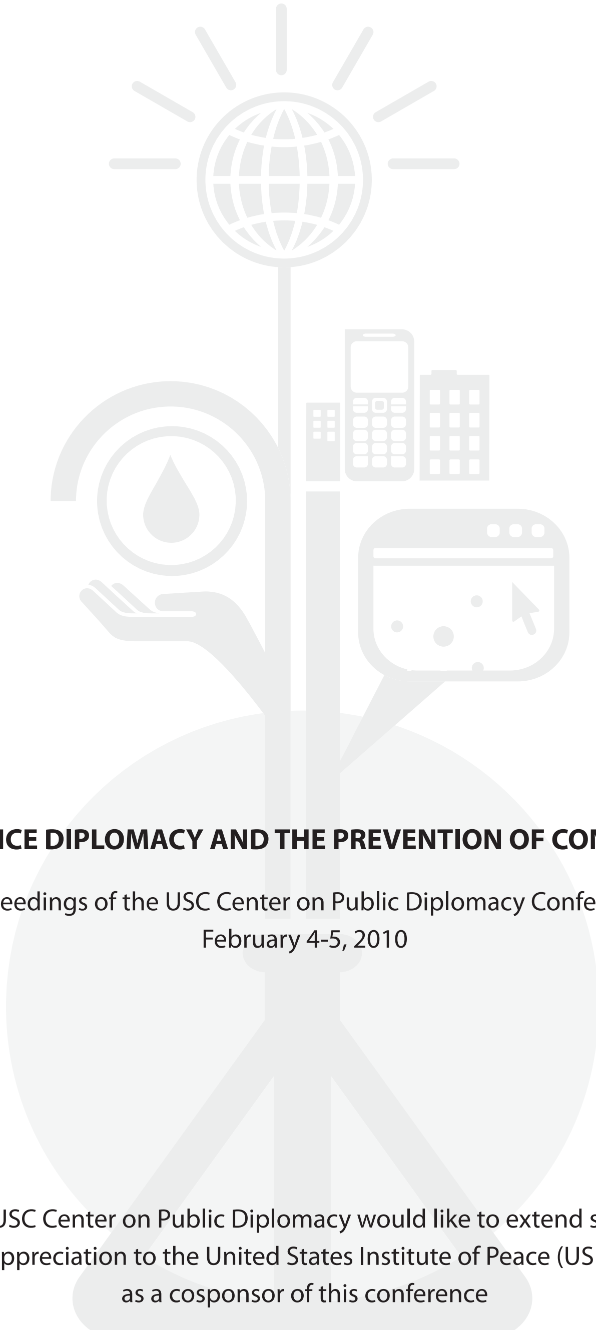
USC Center on
Public Diplomacy
at the Annenberg School

SCIENCE DIPLOMACY AND THE PREVENTION OF CONFLICT

Proceedings of the USC Center on Public Diplomacy Conference February 4-5, 2010



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The USC Center on Public Diplomacy would like to extend special appreciation to the United States Institute of Peace (USIP) as a cosponsor of this conference

Proceedings compiled by Matthew R. Wallin

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Foreword

These are exciting times for those of us working at the nexus of science diplomacy and peacebuilding. Rarely have we seen such high profile expressions of hope and support for science diplomacy as a tool of conflict management as we have lately. President Barack Obama, with his remarks in Cairo in 2009, not only tried to change the tone of our relationship with the Middle East and the Muslim world at large, but he gave science a prominent role in defining that new relationship. And last fall, Secretary of State Hillary Clinton appointed three scientific luminaries as “science envoys” to engage more extensively with the Muslim world in scientific and technical collaborations. Finally, in its recent budget the Administration followed through by requesting new funding for global engagement programs of this nature.

Clearly, our political leaders have great hopes that science diplomacy will help to ease tensions between the Western and Muslim worlds. And we see similar expressions of hope in other areas such as climate change and nuclear non-proliferation where science diplomacy can play a vital role in mitigating conflict.

We at USIP share this optimism. Working with partners like the National Academy of Engineers and the USC Center on Public Diplomacy we are seeking to create a framework for a more systematic use of science diplomacy in conflict management. How can we leverage these scientific and technical collaborations before conflict has become intractable? Why do some technical collaborations morph into powerful peacebuilding initiatives? These are just some of the many questions we are excited to be working on as we seek to make science diplomacy a more powerful tool in our foreign policy toolkit.

Sheldon Himelfarb
Associate Vice President, USIP, Center of Innovation for Science, Technology & Peacebuilding / Media, Conflict & Peacebuilding

Introduction

The University of Southern California's Center on Public Diplomacy at the Annenberg School in association with the United States Institute of Peace, convened the Science Diplomacy and the Prevention of Conflict conference in February 2010 to examine an often overlooked facet of public diplomacy.

In scientific endeavors, as in no other field, nations set aside political differences and collaborate to advance the best interests of their citizens. Even countries generally considered to be outside the diplomatic mainstream can play new and significant roles in world affairs through the efforts of their scientists working with scientists from nations that are presumed to be their adversaries. As one example, during the tense years of the Cold War, American scientists worked with their Soviet counterparts, motivated by the belief that they could help the two states work out their differences. Then and now, scientists recognize that they can do much to advance the cause of peace.

We hope that this report on the conference's proceedings will underscore the importance of science diplomacy and will lead to further consideration of ways that this element of public diplomacy can be of use in the prevention of conflict.

The USC Center on Public Diplomacy will continue to include science diplomacy in its research program and continued updates on the issue can be found on our Web site, www.uscpublicdiplomacy.org.

We wish to thank the many individuals who worked on this conference, specifically Matthew R. Wallin, a student in the Master of Public Diplomacy program who was the Center's Science Diplomacy intern and conference reporter.

