in Brasilia on a mission related to science and technology. This is only my second visit. In 2002, as the first Science and Technology (S&T) Adviser to the U.S. Secretary of State, I led a delegation of U.S. technical agency representatives to meet with your Minister of Science and Technology to discuss cooperation between our two countries. In fact, there had been a science cooperation agreement between the U.S. and Brazil for more than a dozen years, but there had never been a senior level meeting other than an ongoing dialog on environmental issues. It was an excellent visit, both in Brazilian hospitality and also considerable substance. In just a few days we worked out a multi-year agenda for cooperation involving several agencies on each side and initialed a draft agreement.

From Brasilia, I went on to Campinas to see the outstanding multidisciplinary research center that had developed around your synchrotron laboratory. In Rio, I was very impressed with the Oswaldo Cruz Institute and learned of the ongoing cooperation with our health people in the U.S., and Brazil's desire to expand that relationship. I returned to Washington very pleased with what we had accomplished. However, a few months later, there was an election in Brazil and a change of government; and shortly after that, my own three-year term at the State Department ended and I have had little to do with Brazil since that time.

However, in preparing for this trip, I was thrilled to get a very positive briefing from the State Department. There has been great progress in developing S&T cooperation between our countries. A high-level Joint Commission has been established to stimulate and monitor cooperation.

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At a recent meeting of the Commission chaired jointly by your Minister Rezende and President Obama's S&T Advisor, John Holdren, a wide range of activities was discussed. One of the most active areas is biofuels which has great commercial potential, and is now of special interest after the drilling platform disaster in the Gulf of Mexico. Beyond that, there seemed to be a rich menu of possible cooperative programs, with the two sides sharing costs and personnel to carry out specific projects; and I do hope that this cooperation can be vigorously expanded. Importantly, there also was a frank discussion of problems which still impede our cooperation such as U.S. export controls and visa issues.

Regarding U.S. export controls, a study last year by the National Academy of Sciences, has come out with very strong recommendations for a complete overhaul of the export control regime. That report has been endorsed by the Secretary of Defense, seen by the President and stirred interest in the Congress, so there is a chance for some progress on that issue in the coming year. I very much hope that is the case.

But I came to talk about science diplomacy and we had best get to it. Maybe I should start with an apology for being here, because the title of this session is "Diplomacy for Innovation," and not really science diplomacy. My warnings that I might disappoint everybody were politely ignored, but I do think you will find it useful to go through with me the taxonomy of the expression "science diplomacy." These two words have become extremely popular. President Obama and the very strong science team in his administration refer to it frequently. His speech in Cairo featured a major initiative to begin serious U.S. engagement with the Muslim world through cooperation in science and technology. Secretary of State Clinton speaks eloquently of the importance of science diplomacy in international relations and U.S. development assistance programs. The Japanese foreign office has studied it at length and concluded that Japan's strong S&T capabilities can be effective instruments for beneficial engagement with both developed and developing countries. The British Foreign Secretary has given a major address on the subject and a Chief Scientific Adviser has been appointed to the British Foreign and Commonwealth Office.

Probably the best overall analysis of the state of the art of science diplomacy and its relevant vocabulary is in the report released in January this year by the British Royal Society, based on a two-day conference convened in London last summer in partnership with the American Association for the Advancement of Science (AAAS). The report titled "New Frontiers in Science Diplomacy," is on the Royal Society and AAAS web sites and is a must-read for anyone interested in the subject. It is also apparent that different countries and different people and organizations see science diplomacy in different ways.

The report considers three dimensions of science diplomacy. First is science in diplomacy, which means informing policy objectives with scientific advice. Examples are the large global issues

that countries must deal with in their foreign relations such as climate change, global health, food security, energy, nuclear weapons, arms control, etc. We must apply the best available science to develop optimal solutions to these challenging issues that affect all nations and are currently the stuff of intense diplomacy. And, by the way, now faced with the oil well blowout in the Gulf of Mexico, we can add offshore drilling to the list of issues.

The second dimension is diplomacy for science, which means governments facilitating and coordinating the funding of international science cooperation for the benefit of science. The European Nuclear Research Center (CERN), and the Large Hadron Collider located at CERN are examples. ITER (the nuclear fission energy experiment being built in France with multiple country partners), and the International Space Station are two more examples. A great deal of diplomacy was involved in getting all of these facilities and programs agreed on, funded and underway.

The third dimension is science for diplomacy, which means international cooperation in science carried out for the purpose of engaging with other countries in order to improve overall relations—relations which in fact may at times be quite bad. This is the aspect of science diplomacy that we have emphasized at AAAS, which is a non-governmental organization (NGO). Because NGO's can often more easily undertake such initiatives than governments, we created two years ago the AAAS Center for Science Diplomacy to focus on this area. I presently serve as Senior Advisor to this Center.

