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Academic Science Engagement with North Korea

by Hyunjin Seo & Stuart Thorson

Science diplomacy refers to international scientific cooperation aimed simultaneously at advancing scientific knowledge and improving and strengthening broader relations between participating countries and groups. Science diplomacy has proved to be especially helpful in engaging countries where traditional diplomatic relations have been problematic. Successful science depends on the trusted application of shared protocols and thus encourages the development of trust among participants. In this paper we present evidence from a long-term academic science engagement between the United States and North Korea (DPRK; the Democratic People's Republic of Korea) that (1) sustained science engagement provides a valuable context for developing trust between individuals from countries with strong political differences, and (2) this trust can spill over into more traditional diplomatic engagements.

We describe an academic engagement in the area of information science between Syracuse University (SU) in the United States and Kim Chaek University of Technology (KUT) in North Korea. This engagement has been carried out in close cooperation with the Korea Society, a nongovernmental organization (NGO) located in New York City. The science engagement was initiated in 2001 and has to date resulted in 13 exchanges of scientific personnel and in the construction and implementation of the first digital library in North Korea. The trust-centric nature of collaborative science is especially relevant in engaging North Korea because, as with some other Northeast Asian countries, trust flows more from relationships than from quid pro quo contracts. Thus, we argue, science engagement provides a

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useful context for developing the relationships ultimately required for more broad-gauged cooperation.

We then discuss several follow-on science collaborations, including the four-nation Regional Scholars and Leaders Seminar Program for Chinese, North Korean, South Korean, and U.S. information scientists and linguists; the first-ever participation by North Korean undergraduate students in the Association for Computing Machinery's International Collegiate Programming Contest; and the U.S.-DPRK Scientific Engagement Consortium based in Washington, D.C.

The paper concludes with a discussion of lessons learned regarding the role academic scientists, acting both as educators and researchers, can play in helping to create the conditions for more familiar forms of diplomacy. This is of particular relevance in the United States, where academic institutions have an enhanced (though nonetheless constrained) legal capability to deal with academics in countries such as North Korea where many other modes of cooperation might be nearly impossible. When properly administered, science diplomacy can leverage the global credibility of U.S. science to provide an important mechanism for supporting more traditional diplomatic relationships.

Science and Diplomacy

There are many, often incompatible, definitions of diplomacy and related terms such as cultural diplomacy, science diplomacy, and public diplomacy. Although these definitional differences are interesting and have scholarly consequence, a systematic treatment of them is beyond the scope of this paper. For our present purpose, diplomacy can be understood as engagements that include, but need not be limited to, the intent to enhance cooperative relations between the participating parties. In this paper we are interested in a particular kind of diplomacy—that which involves the building of robust trusted engagement between science entities in countries where there are minimal official diplomatic relations.

Prior to getting to the case, however, we want to make a few more general points regarding science diplomacy and how it relates to more traditional forms of diplomacy. In its strictest sense, international diplomacy refers to negotiations among official representatives of nations. However, the science and technology of a nation are an important factor that can influence foreign publics' views on the nation. For example, the Pew Global Attitudes Project showed in 2002 that people around the world have high admiration for U.S. science and technology despite their rejection of "Americanism," such as the diffusion of U.S. ideas and customs.¹

Historically, science engagement helped countries with minimal official diplomatic relations build mutual trust. Examples include U.S. civilian scientific exchanges with the Soviet Union during the Cold War, U.S.-Japan science and technology cooperation in the 1960s, and the U.S.-China Agreement on Cooperation in Science and Technology in 1979.² However, the issues can become especially complex in this case. Although a scientist qua scientist is often able to go places an official government representative might not be permitted, it is also the case that this scientist is fully subject to the laws and regulations of the scientist's home country. The constraints and complications can seem quite daunting in cases where there exist complicated export control issues (U.S. and UN sanctions against North Korea, for instance) or travel restrictions (North Korea requires a visa for entry, yet there is no issuing authority in the United States, and the United States has no embassy in North Korea).