Philip Seib
Director, USC Center on Public Diplomacy at the Annenberg School (CPD)

Opening Night

Keynote Address
February 4, 2010

Vaughan Turekian, Director, Center for Science Diplomacy, American Association for the Advancement of Science (AAAS)

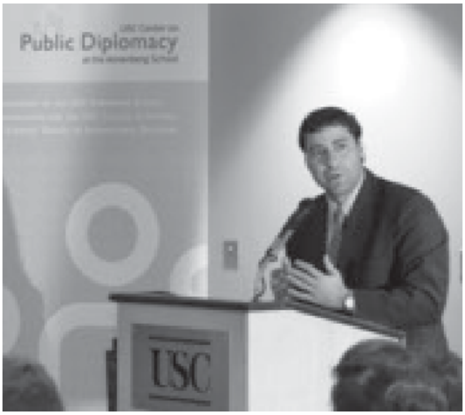
Dr. Vaughan Turekian began his keynote speech at the opening dinner of *Science Diplomacy and the Prevention of Conflict* with the proposition that a new era of science diplomacy is emerging, one that brings together a number of relevant actors, including the public diplomacy community, scientists, NGOs, universities, foundations, and governments. In recent years we have seen the waning effectiveness of hard, soft, and smart power, and the time is ripe for an emphasis on science diplomacy. Turekian pointed out that the world appears to be becoming multipolar, with coalitions forming around specific interests and issues. Nearly every major issue, whether global or national in scale, features science and technology as either the underlying cause or ultimate cure.

In setting the context for the conference, Turekian noted that the United States is currently, and for the foreseeable future will be, the world's major scientific center. Not only does the United States employ the most scientists in major research areas, it also spends the most money, produces the most publications, and is home to many of the world's top ranked research universities. However, the United States' lead is decreasing as other countries begin to see the potential for science to boost economic growth and improve standards of living.

Turekian went on to explain his view of science diplomacy. Since science and diplomacy are two terms that may not always mesh coherently, he found it useful to delineate the terms in three ways. First, "**science *in* diplomacy**" explains how science can help identify and address many of the global and foreign policy issues we face today, as can be seen in the case of climate change. Second, "**diplomacy *for* science**" occurs when the science community requires access to the resources of other nations and must turn to the diplomatic community for assistance. The International Thermonuclear Experimental Reactor (ITER) serves as a prime example. Lastly, there exists "**science *for* diplomacy**," commonly known as science diplomacy, which Turekian defined as:

> the application of international science cooperation, motivated by the desire to establish or enhance relationships between societies.

Turekian addressed the concept of access in science. Scientists desire access to tangible items such as counterparts, ideas, samples, funding, equipment, and machinery, which may only be obtainable through foreign cooperation. While the science community may desire such tangible resources, the foreign policy community is primarily interested in influence. Influence may include the ability to affect how countries make decisions, how they develop, and how foreign publics view the home country. Science diplomacy is the nexus of access and influence.



Vaughan Turekian

Turekian noted a number of important outcomes of science diplomacy. These include building infrastructure for the relationships between countries and allowing scientists in lesser-developed countries without significant access to remain involved and engaged. Turekian's most important proposition, referenced subsequently by several other panelists, was that science diplomacy could serve as the "pilot light" of international relationships, a light that would keep burning after all other avenues were extinguished.

To highlight historical precedent for the success of science diplomacy, Turekian addressed the post-war scientific relationship between the United States and Japan, the Science and Technology Cooperation Agreement with China of 1979, and the classic case of U.S. cooperation with the Soviet Union during the Cold War. As an example of the insights that science diplomacy can provide, he quoted John Negroponte's June 1987 statement to the Subcommittee on International Scientific Cooperation of the U.S. House Committee on Science, Space, and Technology:

> We cannot forget that we are dealing with a closed society, and that these exchanges often give us the only access to significant circles in that society, with whom we would otherwise have little or no contact. It would be shortsighted of us not to recognize that it is in our national interest to seek and expand science cooperation with the Soviet Union.

Science diplomacy, therefore, has the potential to influence national audiences in ways that traditional public diplomacy cannot. Citing a 2004 Zogby poll on Arab impressions of America, Turekian pointed out that while overall public opinion of the United States remained very low, favorable attitudes towards American science and technology were upwards of 10 times higher. President Obama's commitments to the Muslim world during his 2009 Cairo speech provided the impetus for making science diplomacy a key element of U.S. engagement with the world.

2004 Zogby Poll: Arab Attitudes Toward U.S. Values, Products and Policies

U.S. Values, Products, Policies	Morocco Fav/Unfav	Saudi Arabia Fav/Unfav	Jordan Fav/Unfav	Lebanon Fav/Unfav	UAE Fav/Unfav
Science/Technology	90/8	48/51	83/13	52/46	84/12
Freedom/Democracy	53/41	39/60	57/40	41/56	39/53
People	59/29	28/64	52/39	39/58	46/35
Movies/TV	60/37	35/60	56/41	30/66	54/43
Products	73/24	37/59	61/35	39/57	63/34
Education	61/16	12/74	59/29	38/54	62/23
Policy towards Arabs	4/90	4/85	8/89	5/86	7/87
Policy towards Palestinians	3/93	3/95	7/89	4/90	5/90
Policy on Terrorism	13/82	2/96	21/75	10/84	9/84
Iraq Policy	1/98	1/97	2/78	4/93	4/91

Impressions of America, a six-nation survey commissioned by the Arab American Institute on "How Arabs View America -- How Arabs Learn About America" conducted by Zogby International.

Turekian highlighted three core functions of the AAAS' Center for Science Diplomacy, which he directs. First, *inspirationally* the center demonstrates the value of science as a diplomatic tool in bringing societies together. Second, *operationally* members of the center visit other countries to seek areas of cooperation and mutual interest and benefit. In this manner the Center for Science Diplomacy seeks to provide scaffolding and infrastructure to help demonstrate concrete benefits of scientific cooperation. Third, *intellectually* the Center for Science Diplomacy seeks input from the academic community on issues of science diplomacy, including identifying potential barriers and metrics of success.

Turekian closed his keynote address by identifying several key lessons that have been learned from the United States' efforts in science diplomacy.

1. Although governments have an important role to play, civil society's role has now been brought to the forefront, showing that governments need not take the lead in all aspects of scientific cooperation.

2. It is important to separate science cooperation from development.

3. The participation of nongovernmental groups, especially in terms of funding, can be central to the success and sustainability of a project.

4. Good science diplomacy requires the integration of the scientific and foreign policy communities, creating a nexus from which these two groups can work together.

Q & A

Questions from the audience and Dr. Turekian's responses are paraphrased below.

While some may say that science is there to serve humanity, many scientists seem only interested in seeking information and producing scientific results. How would you address this?

Turekian noted that there is a significant distinction between science and scientists, and that the practice of science underpins the solutions or causes of many of the challenges the world faces today.

Can science be disaggregated, and is it useful to try to break boundaries in some areas, such as military technology, where countries may not necessarily want to cooperate?