Certainly, international S&T cooperation is not a new phenomenon. Scientists for many years have cooperated with colleagues in other countries on problems of common interest. However, there is one important difference between international science cooperation (which I also believe in very strongly) and science diplomacy. While the cooperative activities in both cases are similar, the difference is in the motivation behind the cooperation. One is done for the science, while science diplomacy is motivated by a desire to improve relations between countries through scientific engagement. Of course, the science should be mutually beneficial and of good quality, and there should be cooperative projects with defined goals, but the underlying motivation is to improve relations. The selection of science as an appropriate area for initial engagement is supported by polling data showing that even in countries where political relations with the U.S. are quite bad, respect for U.S. science and technology is often quite high. It is also true that if the cooperative projects are successful, some easing of relations may also occur.

The engagement motivation for science diplomacy complicates supporting these programs from normal science budgets. Generally, science funding in the U.S. is based on peer review of the science and federal funds from technical agencies are appropriated for the benefit of U.S. science—not for international relations. We have urged for several years that funding for science diplomacy should come from the foreign policy budget and then be made available to science

organizations for carrying out the programs. This year for the first time, the State Department was given five million dollars by the Congress for funding science cooperation through an NGO. It is going to another NGO and not to us at AAAS, but this is a very encouraging precedent. So far all of our AAAS science diplomacy activities have been funded by private foundations that have been inspired to support science cooperation as a contribution to creating a more peaceful world.

Of course science diplomacy is not a new discovery. It has been around for a long time, but is being actively talked about today far more than ever before. Let me share with you some examples that I have been involved in over the past 50 years. They all represent engagement in science or technology with other countries.

There is a famous photo taken in 1959 of a determined Richard Nixon lecturing Soviet Premier Nikita Khruschev with outthrust finger almost jabbing the Premier in his chest. The picture was later used by Nixon when he ran for President to show how tough he could be with the Soviets. It was a scene from the American National Exhibition in Moscow—a major event showing many aspects of American life that had been agreed on between President Eisenhower and Premier Khrushchev during a slight thaw in the Cold War. I was a Russian-speaking guide at this 40-day long fair and the picture was taken as the two leaders visited the kitchen of a model American home and were arguing about whether working families in Russia and the U.S. could afford such fancy kitchens.

The U.S. was trying to show to 50,000 Russians per day what life is like for the average American family. I was demonstrating a plastic molding machine, producing hundreds of little cups each day, so my exhibit was a kind of technology diplomacy event. But most of a guide's time was spent answering hundreds of questions each day about life in the U.S. The Russian people were intensely curious about America, with which they had had no contact since World War II. What they saw and heard about the U.S. was mainly anti-American Soviet propaganda.

This time in Moscow was also my honeymoon. My wife and I were married just a few days before departure. She also ended up working at the Exhibition—handing out cups of Pepsi Cola. That was my start in such diplomacy—interpreting for President Nixon and Premier Krushchev when they came to see the machine at my exhibit. And just last month when the Russian Minister for Science and Technology Fursenko visited AAAS, one of the professors in his delegation said he remembered being at that Exhibition—when he was nine years old. The impression it made on him has lasted for 51 years.

Or take another example from the days of the Cold War. The nuclear physicists in both the U.S. and the Soviet Union who had built the atomic bombs realized that a full nuclear war between

the two countries might be the end of civilization. They organized themselves into what became a fully international group called Pugwash dedicated to the elimination of nuclear weapons. In time, these conversations became informal channels for communication between the U.S. and Soviet governments and eventually moved to a more formalized, but still non-governmental, bilateral structure between the U.S and Soviet Academies of Sciences. I truly believe these linkages played a major role in saving the world from nuclear catastrophe during the Cold War. Furthermore, the original Pugwash organization still exists and has been quite active in dialogs with China, Iran, etc., as well as with lively networking among members on security policy developments around the world.

The first real science diplomacy initiative by the U.S. Government was taken by President John F. Kennedy himself in 1961. Japan was still rebuilding from the devastation of World War II and the Cold War between the Soviet Union and the U.S. was intensifying. At that time, Edwin Reischauer, a Harvard Professor and President Kennedy's choice for Ambassador to Japan, wrote an article referring to the "broken dialog" in U.S.-Japan relations. He sensed a breakdown in communication and understanding between the intellectual communities of the two countries. Japanese universities seemed increasingly sympathetic to the idealistic appeals of the communists rather than the path on which Japan was rebuilding.