SU-KUT Science Collaboration

Historical Context

North Korea and the United States have had a long-standing difficult relationship, with hostility between the two countries largely stemming from Cold War politics. At the end of World War II in 1945, the United States and the Soviet Union helped to divide the Korean peninsula, and they effectively administered the peninsula south and north, respectively, of the 38th parallel. The Korean War in the early 1950s, which ended in an armistice not in a peace treaty, brought new dynamics into the U.S.-DPRK relationship. The two countries intensified demonization of each other while often inflating threats from the other side. North Korea asserted that the United States was an imperialist successor to Japan and criticized the U.S. military presence in South Korea. The United States, on its part, maintained for nearly 50 years economic sanctions against North Korea under the Trading with the Enemy Act.³

The latest tensions between the United States and North Korea revolve around North Korea's nuclear program. The first nuclear crisis erupted in the early 1990s when Pyongyang refused to sign a full-scale safeguards agreement with the International Atomic Energy Agency. Amid a heightened tension between the two countries during the Clinton administration, former U.S. president Jimmy Carter visited Pyongyang and helped strike a deal with the then North Korean leader Kim Il-sung. The ensuing agreement resulted in the Agreed Framework in 1994 in which North Korea agreed to freeze and ultimately dismantle its graphite-moderated reactors in return for "proliferation-resistant" light-water reactors, heavy fuel oil supplies by the United States and its allies, and steps toward diplomatic normalization with Washington.⁴

The tension between Washington and Pyongyang did not end, however, with the conclusion of the Agreed Framework. The U.S. government criticized North Korea for allegedly exporting missile technology to countries such as Pakistan and Iran. In 1998, North Korea launched a missile that flew over Japan, a move that drew international criticism. Amid the delays of the promised nuclear power plants, North Korea conducted an engine test of its missile in 2001. The relationship between Washington and Pyongyang took another turn for the worse when President Bush labeled North Korea part of an “axis of evil” along with Iran and prewar Iraq.

Another crucial event was Assistant Secretary of State James Kelly’s visit to Pyongyang in October 2002. About a week after his return, Kelly publicly stated that North Korea admitted to having developed a uranium enrichment program in violation of the 1994 Agreed Framework. Kelly’s revelation stirred great international concerns and strengthened the evil stereotype of North Korea. It is important to note, however, that controversies remain to this day over Kelly’s talks with North Korea, as North Korea presented different accounts of the talks.⁵ According to Pyongyang, the North Korean delegation merely told Kelly that North Korea is “entitled” to have such a program to protect itself from U.S. aggression. It is also important to acknowledge that the United States reneged on the Agreed Framework by failing to meet timelines in delivering heavy fuel oil and in making progress on the two light-water reactors by the target date of 2003.

After Kelly’s revelation, the tension between Washington and Pyongyang escalated. In addition, the two sides failed to open talks, as Pyongyang wanted bilateral talks with Washington but the Bush administration refused to hold one-on-one talks; it preferred instead a multilateral format. Although the United States and North Korea finally agreed on the six-party talks including South Korea, China, Japan, and Russia, negotiations often became paralyzed as Washington and Pyongyang disputed who should take the first step to resolve the issue. Washington asked for the complete, verifiable, and irreversible dismantlement of North Korea’s nuclear program before it would provide any compensation to North Korea. Pyongyang said it would dismantle its nuclear program only when Washington agreed on normalization of relations, a security guarantee, and economic aid.

Along the bumpy road of the six-party talks for five years, the countries have eked out some meaningful agreements.⁶ Implementation of these agreements has been hampered by disagreements on details, however, precipitating new tension in the region. In fact, North Korea conducted an underground nuclear test in October 2006.

Despite these tensions, there have been areas of engagement between the United States and North Korea. These include short-term study tours in both directions, U.S.-based NGOs providing humanitarian assistance, and the 2008 high-profile performance of the New York Philharmonic in Pyongyang. It is important to note here that the DPRK mission at the United Nations has often worked as the only direct communication channel between the United States and North Korea, and it has served as an important contact point for these engagements. It is through the DPRK mission that SU forged its relationship with KUT.