Science cannot be viewed as a singular field, but rather as a multitude of disciplines, including physical, biological, and natural sciences. The AAAS supports civil research, as defined by the basic notions of the scientific method and its inherent transparency. Data must be shared to promote scientific collaboration. Peer review is essential because when data and results cannot be agreed upon by the scientific community, they fail to achieve the requirements of the scientific method. Finally, it is vital to separate political motivations from scientific research when identifying the best scientific research projects.

Can you comment on the January 2010 murder of an Iranian physicist in Iran?

Any actions taken to mute a scientist or the science community as a whole stand against the scientific method. This incident demonstrates the important lesson that scientists do not function as isolated members of society. When politics becomes negatively involved in scientific cooperation, it not only hurts the scientific enterprise, but changes the way in which societies interact with each other.

How do scientists actually interact with foreign publics and civil society?

Since many countries are looking to science and scientists as a key element of broader economic growth, public engagement is attracting expanding attention. While in the past, scientists may have simply advocated their findings and positions within the scientific community, they now must seek open, two-way dialogue with the public. Although publics may indeed understand potentially complicated scientific issues, they may not agree with how or if the research should be applied or performed on ethical or religious grounds. This has led the AAAS to seek to bring scientists and religious leaders together to discuss science, ethics, and religion.

Additionally, outreach through the media is becoming more important.

Visits by Nobel Laureates in science to underdeveloped countries help to boost foreigners' positive perceptions of the scientists' home countries, facilitating mutual understanding and trust.

How does AAAS handle boycotts of foreign scientists?

AAAS maintains that science is based on the free flow of information and people, and that the scientific community should not be penalized for political differences. Scientists need to interact with each other both for the advancement of science and for the service of society.

Did science diplomacy through nuclear physicists end the Cold War?

While many arguments have been made regarding this subject, what is clear is that Cold War cooperation helped create close connections and links between the United States and the USSR that continued after the fall of the Soviet Union. Scientists in the USSR were recognized as being among the best in the world and they held a very high level of respect and influence in the Soviet policy sphere. Their access to influential communities within their country's policy structure was very helpful in ensuring communication between the two nations.

Introductory Remarks

February 5, 2010

Philip Seib, Director, USC Center on Public Diplomacy at the Annenberg School (CPD)

Philip Seib

Opening the first full day of the conference, Professor Philip Seib returned to Dr. Vaughan Turekian's proposition that science diplomacy exists as "an intricate blending of science and the diplomatic process." It is essential for scientists to have access, and sometimes this can only be achieved through careful diplomacy.

Returning to the previous night's question concerning the personal ambitions of scientists as opposed to science in the service of humanity, Seib underscored the reality of what science stands to offer. While science for humanity may be idealistic, it is not unrealistic, and it is certainly essential. Ultimately, science must strive to move beyond what is thought of as possible.

Ernest J. Wilson III, Dean, USC Annenberg School for Communication & Journalism

In his introductory remarks, Dean Ernest Wilson pointed out that although science diplomacy can be utilized to prevent conflict, it tends to be neglected as an important aspect of diplomacy. Science diplomacy takes place at the intersection of events and trends, and so it doesn't neatly fit into traditional analytic categories, nor does it fit into the standard and familiar organizational silos.

Proposing three areas of analysis for science diplomacy, Wilson outlined the concepts of *Context, Curves,* and *Caution*. *Contextually*, science and technology's ability to play a larger role in the foreign policy of states is an area that requires careful scrutiny. This field is becoming more pertinent, as can be seen from recent conflicts between Google, Inc. and the People's Republic of China over Internet access. This example highlights technology companies' attempts to gain political influence that they believe is commensurate with their economic weight, demonstrating the possible emergence of a new political context where science and technology (S&T) may be augmenting companies' audiences and constituencies.

To demonstrate the concept of *Curves*, Wilson brought up the previous night's question about the disaggregation of science. As with science, conflict can be subdivided into different categories, many of which require different tools to achieve lasting and successful resolution. Conflict cannot be modeled as a steady state, but rather as a bell-shaped curve. On the left side, conflict is either non-existent or in a pre-conflict state. Accelerators act to raise the level of conflict to a peak or plateau, and on the right side of the curve, conflict declines. It is subsequently important to understand at which points on the curve science and technology can intervene. On the left side, S&T can help prevent conflict, whereas at the peak it can help reduce it. On the right side, the question remains of how exactly S&T can help sustain the reduction in conflict.

Ernest J. Wilson III

Regarding the concept of *Caution*, Wilson noted that much of the understanding of science diplomacy thus far exists in the form of hypotheses, and efforts must be undertaken to understand how it can have tangible impact. Under what circumstances do S&T help mitigate conflict? What impact do public diplomacy, science diplomacy, and professional exchanges have on the practice of science? While many cases can be made for the success of international science collaboration to create "better science," there have been instances of inequality, particularly in developing countries, where bringing diverse scientists together has not necessarily produced positive scientific results.

In closing, Wilson noted the assumption that society often views scientists as one of the "nicer" groups of individuals, particularly when compared to those trained in the field of military operations. Scientists seek to protect the truth. But do scientific progress and science diplomacy actually act to enhance a nation's diplomatic standing? As of yet, this remains unclear. In order to improve the practice of science diplomacy, concerned parties must hold discussions such as this and ask tough questions to achieve a better understanding of scientific, moral, and ethical truth.

Sheldon Himelfarb, Associate Vice President, USIP, Center of Innovation for Science, Technology & Peacebuilding / Media, Conflict & Peacebuilding

Dr. Sheldon Himelfarb began his presentation by exploring the apparent separation of professions and fields, and their ability to become intermeshed despite obvious degrees of separation. Scientists and workers in the field of conflict resolution and prevention, for example, often remain worlds apart and completely oblivious of each other. Even the classic example of scientific cooperation during the Cold War places scientists on a different level than those working in the day-to-day challenges of conflict resolution and prevention. These workers typically have been focused on more generally recognized areas of preventing violence, such as promoting the rule of law, holding peaceful elections, returning people to their homes, and negotiating compromises over scarce resources.

Yet recently, conflict management has received a higher level of attention in daily public discourse, indicating it may have become mainstream. Field Manual 3-07 (*Stability Operations*), released by the U.S. Department of Defense in October 2008, marks a fundamental broadening of military perspective, from standard combat to the wider field of conflict management. With peacebuilding practitioners now working side by side with soldiers in troubled states around the world, Himelfarb noted, conflict management has been raised to the same stature as offense and defense within military doctrine. Now that this has been codified in DoD's official doctrine, doors have been flung open for new investments in training and education within the field of conflict management.