Reischauer wanted to fix the "broken dialog." And so later that year at a White House dinner in honor of Japanese Prime Minister Ikeda, the President announced the creation of three U.S.-Japan Committees: one at cabinet level on economic issues; one on cultural issues with university scholars; and, for the first time ever in U.S. diplomacy, a Joint Committee on Scientific Cooperation.

The chairman of the Committee on the U.S. side was Harry Kelly, who had been General MacArthur's science advisor during the U.S. occupation of Japan. He was also seen as a hero by the Japanese science community for having supported the recovery of Japanese science after the war. The Japanese chairman was Professor Kaneshige, a small and frail-looking man, but one of great character and authority. As science advisor to the Prime Minister, he guided this initially contentious program to a successful launch in the Japanese university research community. The implementing agency in the U.S. was the National Science Foundation (NSF), which set up an office in Japan to facilitate communication and the Japanese responded by modifying appropriate agencies to manage the program on their side.

The program moved very slowly at first as funds had to be appropriated in both countries, members of the Joint Committee appointed, implementing offices established and acceptable scientific projects identified for cooperation. In 1963, when I joined the NSF, the program was just getting started and I became its first permanent director. There were a number of problems.

It was not easy to find projects that could be truly cooperative because the level of science in Japan in terms of laboratories and equipment was well below that in the U.S. Secondly and unexpectedly, there was even criticism of the program from President Kennedy's Science Advisor, who was concerned that science funded to achieve a "political" purpose was not subjected to as rigorous peer review as other research projects and hence might be second-rate science. On the Japan side, some professors were reluctant to get involved with the U.S. Also, too few Japanese and American scientists knew each other to even think about cooperating—in addition to the huge language barrier.

To bring scientists in the same field together from the two countries, we funded many workshops, of course with interpreters, in the belief that common interests and personal acquaintanceships would lead to joint projects. And this was what happened as we began funding projects on earthquakes, cancer and marine sciences. Ultimately, the program was recognized as a great success in both countries. Remarkably, it still exists today, although in a different form without special funding and more appropriate to cooperation between equal partners. It also has served as a model for other international activities with other countries.

I also moved on from NSF to a unique experience as the first scientific attaché in Eastern Europe based in Warsaw, Poland with responsibility also for Czechoslovakia and Hungary. The U.S. Ambassador to Poland at that time had specifically requested a scientist on his staff to begin to develop contacts in the very active Polish science community. Despite all the problems and a very hostile political environment because of the war in Vietnam, we were able to begin some cooperation and generally found a friendly reception in the science community—especially in Poland where so many families had relatives living in the United States.

In 1969, I had the good fortune of joining the White House Office of Science and Technology (OST, the forerunner of today's OSTP), as the international affairs assistant to the President's Science Advisor. That was a time when Henry Kissinger (as National Security Advisor) and President Nixon truly monopolized the formulation of U.S. foreign policy. The two men were also great supporters of science diplomacy—without calling it that. It seemed that whenever they visited a country, they proposed a follow-up visit about science. Two examples were Romania and France, where President Nixon saw a chance for better relations through science cooperation; but the high points were China and the Soviet Union in 1972. The history of President Nixon's surprise visit to China, which eventually led to diplomatic relations, is well known. What is not generally known is the role that science played in the process.

While preparing secretly for the President's trip, Dr. Kissinger one day said to my boss, that in addition to the geopolitical change that was being discussed with the Chinese, the President wanted to offer something concrete, something of direct tangible benefit, such as cooperation

in science. I was given the task of putting together some substantive proposals that could be offered to the Chinese as part of the total diplomatic package. Of course, it had to be done quickly and in complete secrecy. With some help from our National Academy of Sciences and several knowledgeable colleagues in OST, we produced some 40 specific initiatives for science cooperation in non-sensitive areas that we thought would be of interest to the Chinese. These proposals became part of the package that went to Beijing, and in the famous Shanghai Communiqué at the conclusion of the visit, science was mentioned as one of the areas where future cooperation was expected. Some time later, when the Chinese signaled that they were ready to begin cooperation through a non-governmental body, the National Academy of Sciences, (which despite its official sounding name is a non-governmental body), was chosen as the responsible U.S. organization and the first modest visits and exchanges began.