History of the KUT-SU Relationship

The KUT-SU relationship began in late spring 2001 when SU with participation and counsel from the Korea Society began discussing with the DPRK UN mission representatives the possibility of joint academic science engagement in the area of information technology. These initial talks ultimately led to the establishment of bilateral research collaborations between KUT and SU in the general area of information technology. KUT focuses on technology although it offers coursework in a wide range of areas in its role, along with Kim Il-sung University, as a comprehensive university in North Korea. SU is a private research university in upstate New York.

Each university agreed to supply a team of researchers. The interdisciplinary SU team involved scholars from the Maxwell School, the L. C. Smith College of Engineering and Computer Science, and the School of Information Studies as well as the Systems Assurance Institute, the English Language Institute, and the University Library. The director of KUT's Information (Computer) Center was the KUT team leader.

The KUT-SU relationship has gone through four phases. The first phase ended with completion of North Korea's first digital library, located at KUT. The primary research focus during this period was modifying open-source software for use as back-end support in the library and identifying appropriate international standards for use in categorizing information held in the library. The second phase, the Regional Scholars and Leaders Seminar (RSLs) program, enlarged participation to include China and South Korea in addition to North Korea and the United States. The RSLs sessions were held in Beijing and emphasized information sharing and developing language and presentation skills necessary for participating in international scientific meetings. The third phase involved North Korean undergraduate teams of computer scientists participating in the Association for Computing Machinery (ACM) annual International Collegiate Programming Contest. This was the first time North Korean teams had ever participated in this international science competition. The fourth phase saw the establishment of

the U.S.-DPRK Scientific Engagement Consortium aimed at exploring collaborative academic scientific activities between the two countries. These four specific phases will be elaborated later in this paper. The next section explains exchanges of personnel that are at the core of the KUT-SU relationship.

Exchanges of Personnel

Since a DPRK delegation's first visit to SU in 2002, there have been nine exchanges—seven visits to SU by KUT scientists and two visits to KUT by SU participants—and four joint meetings and programs in Beijing (see **Table 1** for a summary of the exchanges). These exchanges ranged from one to five weeks. To ensure that results from the exchanges cumulate, KUT and SU have, as a matter of policy, maintained substantial consistency in the composition of their delegations over time.

An initial delegation led by Vice Chancellor Jong Kwan-chon of KUT visited SU in March 2002. The success of this visit led to an invitation to SU to send a science delegation to KUT in June 2002. During the SU delegation's visit to KUT, the two sides agreed on enhancing resource commitments to the collaboration and adding a written plan for its focused development under the leadership of a KUT-SU Joint Coordinating Group (JCG). In December 2002, KUT sent its delegation again to SU for a meeting of the JCG, which yielded an agreement that the North Korean university would send a team of research scholars to SU for the month of April 2003 to work with SU researchers on joint information technology projects, including digital libraries, machine translation, and decision support. These topics were an outgrowth of the Pyongyang meetings where KUT researchers demonstrated their IT and software development research programs.

As a result of the JCG agreement, a team of five KUT researchers together with one protocol officer who also functioned as a translator arrived in Syracuse in April 2003 for one month of intensive research collaboration with SU scholars. Thirty faculty, graduate students, and professional staff from SU participated in the program activities. The director of the KUT Information Center, who has participated in every joint KUT-SU meeting to date, led the KUT delegation. All research meetings were conducted in English and focused on issues of digital libraries, decision support, and formal methods for proving correctness. Outcomes of these sessions included academic science presentations, in English, of research results by KUT and SU participants and an academic paper, written jointly by representatives of KUT, SU, the DPRK mission, and the Korea Society. The paper was presented at the Asian Studies on the Pacific Coast meetings at the East-West Center in June 2003.⁷

Table 1: Syracuse University– Kim Chaek University of Technology Engagements, 2001–07