After pointing out some of USIP's efforts to help promote S&T as tools for peacebuilding, Himelfarb explained why he believes the time is right for increased efforts in science diplomacy. High profile events such as President Obama's 2009 Cairo speech and Secretary of State Clinton's recent appointment of science envoys indicate that science is now taking a prominent role in defining new relationships. These efforts also appear to have financial backing, as can be seen in the President's 2009 budget proposal calling for $100 million in funding for new global engagement, including scientific cooperation with the Muslim world.

Yet how do we help convert this good will into good policy? Himelfarb stressed that conflict must be prevented before it reaches the point where it needs to be resolved, and it must also be directed to areas other than the popular focus on a perceived divide between the Muslim and Western worlds. As the Cold War gave way to smaller ethnic and sectarian clashes, it quickly became clear how few tools existed to deal with this type of conflict. In order to develop these tools, it is insufficient simply to request funding from the State Department, an agency which also is competing for scarce resources. Rather, a case must be built as to why various peacebuilding efforts are worthy of funding. Accomplishing this will require evidence to be gathered by compiling data, sharing it, and submitting it for peer review – essentially undertaking a process normally employed by scientists. The modern debate over peacebuilding must be less anecdotal, and debates must be held based on tangible evidence, helping us to understand why modern efforts for peacemaking appear to be more effective than those for conflict prevention. Perhaps, as Himelfarb hopes, we may witness the emergence of a *science* of conflict prevention.

Sheldon Himelfarb

In the end, while there is a growing recognition of the effectiveness of science diplomacy, Himelfarb noted that many related projects still appear to be created in an ad-hoc manner. There has been little effort to embrace the greater lessons and tactics of previous initiatives in Track II diplomacy. What processes or guidelines can be identified and employed? Can mechanisms be built into agreements to help weather impending political storms? How important is it to choose the right people, and do some subjects lend themselves better to bridging the gap from science to the ultimate goal of peacebuilding? As Himelfarb stressed, much still needs to be done to harness the power of science diplomacy.

Panel 1: Scientific Cooperation Between Adversaries

Overview

This panel discussed specific cases in which science diplomacy has been employed to ease tensions or foster a warmer relationship between nations that have experienced strained relations. The panel was designed to explore lessons learned and provide a framework for studying future cases of science diplomacy.

Moderator
K.C. Cole, Professor, USC Annenberg School for Communication and Journalism

Panelists
Herman Winick, Assistant Director and Professor (Research), Emeritus, Stanford Synchrotron Radiation Laboratory Division of the Stanford Linear Accelerator Center

Stuart Thorson, Professor of Political Science and International Relations, Maxwell School, Syracuse University

Varaprasad Sekhar Dolla, Associate Professor in Chinese Studies, Jawaharlal Nehru University

(Left to Right) Varaprasad Sekhar Dolla, Stuart Thorson, Herman Winick, K.C. Cole

SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East):

Herman Winick, Assistant Director and Professor (Research) Emeritus, Stanford University, Synchrotron Radiation Laboratory Division of the Stanford Linear Accelerator Center

Dr. Herman Winick began his presentation by telling the audience that he would be presenting from the view of a scientist who has personally witnessed the impact of science on conflict resolution, peace, and understanding.

SESAME is a type of particle accelerator that produces synchrotron radiation, an extremely intense source of x-rays and other forms of light. X-rays can be used to understand the properties of matter, proteins, and semiconductors, and to analyze environmental contaminants, archaeological finds, and artwork. The SESAME particle accelerator is one-million times more intense than other sources of x-rays, and research in the field of x-rays has produced more than 20 Nobel Prizes.

However, while synchrotron radiation may produce powerful science, how this research stands to benefit science diplomacy has remained largely unexplained. Winick noted that construction of more than 60 synchrotron radiation facilities in 19 countries has helped to prevent the brain drain that some of these countries have experienced. In fact, the presence of these facilities has actually reversed the brain drain, serving as a magnet to draw scientists back to their home countries. Additionally, these facilities can be used to research and understand local scientific problems, and their presence has created increased demand for expertise in high technology. The SESAME project has trained scientists in synchrotron-related specialties for the first time in the Middle East, catalyzing scientific cooperation that promotes peace and understanding.

In addition to understanding the technological elements of SESAME, it is important to understand its international aspects and the standards it has set for cooperation in a historically unstable region such as the Middle East. SESAME is a UNESCO-sponsored project which was initiated through a gift by Germany of components for a synchrotron facility. These components had been designated for decommissioning and destruction, but upon learning of this, Winick suggested offering them as a gift to a consortium of Middle Eastern nations. Modeled after the European Organization for Nuclear Research (CERN), SESAME's executive council is composed of nine member states, including Bahrain, Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, the Palestinian Authority, and Turkey. Members meet biannually and are collectively responsible for the facility. Council members are seated alphabetically, and Winick drew attention to the fact that Iran is seated next to Israel. While these nations have no diplomatic relations, and Iran does not recognize the existence of Israel, they are cooperating on SESAME, and the two countries' scientists "have become friends." While it was hotly contested which country would host the facility, the council members democratically agreed that the facility would be constructed in Jordan. Winick noted that while SESAME is not yet 100% operational, with appropriate funding the facility should be up and running in 2013.

Winick brought attention to SESAME's strategic location within Jordan, a short distance outside of Amman. This positioning places it within driving distance of Israeli and Palestinian cities and universities. The SESAME accelerator, which has been described as "a quintessential UNESCO project combining capacity building with vital peacebuilding through science," has been visited by several Nobel Laureates. It is staffed by more than 20 individuals from Middle Eastern countries. While there are dozens of other synchrotron facilities around the world, SESAME has provided the impetus for scientists as far away as East Asia to invite their Middle East counterparts to visit and build bonds, friendship, and research. Winick stressed that even though SESAME may not yet be operational, scientists are already meeting each other and forming collaborations.

Winick then addressed political notions about what science can do for the Middle East. He explained that his contacts in the Middle East were "electrified" by President Obama's overtures to science during his Cairo speech, and that they are excited about the prospects that his support for science may introduce. In a related development, Dr. Ahmed Zewail, an Egyptian-born femtoscientist and one of the U.S. State Department's new science envoys, has been invited to visit the SESAME facility.

In closing, Winick quoted Anton Chekhov's stipulation that like math, science is not national, it is *international*. On a more personal level, he quoted his colleague, Eliezer Rabinovici of Hebrew University, the Israeli Representative to the SESAME Council:

As a string theorist, I work on parallel universes. I was always curious about what a parallel universe was like, and now I know. I'm living in one when I go to SESAME meetings.