After the U.S. and China established diplomatic relations in 1979, cooperation began in earnest. A trip to Beijing, led by President Carter's Science Advisor with representatives from some 19 U.S. technical agencies, had already set the stage for what has now become our largest official cooperative program. Furthermore, hundreds of U.S. companies have invested in China, many of them with research activities there. Since the S&T cooperation agreement was signed by President Carter, well over a million Chinese students have come to the U.S. for study, some 2/3 of them in science and technology. At the beginning perhaps 90% of them did not return to China, becoming university professors, researchers in U.S. companies or entrepreneurs starting their own businesses. It is interesting to see that the children of these immigrant Chinese scientists and engineers are today among the most talented of our young scientists in the U.S.

Presently, many more Chinese students are returning home with their advanced degrees. And Chinese institutions are now actively recruiting, with some success, among long-time Chinese residents in the U.S. with offers of excellent research facilities, fully competitive salaries, and attractive living arrangements. One does not hear much today about brain drain—it is more about brain circulation. The truth is that the U.S. still depends on foreign researchers. Not enough young Americans are attracted to careers in science and engineering.

But Nixon and Kissinger were not yet finished with their science diplomacy. Only a short time after the 1972 breakthrough with China, President Nixon was in Moscow for a summit meeting with Leonid Brezhnev. At that time seven different science-related agreements were signed that had been in preparation for over a year. At OST, we had prepared the agreement establishing for the first time a Joint Commission on S&T cooperation with the Soviet Union. And when Brezhnev came to the U.S. a year later there were additional agreements involving specific agencies. Of course, there were difficulties and opposition in the U.S. to "cooperating with the enemy," but these programs clearly provided a degree of access to Soviet scientists and institutions that had not existed before. Cooperation under the general agreement continued until 1979

and the Soviet invasion of Afghanistan, when President Carter essentially cut off all cooperative activities. However, in 1993, after The Wall had come down and the Soviet Union dissolved, an almost identical agreement was signed with the Russian Government. It was renewed again in 2005. However, cooperation today is in my view not yet what it should be. There are a variety of reasons, including major reorganizations in the Russian science community; an increased focus on economically useful, applied research at the expense of the basic research for which the Russian Academy is noted; and certain bureaucratic issues on both sides with visas and customs, exacerbated by a period of cooling relations between the two countries. However, with recently renewed interest in cooperation on both sides, I am hopeful this situation will be improved.

Brazil's recent diplomatic initiative with Iran has attracted great attention in the world. It will be very interesting to see how this plays out, with the UN considering tougher sanctions against Iran at the same time. At present, U.S. relations with Iran, which have been bad since 1979, are getting steadily worse. The U.S. wants to increase sanctions because of the Iranian uranium enrichment program, which many people believe is a key part of a nuclear weapons program.

The U.S. National Academy of Sciences began to explore science engagement with Iran in 1999. Since then about 20 joint seminars and workshops have been held with Iranian scientists and some useful exchanges in both directions have taken place. However, the already severe sanctions regime against Iran by the U.S. has greatly limited any real cooperation. My wife and I have been on two Academy missions—the first in 2004 gave us a chance to visit several universities and science parks and lecture on science policy. In 2007-8, several high-level visits of U.S. university presidents and Nobel Prize winning scientists arranged through Sharif University were quite successful, although not leading to any sustained relationship or program. One particularly memorable trip was for a seminar proposed by Iran entitled "Science: Gateway to Understanding," which also included former Iranian President Khatami as a speaker. We actually agreed at the end to try to reconvene that seminar once every year or two. However, the hardening of U.S. policy toward Iran and the incendiary rhetoric of the Iranian leadership, along with their continuing uranium enrichment program, has made exchanges increasingly difficult. Although three workshops with Iranian scientists took place last year, all were held in third countries. It is to be hoped that Brazil's recent initiative with Turkey to deal with the uranium enrichment problem will mitigate the situation, but there is a danger that it may be too late to avoid more serious trouble.

If one can imagine a worse political situation than with Iran, it is with North Korea. For several years, we at AAAS had been trying to make a science visit to North Korea, but despite a number of visits to the North Korean diplomatic mission in New York, we had met with no success. However, last September I accepted an invitation, which came from a South Korean, for a

two-day trip to attend the dedication of a remarkable institution called the Pyongyang University of Science and Technology or PUST.

The 14 modern and attractive buildings of PUST were built with funds donated mainly from Koreans in South Korea and the U.S. The plan is to eventually have 2000 students from the North Korean elite, with lectures in English at both graduate and undergraduate levels provided by foreign instructors. The man who raised the money and built the institution is a Korean-American named James Kim, who also built a similar institution in the Yanbian Korean Autonomous Region of China. After seven postponements, he was formally confirmed as Operating President of PUST at a ceremony last September, with students enrolled and the official opening slated for April of this year. That opening has now been postponed until September, but nothing is certain. The recent sinking of the South Korean ship has brought North-South relations to a new low, and that could lead to further delays.