Date	Location	Number from DPRK	Activity	Duration (days)	Proximate U.S.-DPRK event
July 2001	Syracuse	3	Orientation	2	
March 2002	Syracuse	9	Discuss research topic	6	January 2002, axis-of-evil speech
June 2002	Pyongyang	20	SU orientation and finalize research topic	5	
December 2002	Syracuse	8	Digital library research	7	October 2002, HEU accusation; December 2002, IAEA inspection at Yongbyon disabled
April 2003	Syracuse	6	Digital library research	35	January 2003, DPRK quits Nuclear Non-Proliferation Treaty
March 2004	Syracuse	6	Digital library research	7	
June 2004	Pyongyang	22	Digital library research	5	June 2004, six-party talks
August 2004	Beijing	22	Technical English as a second language (ESL) education	21	February 2005, DPRK proclaims it has nuclear weapons
November 2005	Syracuse	5	Medical research	8	November 2005, six- party talks break down
November 2005	Syracuse	9	Digital library research and KUT chancellor visit	6	
August 2006	Beijing	22	Technical ESL education	22	July 2006, DPRK test fires seven missiles
October 2006	Beijing	15	Support for ACM computer science		October 2006, DPRK tests nuclear device
October 2007	Beijing	15	ACM computer science	19	

In March 2004, Vice Chancellor Jong again led a team of five KUT researchers and one protocol officer to SU. All the KUT researchers had been to SU previously, and the central research focus was on developing the KUT digital library. According to the SU scientists involved in the collaborations, the North Korean researchers were highly motivated and dedicated, and “they seemed to work nonstop.” The KUT participants impressed their SU counterparts when they gave “excellent” PowerPoint presentations in English at the end of the program.⁸

In November 2005, SU Chancellor Nancy Cantor, Korea Society Chairman Donald Gregg, and KUT Chancellor Hong So Hon signed a Memorandum of Understanding to expand existing scientific research collaboration. Subject to export control and licensing considerations, the MOU expressed intent

to 1) expand twin integrated information technology labs (Twin Labs) at KUT and SU to enhance and accelerate further joint research; 2) continue the Technical English Language Training programs begun in Beijing in August 2005 as the first step in development of Regional Scholars and Leaders Seminar program (RSLs); and 3) exchange junior faculty members from each other's institution.

Work on the establishment of a Twin Labs at KUT is in progress but has faced a major obstacle: export control regulations. However, a shipment of uncontrolled items—lab desks, chairs, tables, and file cabinets—was delivered to KUT in spring 2007. In accordance with the 2005 agreement, a three-week RSLs Technical English Language Training program was held in Beijing in 2006 and 2007. In regard to the scientist exchange program, SU and the Korea Society, with the collaboration of Korea Fulbright Foundation, received a grant from the United Board for Christian Higher Education in Asia to support a five-year program designed to bring five to six North Korean junior faculty members annually to SU. To date no scholars have come to the United States under this program.



KUT presentation to SU team in Pyongyang (June 2004)

Phase 1: KUT Digital Library

A digital library replaces the traditional physical card catalogue with a computer-driven and remotely accessible directory of library holdings. At the time the KUT-SU collaboration began, there was, to our knowledge, no digital library in North Korea. KUT was, however, in early stages of designing a digital library, and a construction site had been identified. KUT-SU research teams focused on adapting open-source software to develop the

back-end library information management. These efforts were intended to replace proprietary software written at KUT.

An important consequence of the collaborative efforts was KUT's decision that both software and library metadata⁹ would conform to international standards. To support the ongoing development of the KUT library and to facilitate the sharing of digital library metadata and content, it is hoped that, subject to the regulations of North Korea and the United States, it will ultimately be possible to construct twin information research labs. These labs, one at SU and one at KUT, would be used to support collaborative work at a distance and would also provide a common working environment for visiting researchers.

In 2005, SU submitted a licensing request to the U.S. Commerce Department for permission to export a small quantity of low-level computing equipment to support the KUT digital library. Although this request was denied, the ultimate denial was made on foreign policy grounds rather than national security ones. As it turned out, the request was actually considered at a low point in the six-party talks.