Roundtable SESAME Accelerator Group, Meeting © Herman Winick 2007

U.S.-North Korean Scientific Cooperation:

Stuart Thorson, Professor of Political Science, Maxwell School of Syracuse University

As Dr. Stuart Thorson stepped to the lectern, he made reference to Dr. Winick's closing remarks, stating that he too had seen a parallel universe through his experience with North Korea. Noting that the United States' relationship with North Korea is a prime example of difficult relations, Thorson pointed out that most communication with the North Koreans occurs through the channel of the North Korean delegation to the United Nations in New York. He also noted that relations with North Korea are most importantly analyzed through *social science*, by examining the demonization that occurs on both sides of the Pacific. Thorson added that although the United States may not maintain diplomatic relations with the Democratic People's Republic of Korea (DPRK), many nations around the world do.

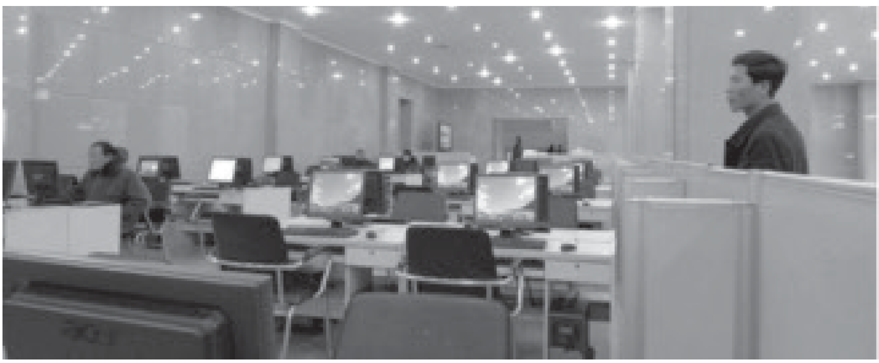
Highlighting past opinion polls which reveal that residents of other countries have a positive image of American science in comparison to the overall national image of the United States, Thorson drew attention to the need to use science as a positive attractor force in this country's relationship with the DPRK. Syracuse University first began communication with the DPRK delegation to the UN in 2001 as a non-governmental effort, establishing bilateral research cooperation with the Kim Chaek University of Technology that focused on standards-based information technology. Explaining the significance of this collaboration as "standards-based," Thorson emphasized the role that established standards play in integrating the international community. As North Korean scientists are trained in English proficiency and begin to adopt international standards of science, isolation from the international community becomes much more difficult. This type of training also allows a nation to engage a difficult partner in situations where a reasonable degree of safety exists. Since the DPRK's first visit to Syracuse in 2002, when research priorities and agendas were established, there have been 15 exchanges between the two countries. Eight have occurred at Syracuse, three in Pyongyang, and four in Beijing. Each of the exchanges has involved the same individuals, with one exception, allowing both parties to continue where the previous exchange left off.

Thorson continued his presentation with a slide show depicting what he had seen during his travels to North Korea, including evidence of the prominence of science in North Korean culture, such as street banners and signs that promote science and call for its emphasis. Thorson also quoted Kim Jong-il's assessment of North Korea's *Juche* doctrine of self-reliance:

> The true and ideal self sufficiency policies stem from advancement of science and technology, and therefore the North should no longer rely on its traditional policy of self reliance.

Thorson noted that this statement, which inherently recognizes the international nature of science, offers a leveraging opportunity for the United States which must not be missed. He showed data indicating that although U.S.-North Korean relations have been severely strained on several occasions since collaboration began in 2001, exchanges have continued despite tense periods in high politics.

Thorson then explored the more practical side of science diplomacy, arguing that science collaboration must produce results, especially in diplomatic discussions where there is mistrust. "Words are very cheap," he stated, "What's hard to do is build things." In 2006, the Kim Chaek-Syracuse collaboration produced the first digital library in North Korea. The program has also focused on technical English language training, and the North Koreans were able to enter a team in the English-language Association for Computing Machinery International Collegiate Programming Contest. Thorson also argued that it is ineffective to keep the partnership limited to Kim Chaek and Syracuse, and brought attention to efforts to increase the scope of cooperation to include CRDF, AAAS, and The Korea Society, which has subsequently produced the U.S.-DPRK Science Engagement Consortium. Thorson hopes that these efforts will lead to a transformation in U.S.-DPRK relations.



Digital Library at Kim Chaek University, © Stuart Thorson 2006

Future collaborations may explore the possibility of opening a green data center in North Korea and may enhance the DPRK's current digital library capabilities. The digital library has essentially become Kim Chaek's face to the outside world (as an example, it was used by the New York Philharmonic during its 2008 visit), but such facilities and data centers also use massive amounts of energy. This opens the possibility for collaboration to develop green data centers which would use alternative energy and therefore reduce the cost of computation.

Reviewing a few of the difficulties encountered during the science collaboration program with North Korea, Thorson highlighted several major themes. First, "Science collaboration with difficult countries is not about individual scientists, it's about institutional commitments of a very serious sort." The commitments must be geared for the long haul, and must be protected against changes in internal organizational environments. Second, the role of the press and publicity can be both helpful and detrimental.

Scientific collaborations with difficult countries are often kept quiet due to the sensitive nature of the programs, and publicity risks destroying the work that has been accomplished. Third, because it is difficult to obtain funding for collaborations with countries like North Korea, it is useful to seek organizations and foundations that are willing to shoulder the risk.

Thorson also offered six lessons learned from his experience with the DPRK: 1) institutional commitment is important; 2) maintain focus, as it is very easy to get off track; 3) participant consistency should be maintained; 4) put things in writing, as it helps to work out linguistic and other differences; 5) don't over-commit; and 6) informal communications can't be conducted at a distance.

In conclusion, Thorson explained that standards-based academic cooperation does indeed build generalized trust. This has been demonstrated in his dealings with the North Korean UN delegation and the quality of people sent to work with Syracuse by the DPRK's Ministry of Foreign Affairs.

Scientific Cooperation between India and China:

Varaprasad Sekhar Dolla, Associate Professor of Chinese Studies, Jawaharlal Nehru University, New Delhi

In his opening remarks, Dr. Varaprasad Sekhar Dolla felt it important to explain his perspective as an outsider who has studied the field of science and technology (S&T) cooperation, rather than as someone who has practiced it. Noting that while S&T cooperation between India and China is becoming robust as both countries are strengthening and consolidating their respective S&T capabilities, this has not occurred without complexities. Dolla proceeded to explain the findings of a study he performed that mapped the trajectory of S&T cooperation between India and China with respect to their independent capabilities.