The present chairman of AAAS is Professor Peter Agre of Johns Hopkins University, who won the Nobel Prize for chemistry in 2003. He has embraced our science diplomacy program with great enthusiasm and has a special interest in North Korea. AAAS has joined together with two other NGO's and a university to form a consortium for developing science cooperation with North Korea. After several years of trying, this group was recently invited to Pyongyang by the Korean Academy of Sciences to spend a week discussing possible cooperation. The visit went very well and included visits to a number of institutes. The next step would be for a reciprocal visit by the Koreans to the U.S, but it now seems likely that this visit will have to wait for improvement in the overall political atmosphere.

AAAS also partnered with another NGO in Washington in a fascinating science visit to Syria, in which we spent more than one hour with President Bashar Assad. He clearly enunciated his desire to get more research into his universities that could support more knowledge-based industries in Syria. The follow-up has been that we have been hosting at AAAS for the past four months a brilliant young Syrian woman who is a highly qualified medical bioscientist. Her assignment is to define a modest program of bilateral cooperation. While this relationship will always be subject to the tensions that periodically inflame the Mideast, we are still hopeful that these efforts, all funded by a private foundation, can result in some extended engagement between our science communities.

The visit to Cuba took place in the hope that early comments by the Obama administration would lead to some relaxation of constraints on dealing with Cuba. While that has not been forthcoming, our team that visited Cuba, which was also led by Nobelist Peter Agre, was received with great enthusiasm by the Cuban scientists. Our people in turn were quite favorably impressed with Cuban competence in biotechnology. However, a planned follow-up visit

scheduled for this week was suddenly postponed, saying that the responsibility for the visit had been moved from the Foreign Ministry to the Science and Technology Ministry and that would take some time to arrange. We are not quite sure what that means. Furthermore, it is not clear whether any further liberalization of U.S. policy toward Cuba will be forthcoming. If it does, there would be considerable potential for cooperation, particularly in the area of biotechnology.

Our most recent science diplomacy mission was to Myanmar. It was arranged by a young Burmese, now a U.S. citizen in Washington with family connections in the Ministry of Forestry in Myanmar. He recognizes that there are many bad things in Myanmar but urged us to visit to see that it is not all bad and that there may be some opportunities for cooperation. We were very graciously received in four ministries—Health, Forestry, Science and Technology, and Foreign Affairs. There would be opportunities for cooperation in environmental issues, forestry conservation, protection of tigers, AIDS and malaria, and perhaps some general areas of science and technology. Fellowships for graduate or post-doctoral work abroad are badly needed to provide advanced training for university instructors and future researchers in Myanmar. Because of the very strong "Free Burma" campaign in the U.S. against any softness toward the present Myanmar leadership as well as the manifest human rights abuses of the regime, the U.S. sanctions against Myanmar are quite severe. However, if private funding can be secured, there should be possibilities for a modest beginning of engagement. An increase in the number of advanced science students coming to the U.S, for study would be a good and easy first step in such engagement.

So what have we learned from these experiences? We know that science is an area in which we can find a common language and understand one another. Secondly, we know that scientists are often very influential in their countries and as mutual trust is developed, contacts in the host country are often broadened to include very important people. Furthermore, both sides begin to see that we have the same problems of water, energy, pandemic disease, climate change, etc., and that it makes sense to find ways of working together on those common problems. And finally, we know that it is possible to have good workshops and sometimes good projects, despite many barriers.

We also know that if we work with a country where relations are bad, we will be criticized at home for "helping the enemy." It takes some fortitude to pursue engagement with what may be considered nasty countries or countries with nasty regimes. But one also has to be careful to be working with the right people in those countries. Sometimes the people are taking a risk by working with us. But sometimes such contacts can turn into opportunities for so-called Track II meetings, where serious political issues are explored in a non-governmental context and the results provided to governments to see if formal negotiations are justified. Such meetings, including so-called Track 1.5 meetings, which may include some government people, have been useful in the past in moving the 6-party talks forward with North Korea.

In conclusion, it is often not so difficult to arrange the first meeting in science diplomacy. The challenge is in the next steps: to determine the areas of mutual interest, to get approvals on both sides, to secure the necessary funding, and then to move forward with a modest, but substantive, program. One usually has to face down some critics and it may be difficult in the present funding environment in the U.S. to secure adequate funding. I personally believe, however, that for a really good program, resources can be found. And I also believe that for the future of the world this kind of engagement is very much worth both the trouble and the modest amount of funding involved. For me, science diplomacy is a truly noble cause.