KUT's digital library opened in January 2006. The library is a concrete example of IT-driven academic infrastructure within North Korea. Moreover, as North Korea increasingly interacts with the larger world, it will be critical that it have trusted and successful experience working with U.S. agencies and organizations. During the 2008 visit of the New York Philharmonic to Pyongyang, for example, some journalists were shown the digital library and even were able to access their current Facebook pages from the library.¹⁰



A classroom at KUT's digital library (Photo courtesy of Nicole Finnemann, KEI)

Phase 2: Regional Scholars and Leaders Seminar Program

The RSLs program is designed to develop future leaders who share a commitment to information sharing, collaboration across boundaries, and, most of all, establishment and maintenance of standards-based modes of trusted communication. Our past success in working with KUT on the development of its digital library, together with associated discussions with academic and government officials in North Korea, China, South Korea, and the United States, demonstrates that legal and appropriate sharing of scientific information for peaceful purposes is of common interest.

From 31 July to 20 August 2005, SU, Pohang University of Science and Technology (POSTECH), and the Korea Society hosted the first RSLs Beijing Technical English Program for North Korean researchers from KUT, members of the North Korean Ministry of Foreign Affairs Flood Damage and Rehabilitation Committee (FDRC), and representatives from POSTECH and Huazhong University of Science and Technology (in Wuhan, China). The second program was successfully executed during the same period in 2006, with several major changes and improvements.

The 2006 session established an IT-oriented English training curriculum and received members of the Korea-America Private Exchanges Society (KAPES).¹¹ Building upon the 2005 program, the 2006 curriculum was far more technical but continued to emphasize English as used in the global computer industry and at scientific conferences.

North Korea sent 20 participants to each year's RSLs Technical English programs. In each session, 16 were identified as scholars from KUT, and 4 were from the Foreign Ministry's FDRC or KAPES. North Korea's head of delegation was the director of KUT's Information Center and a longtime collaborator in exchanges with SU. Significantly, four participants in each session were females. To the best of our knowledge, it has been extremely unusual for North Korea to send female scientists to travel outside the country. All North Korean participants were housed at a Beijing hotel where, among other things, they had access to English-language television, unlimited Internet access, and a variety of newspapers from around the world.

The occasion of this RSLs Beijing Technical English training provided an extremely valuable opportunity for informal interactions among North Korean participants and representatives of partner institutions. An ongoing goal for RSLs is to leverage these interpersonal connections through development of concrete projects and ultimately trusted institutions for sustained cooperation on standards-based IT projects. It is hoped that what begins with interpersonal trust among participants from the RSLs countries will

become self-perpetuating through the development first of concrete projects and then, ultimately, trusted institutions.

Phase 3: ACM International Computer Programming Contest

One of the 2005 RSLs Beijing session participants was named director general (Information Technology Department) in the Ministry of Education after her return to Pyongyang. Soon thereafter she requested advice from SU and the Korea Society about how the DPRK might participate in the International Collegiate Programming Contest (ICPC) run by the Association for Computing Machinery (ACM).¹² This, of course, is precisely the sort of outcome RSLs was intended to produce as it involves standards-based engagement with the world outside of North Korea. It also illustrates North Korean comfort in collaborating with SU and the Korea Society.



RSLs session in Beijing (August 2006)

From a global-engagement and scientific-cooperation perspective, North Korea's participation in the ICPC presented a significant opportunity. At that point, SU and the Korea Society approached the United Board for Christian Higher Education in Asia to see if it would be able and willing to supplement existing RSLs funds to support travel costs for a delegation from the Ministry of Education to meet with SU and the Korea Society in Beijing. The United Board responded both positively and quickly.

As a consequence, a planning meeting was set for Beijing during the week of 18 June 2006. The North Korean delegation was headed by a Ministry of Education director general and included additional representatives from the ministry as well as a member of KAPES.