Outlining the basis on which China and India might exist on adversarial planes, Dolla highlighted trade, WTO cooperation, and climate change as fields in which the two nations experience a blend of conflict and competition as well as cooperation. He explained the concept of a paradigm shift, from technology transfer to science and technology cooperation on a level playing field, to a final goal of science diplomacy which more broadly integrates the power of civil society. To provide context, Dolla examined the globalization of S&T, including the generation, collaboration, and diffusion of technology as led by governments, universities, research institutions, and multinational corporations. As an example of globalization in action, during his studies in China, Dolla was able to personally witness the integration of Indian music in Chinese culture, and later observe the intense discussions of Bangalore as the "Indian Silicon Valley." Dolla noted that in their respective approaches to S&T, China has a more positive outlook in employing globally produced technology for domestic purposes, whereas India tends to be more inward looking for its development model.

Dolla argued that S&T capabilities shape the dynamics of bilateral cooperation. As such, India and China hold an edge over each other in certain technical or scientific areas. Even within particular subjects, each country can hold a comparative advantage within certain subfields or aspects of the applied science. The concept of these advantages extends to fields of innovation. Fortunately, S&T cooperation exists as a positive meeting point between the two nations. It is important to note, however, that it is subsumed in the broader scope of bilateral economic negotiations, and has a long way to go before it can be viewed as an independent force pushing for improved bilateral relations. Yet it is seen as an important factor, as demonstrated by the inclusion of S&T cooperation in the 1988 memorandum of understanding (MOU) between India and China.

After China and India signed the MOU, in the early 1990s, cooperation between the two countries was confined to government agreements. Later in the decade, the private sectors of the two nations began to dominate and become the driving force, with China's hardware teaming with India's software. In modern times, cooperation can be seen as moving from the embryonic stage to becoming something much more mature. Areas of cooperation and data sharing between the two countries are now coming to the forefront, such as earthquake engineering, nanotechnology and the production of advanced materials, climate change and weather forecasting through satellite technology, and in the field of biology as well.

Yet problems do exist, since the aftermath of the 1962 war between India and China has left a great deal of apprehension and mistrust on the government level. While this affects private industry to a lesser degree, a general lack of adequate information about each other's S&T systems and their rate of growth can still be seen. Dolla pointed out the lack of a comprehensive and holistic S&T forum through which India and China can discuss related issues. Such a forum would help to ease tensions and seek shared solutions, and would ideally bring the power of civil society to the table.

In closing, Dolla emphasized the prospects for cooperation, arguing that the comparative advantage that each country holds in various fields provides an effective platform for cooperation. Cooperation should begin in the least controversial areas and can focus on mutual economic gain, as the business field is certainly ripe for such endeavors. He noted that individuals in both countries who have read his study on S&T cooperation between the two nations have become interested in starting their own collaborative projects, highlighting the enormous possibilities for mutual benefit. As Dolla argued, science diplomacy as a well thought out policy must be factored into bilateral relations.

Moderator-Led Discussion:

The following questions were posed by **K.C. Cole**, Professor of Journalism at the USC Annenberg School for Communication & Journalism.

Are there some less-obvious ways in which science diplomacy can help countries prevent conflict?

Dr. Winick responded to this question first by noting his belief that:

One of the consequences of international communication among scientists is the increased awareness of violations of human rights and academic freedom internationally. Because scientists communicate so quickly, so effectively, they become aware of these violations.

Expanding on this, Winick pointed out a series of incidents which took place in 2007, when the American Chemical Society (ACS) expelled Iranian members due to an erroneous interpretation of their participation as a violation of U.S. sanctions against Iran. However, a similar organization, the American Physical Society, did not follow suit and instead began a letter writing campaign to the ACS calling for the reinstatement of the Iranian members. As a result, the ACS reversed its decision, much to the delight of the affected Iranians. However, in the following months, the United Kingdom's University and College Union (UCU) passed a resolution calling for the boycott of Israeli academics. Responding to this, Winick wrote to colleagues in Iran, with whom he had been in contact during the ACS incident, encouraging them to take action. Several prominent Iranian scientists then wrote to Sally Hunt, Secretary of the UCU, criticizing the Union for their actions, and ultimately achieved a reversal in policy.

Dr. Thorson proposed that conflicts are things that humans create, and conditions must be developed in which conflicts do not arise. This is especially important with respect to closed regimes. By engaging in collaborative science, we create alternatives to how people view things and open new, expanded possibilities in which people seek to achieve more than what is originally thought possible. This helps to enable people to make changes on their own. As he explained, the worst method for affecting change within the DPRK is to employ military power. Rather, North Korean citizens must be encouraged to change their views of what is and what is not possible. Thorson said that science is not merely about honesty and truthfulness, but also about tolerance. Tolerance creates trust by accepting that there are alternative paths to outcomes, and out of trust comes a reduced likelihood of conflict.

Dr. Dolla pointed out that, as can be seen in the India-China example, true S&T cooperation can help to break barriers developed during past conflicts. Science is a tool that is important for the individual development of each country. Science, in combination with economic development, has succeeded in bringing forth positive signs despite other evident difficulties.

Can you comment on the suggestion after the keynote speech that science diplomacy is an oxymoron due to scientists' interest in their practical work rather than ideals?

Dr. Winick stated that a prime example of scientists working for ideals can be seen in their coming to the aid of prominent Soviet scientists such as Andrei Sakharov who were imprisoned as dissidents. Their efforts to pressure the Soviets and raise awareness about the issues led to the eventual release of these individuals.

What are the prospects of public diplomacy having an effect on the situation with North Korea?

Dr. Thorson explained that the problem is multi-dimensional and subject to a very lengthy discussion. However, through his conversations with other experts in the field, he believes solving the problems with North Korea could actually be a very easy thing to do. But because some of the steps required to solve these problems are considered to be "politically radioactive," taking such steps would require enormous political will. Given the list of issues to tackle in President Obama's current political agenda, pursuing such efforts with the North Koreans is simply not a priority.

Panel 2: Science, Development and Security

Overview

This panel addressed cases in which science diplomacy has been employed to better the lives or increase the security of people around the world. Panelists demonstrated tangible benefits of science diplomacy by citing cases in which science has been used to save lives or spread technological knowledge. Yannis Yortsos, Dean of the USC Viterbi School of Engineering, moderated the panel.