The meetings proved to be extremely productive, and we were able to discuss practical issues such as the need for Internet access to participate in the contest and how to certify student status of team members. In addition, we discussed the possibility of sending North Korean teams to China to prepare for and participate in the initial round of the contest. The North Korean delegation then spent much of the remainder of the week discussing with Chinese counterpart universities the possibility of training with them.

ACM contest officials agreed to invite DPRK participation. Three undergraduate teams, one representing KUT, spent approximately three weeks in Beijing preparing for the 2006 contest. North Korean teams competed effectively and won bronze, silver, and gold medals, falling just short of progressing to the next round of competition. North Korean coaches felt that their teams might have done even better had they had more preparation in technical English and strategies for Internet-based competition.

Therefore, for the 2007 competition SU and the Korea Society held a precompetition workshop for the teams focusing on technical English¹³ and logistics of the rather grueling Beijing regional competition. North Korea again sent three teams—Dark Horse from KUT, Red Star from the Natural Science University, and Jon Mang Bong from the Communication University—to the workshop. This time the KUT team did even better than the previous year and won an invitation to the world finals in Banff, Canada. For unannounced reasons, Pyongyang did not send the KUT team to the final competition.

These results provide empirical evidence suggesting that the best KUT students are able to hold their own with top undergraduates from around the world. Moreover, it demonstrates that North Korea is both willing and able to engage international standards, and it thus provides another concrete example of the power of standards-based academic scientific cooperation.

Phase 4: U.S.-DPRK Scientific Engagement Consortium

In May 2007 the U.S.-DPRK Scientific Engagement Consortium was established to explore collaborative academic science activities between the United States and North Korea. The consortium is currently made up of four organizations: the U.S. Civilian Research & Development Foundation (CRDF), the American Association for the Advancement of Science (AAAS), SU, and the Korea Society. Collectively, the consortium members have decades of extensive experience in successfully establishing and advancing international scientific collaborations, including with North Korea.

On 22 May 2007 approximately 50 participants took part in a workshop organized by the consortium and held at the CRDF headquarters in Arlington,

Virginia. They discussed shared experiences, lessons learned, and successes and challenges regarding scientific collaboration with North Korea. Participants included representatives from nine universities as well as high-level officials from the U.S. government, Congress, and NGOs. Funded by the Richard Lounsbery Foundation, the workshop demonstrated a strong interest by a number of U.S. universities to work toward collaboration with North Korean academics in a variety of key areas of scientific exchange, including agriculture, information technology, and health.

The consortium has since hosted several meetings with the U.S. State Department, key staff from the House Committee on Foreign Affairs and the Senate Committee on Foreign Relations, key U.S. stakeholders, and the DPRK UN mission. The purpose of these meetings was not only to present the findings from the U.S.-DPRK Scientific Exchange Program Expansion Workshop but also to show key decision makers and interested parties in the United States and in North Korea that a coordinated approach is being taken in order to leverage the diverse resources and capabilities of several unique and complementary institutions.

The consortium conducted several concurrent activities in 2008 to advance mutual discussion and information sharing on scientific engagement between the United States and North Korea, including a session with stakeholders at the 2008 annual AAAS meeting in Boston. The consortium also hosted a public panel at AAAS's 2009 annual meeting in Chicago, featuring AAAS president and Nobel laureate Peter Agre and other consortium leaders. The consortium supported the attendance of North Korean representatives at both the 2008 and 2009 AAAS annual meetings.

In 2009 the consortium plans to send a delegation to Pyongyang headed by Professor Agre and funded by the Richard Lounsbery Foundation. This delegation will launch a dialogue regarding each country's respective science and policy infrastructure and seek to identify research areas of mutual interest.

Science Diplomacy and U.S.-DPRK Relations: Conclusion

*Operational Lessons Learned*⁴

Some lessons learned are now guiding our efforts:

- **Organizational commitment.** The support, involvement, and willingness to contribute tangible resources by the Korea Society, KUT, and relevant North Korea top leadership have been essential to keeping the program moving forward during difficult times.

- **Face-to-face meetings.** Trust benefits enormously from regular in-person meetings among key participants. This is especially important when direct electronic communications are difficult as they are between the United States and North Korea.
- **Trusted communications.** Over time, moving as slowly as necessary enabled the teams to increasingly trust that they had shared objectives. The DPRK mission and the Korea Society have worked diligently to keep communications open and on task.
- **Benefits from cooperation.** In the context of trusted communications, benefits (for example, the ACM initiative) accrue to all parties.
- **Realistic timetable.** Meeting deadlines, clearly identifying risk factors, and establishing clear and shared project milestones have been important to keeping the collaboration moving forward.
- **Informal communications.** Unplanned discussions are frequently as significant as planned ones. Meals have provided a congenial and productive environment for such conversations.
- **Understandings in writing.** Misunderstandings may take considerable time to become visible. Developing jointly acceptable written documents describing objectives and milestones can be extremely helpful.

Science Diplomacy Lessons

U.S. citizens cannot travel to North Korea without first receiving an invitation from Pyongyang and picking up a visa in Beijing. Similarly, North Koreans require a U.S. government-issued visa to enter the United States. Thus, although the U.S. government in no way officially supported the efforts described in this paper, it should be clear that none of this could have taken place absent full awareness of both the U.S. and DPRK governments.

Moreover, during the period being discussed, there were no formal diplomatic relations between the United States and North Korea, and North Korean universities and academics did not have open access to the Internet. The DPRK UN mission in New York, the only official North Korean presence in the United States, played a positive role in keeping communications flowing between the U.S. and North Korean research teams. For those of us used to near instantaneous exchanges via e-mail, this approach often felt quite cumbersome; however, because the mission generally housed two ambassadors accredited to the UN and because it reports back through the

DPRK Ministry of Foreign Affairs, this also meant, not surprisingly, that our science engagement was, at least from the North Korean perspective, very much a part of a diplomatic process.

As shown by Table 1, engagement-related exchanges often occurred during times of heightened political tensions between North Korea and the United States, such as North Korea's 2004 declaration that it was a nuclear power, its July 2006 test firing of seven missiles, and its October 2006 testing of an apparent nuclear device. One interpretation is that the two governments permitted the exchanges in part to keep at least some channels open.

The string of relatively successful exchanges paused, however, when participants at SU attempted to bring KUT scholars for a more extended stay at SU under our new DPRK Junior Faculty Leadership and Development Program. This program was developed in close and supportive consultation with North Korean representatives, and we expected the first cohort of North Korean scholars to arrive during the 2007–08 academic year. Unfortunately, there have, to date, been no young faculty come to the United States under this program, and SU staff are in the somewhat embarrassing position of having to return funding raised in support of the program.

Although it is still not clear precisely why the junior faculty program has not moved forward as expected, there are several plausible accounts, each of which reinforces the other. The first is that it is possible that some in North Korea viewed our inability to deliver desktop computers to the planned Twin Labs at the KUT digital library as a sign that the science engagement had failed to produce promised results. Although our inability to send machines was due to a failure to obtain a required export license (recall that the license request ended up being heard as the six-party talks were in the process of, temporarily, breaking down), for some in the North this may have signified a failure to honor a promise. In a country like North Korea, where needs often far exceed the available resources, it is understandable that a higher priority may be placed on the one-way provision of material resources than on a two-way exchange of intellectual resources. In practice, this means that there may be a greater sense of urgency regarding acquiring equipment—for example, computers for a twin research laboratory—than about joint open-source software development. Or, at least, the two aspects are perceived to be intertwined.

Second, the length of time we were inviting the North Korean scholars to stay at Syracuse, from several months to a whole semester, was asking a lot. As best we can now tell, no decision had ever been made at a high enough level to permit such a lengthy stay. Here we may have misinterpreted planners'

interest in such a program as signifying higher-level DPRK authorization. Let no one dealing with North Korea ever believe that bureaucratic politics do not operate there as here.