Moderator
Yannis Yortsos, Dean, USC Viterbi School of Engineering

Panelists
Jill Shaunfield, Science and Technology Policy Advisor, Bureau of Near Eastern Affairs, U.S. Department of State

Jörn Lauterjung, Head, Scientific Infrastructure, German-Indonesian Tsunami Early Warning System (GITEWS), GFZ German Research Centre for Geosciences, Helmholtz Centre Potsdam

Eric Savitsky, Director, UCLA Center for International Medicine

(Left to Right) Jill Shaunfield, Eric Savitsky, Jörn Lauterjung, Yannis Yortsos

Desalination:

Jill Shaunfield, Science and Technology Policy Advisor, Bureau of Near Eastern Affairs, U.S. Department of State

As a member of the State Department's Bureau of Near Eastern Affairs, Ms. Jill Shaunfield's duties often focus on looking for ways to advance the administration's policy goals and engagement initiatives in the Middle East. These policy goals include pushing for the integration of Israel into the regional and world community and building capacity for a future Palestinian state. She noted that in her position as a policy advisor she often finds herself navigating the worlds of both standard public diplomacy and science diplomacy.

With regard to tangible projects in the Middle East, Shaunfield's work has focused primarily on water issues, as water remains the pressing scientific issue of the region. Many of these projects are so-called "legacy programs" initiated by the Oslo Accords in the 1990s. Yet in consideration of the rapidly fluctuating cycle of violence seen in the Israeli-Palestinian conflict since Oslo, Ms. Shaunfield countered Dean Ernest J. Wilson's description of conflict as a bell-shape curve, instead choosing to model it as vacillation. Because of the often violent situation and inflamed tempers in the region, she said, it has been difficult to keep many scientific projects at a sufficiently low profile to prevent them from becoming entangled in the wider political fray. Of the few programs that survived through the Second Palestinian Intifada, most have been water and environmental programs, serving as what Dr. Vaughan Turekian called "pilot lights" for Palestinian relations with Israel and the United States.

In her role as the Executive Council Vice Chairman of the Middle East Desalination Research Center (MEDRC), Shaunfield explained the importance of desalination research in promoting scientific cooperation among Middle Eastern countries. MEDRC, which launched in 1997 following the Oslo Accords, provides multilateral support for bilateral negotiations. As the program began to develop, Oman expressed interest in desalination technology, prompting the U.S. Government to place the Omanis at the head of the MEDRC project, and to subsequently send U.S. scientists to assist in connecting that Gulf state to the World Wide Web for the purposes of the desalination center. Shaunfield also commented that since desalination in the Gulf region was not well researched, the Israelis were in a position to offer valuable expertise. Many of the projects initiated by MEDRC have examined problems associated with the desalination process, such as where to deposit brine produced as a byproduct of the desalination process, and how to remove organisms that foul up various mechanisms used in the process. MEDRC members come together every six months to discuss what has been accomplished and what to work on next. Members include Oman, Jordan, the Palestinian Authority, Japan, Israel, the Netherlands, the Republic of Korea, Qatar, and the United States.

However, Shaunfield noted, by 2008 it appeared that MEDRC's overall scientific value had decreased, mostly as a result of uncontrollable external factors. For instance, private desalination companies had become more prominent, and the financial situation was becoming a challenge for the Department of State. Highlighting the major issues faced in running a project like MEDRC, Shaunfield drew attention to the need for resourcing and sustainability. A great deal of planning is required for collaborative projects, which may take years to implement after the planning stage has been completed. Additionally, the political leadership of the host country must see a clear benefit, which can be difficult to identify on long-term projects. While MEDRC was designed prior to the Second Intifada, when prospects for peace were more apparent, it now spends a great deal of time looking for basic funding in an environment of increasing pessimism.

Shaunfield continued by explaining the role of the Executive Action Team on Regional Water Databanks (EXACT). This group brings together scientists and water authorities from Israel, the Palestinian Authority, and Jordan for discussions about new ways to think about water management and to provide training on new technology. The United States offers interagency experts to provide training, while local partners implement the water programs. As in the case of MEDRC, EXACT has maintained a relatively low profile in order to protect the programs from political attack. As a result, these programs have been similarly under-resourced. The U.S. State Department hopes to double funding for the projects by fiscal year 2011.

Although relationship-building for such programs can sometimes take 15 years before producing obvious benefits, there have been instances in which these programs have clearly served the greater good. A good example is the case of the 2008 drought in Jordan. Thanks to the increased confidence resulting from cooperation through EXACT, the Jordanians were able to confidently call the Israeli Water Authority to request assistance. This connection allowed the Jordanians to receive significantly more water resources from Israel that summer than were required by treaty obligations, undoubtedly saving lives. This episode demonstrates how science cooperation and collaboration can benefit those beyond the immediate scientific community.

Q & A

How do citizens get information on the impact of desalination?

Ms. Shaunfield explained that MEDRC's Web site (http://medrc.org/) has information about its various projects. She noted that greenhouse gases are a problem, especially since countries are under mounting pressure to reduce emissions. MEDRC hopes to do more research on reducing pollution, since the private sector has not yet provided a solution.

Yortsos drew attention to the scientists' occasional lack of good communication with the public, pointing out that while scientists and engineers may not have a problem communicating with each other, they sometimes have difficulty explaining their work to the public. Intermediaries such as science journalists can help to fill this role and better disseminate information.

Are the questions of environmental impact being addressed with U.S. Government or other sources of funding?

Shaunfield answered that about one-quarter of MEDRC's projects are designed to research environmental impacts.

Where will the new science envoys set their priorities?

Explaining that many of a science envoy's priorities are determined by his or her area of expertise, Shaunfield observed that envoys will also base their focus on their interests and the needs of the countries they decide to visit. Embassies in target countries will reach out to governments in order to find out if and how they may be interested in setting up collaboration.

German-Indonesian Tsunami Early Warning System (GITEWS):

Jörn Lauterjung, Head, Scientific Infrastructure, German-Indonesian Tsunami Early Warning System (GITEWS), GFZ German Research Centre for Geosciences, Helmholtz Centre Potsdam

Beginning his presentation by acknowledging that the scientific cooperation behind GITEWS was initiated by a catastrophic event, Dr. Jörn Lauterjung focused on what was made immediately evident by the massive number of casualties seen within two hours of the 2004 Sumatra Tsunami. In several countries neighboring the Indian Ocean there was an apparent lack of general information, transmission, and preparedness. Additionally, there were no national or community systems in place to react to these types of events.