Third, the junior faculty program was initially scheduled to get under way just as planning was beginning for the Pyongyang visit of the New York Philharmonic. Perhaps science engagement fell to a lower priority relative to a much higher profile cultural exchange, especially since the philharmonic visit placed unprecedented demands on the time and focus of critical personnel dealing with U.S.–North Korea relations.

Fourth, this was a period of optimism regarding U.S.–North Korea relations. North Korean diplomats appeared not to want to do anything to jeopardize high-level negotiations. Once this became apparent to us, we asked a senior U.S. diplomat to make it clear to his North Korean counterpart that the United States valued academic science exchanges of the kind we were proposing. Our understanding is that our message was conveyed. However, it may well have had the effect of entangling our program with the larger and very delicate nuclear negotiations. If this occurred, then we would have, unintentionally, disintermediated the New York channel. Here we violated our own principle of keeping the science engagement isolated from high politics.

We may never know whether any of the above accounts have validity. However, no matter the particular outcome, it should be clear that there was spillover from science engagement to higher-level diplomacy. We hope this reinforces the message with which we began this paper: standards-based science diplomacy can be a particularly useful way in which to build trusted and cooperative relations between countries that have had only minimal official diplomatic relations.

Endnotes

1. “What the World Thinks in 2002” (Washington, D.C.: Pew Research Center for the People and the Press, 2002), <http://people-press.org/reports/pdf/165.pdf>.

2. See, for example, Kristin M. Lord and Vaughan C. Turekian, “Time for a New Era of Science Diplomacy,” *Science* 315, no. 5813 (2007): 769–70.

3. The George W. Bush administration rescinded in 2008 the imposition of the Trading with the Enemy Act on North Korea, although many other sanctions against the country remain in place.

4. "Agreed Framework between the United States of America and the Democratic People's Republic of Korea," Geneva, 21 October 1994, www.kedo.org/pdfs/Agreed-Framework.pdf.
5. Mike Chinoy, *Meltdown: The Inside Story of the North Korean Nuclear Crisis* (New York: St. Martin's Press, 2008); Selig Harrison, "Did North Korea Cheat?" *Foreign Affairs* 84, no. 1 (2005).
6. For example, North Korea agreed in September 2005 to give up its "existing nuclear weapons" and rejoin the Nuclear Non-Proliferation Treaty. The United States and North Korea agreed to "respect each other's sovereignty, exist peacefully together, and take steps to normalize their relations subject to their respective bilateral policies." See "Joint Statement of the Fourth Round of the Six-Party Talks Beijing," U.S. Department of State, 19 September 2005, www.state.gov/p/eap/regional/c15455.htm.
7. Sin Thae Song et al., "Bilateral Research Collaboration between Kim Chaek University of Technology (DPRK) and Syracuse University (U.S.) in the Area of Integrated Information Technology" (unpublished paper, presented at Asian Studies on the Pacific Coast meetings at East-West Center, Honolulu, June 2003), www.nautilus.org/DPRK-BriefingBook/transition/ASPAC-Kim-Chaek-Syracuse.pdf.
8. These results come from interviews conducted after the program was completed.
9. "Metadata" refers to the categories used in describing the information in the library. Conformance with international standards means, among other things, that digital libraries can share information over electronic networks.
10. Margaret Aro, CBS News, conversation with authors.
11. KAPES took over many of the functions of the FDRC.
12. ACM was created in 1947 and is the world's first educational and scientific society focused on computing. Among the ACM programs is the International Collegiate Programming Contest (ICPC) sponsored by IBM. The contest itself is made up of three rounds. In the first round university teams compete at a local level. Successful teams then move to round two, which is held at a regional site. Finally, the top regional teams are invited, with all travel expenses paid, to participate in the world finals.
13. English is the language of the competition.
14. This section is adapted from Stuart Thorson, Thomas Harblin, and Frederick F. Carriere, "U.S.-North Korea Trust Building through Academic Science Cooperation," *Journal of the World Universities Forum* 1, no. 3 (2008): 57-63.

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