In the tragedy's aftermath, the German Research Center for Geosciences (GFZ) quickly contacted German Chancellor Gerhard Schröder to propose establishing an early warning system for Indonesia as part of German reconstruction aid. The German government responded with millions of dollars in funding within two weeks of the request – the quickest government decision Lauterjung has ever personally witnessed.

Considering that the travel time for a tsunami to reach shore is a mere 20 to 40 minutes, there is a vital need to have accurate information as soon as possible. Germany's research is approximately 25% of a wider international effort that includes donor countries such as Japan, China, and the United States. Judging solely by the sheer geographic distances such a warning system must encompass, this is nothing short of a massive contribution. After a seismic event occurs, data collected by instruments placed throughout the country are delivered to a decision support system, allowing Indonesian operators to determine when and where an impending tsunami may strike, as well as its height. Using simulation software, the decision support system determines the best course of action. Lauterjung explained that this data is also collectively used by UNESCO, which coordinates the efforts of various warning systems around the globe.

Lauterjung emphasized, however, that the information provided by this technical infrastructure is absolutely useless without the proper responses from society. Capacity-building plays an important role, and thus the GFZ has been working with schools, NGOs, and local authorities to implement disaster preparedness training courses. Additionally, the GFZ has helped to produce training materials such as readers and comic books to raise disaster awareness. Lauterjung highlighted his hope for establishing a center for international interdisciplinary science research which would introduce curricula for topics including disaster management, earthquake engineering, and coastal security.

Institutionally, Indonesia has responded with National Law 24, passed in 2007, which provides a framework for disaster warning, management, and prevention, resulting in the establishment of disaster management agencies on the national, provincial, and local levels. The GFZ has in turn followed with vital assistance for community preparedness and reaction. This has included low-tech hazard mapping for public use, developed from information gathered from local people who had disaster-related experiences. By combining laws and information, a standard operating procedure can be developed to deal with tsunami warnings.

Lauterjung concluded that science plays a very basic and important role in diplomacy as the future holds problems that will be faced on a global level. From increasing populations to renewable energy, no political decision can be made regarding these issues without an agreed-upon international scientific basis.

Q & A

What effect is this project having on political entities in the area?

Dr. Lauterjung explained that the direct impact is evident in the legal framework in Indonesia, such as National Law 24. Additionally, other countries have implemented their own legal frameworks in order to provide an official mechanism for the international exchange of information on catastrophes.

Has UNESCO proved to be an effective partner during this project?

UNSECO has worked well so far. It is essentially a roof under which many of these humanitarian activities take place, and works independently of national interests. Considering that many nations respond to UNSECO’s call, it has been very helpful and important in ensuring the success of GITEWS.

To what extent have Indonesian scientists been involved in the development of the system?

Indonesian scientists have been very involved, especially as the sensors are installed throughout Indonesian territory. Indonesia decides how to install the infrastructure, and many Indonesian institutions and universities have participated.

Medical Outreach:

Eric Savitsky, MD, Director, UCLA Center for International Medicine

Dr. Eric Savitsky's presentation addressed a different side of science diplomacy, focusing on the use of technology to expand scientific know-how. After the UCLA Center for International Medicine (CIM) was founded in 2002, Dr. Savitsky used his time to provide international medical training in a fairly typical fashion. He noted that traveling from country to country and then returning home did not provide the most efficient use of time and resources with regard to the ultimate goal of educating medical practitioners. Consequently, he began looking into the use of digital multimedia to spread knowledge in a more efficient and effective manner.

The digital training media produced by CIM is designed to educate and challenge people to apply what they have learned in a real-life setting. Material produced by CIM uses multimedia featuring footage of actual trauma cases to teach people the skills and life-saving procedures that are necessary for rare and emergency situations. In this sense, technology has had a huge pay-off.

Citing the world-wide shortage of 4.3 million healthcare workers, Savitsky laid out CIM's goal of improving global health through education, training, and technology. CIM has worked with the UN and a variety of nonprofit organizations in order to amplify its efforts. For example, CIM recently worked with Project Hope in China to create multimedia training programs in Mandarin that focus on core healthcare issues identified by partners in China. Savitsky said that partnering with local healthcare workers in target countries and reaching out extensively to local communities produces a high degree of outreach and collaboration, which prevents the perception that the materials CIM produces have come from "an ivory tower on the west side of Los Angeles."

Highlighting another example of CIM's work, Savitsky discussed a recent partnership with the International Rescue Committee (IRC) to assist survivors of sexual assault in Kenyan refugee camps. IRC's problem, as Savitsky saw it, was how to teach community healthcare workers to provide compassionate, competent, and clinical care. By partnering with IRC, CIM was able to visit the refugee camps and develop a better understanding of whom they were serving, thereby gaining a better understanding of the social, cultural, and logistical issues CIM faced as it interacted with aid and health workers on the ground. After determining with whom they would be working and assessing their level of knowledge, CIM was able to develop materials that would best meet the needs of those workers. Savitsky highlighted the example of "Medisodes," short instructional videos that can be downloaded to devices such as mobile phones, which allow vital emergency medical information to potentially be distributed to billions of individuals.

In exploring some of the challenges CIM has faced, Savitsky stressed issues from a policy perspective, paying particular attention to the political need for quick results. Politicians and governments do not want to fund large numbers of pilot projects, but instead seek projects that will be successful and sustainable. Therefore, obtaining public funding is incredibly difficult, and focus should be given to seeking private support at an early stage. By incorporating private support with the knowledge provided by academia, projects are more likely to find good sources of funding.

In closing, Savitsky said that the payoff of linking health, technology, and diplomacy through international collaboration is the positive reach it has on publics. Reaching out directly to the people through such projects ultimately creates grassroots advocates for positive diplomatic engagement.

Q & A

Is research into treating potential victims of biological warfare included as part of your work?

Dr. Savitsky explained that during the run-up to the Iraq War, two programs were created to address chemical, biological, and radiation safety. One of these programs was funded by both USAID and the International Medical Corps. CIM was faced with a seven-week deadline to generate material that would benefit on-the-ground workers who might have to deal with victims of such exposure. In the form of a CD-ROM as well as web-based content, these materials addressed treatment and contained information that would help agencies decide at which point workers should be deployed or withdrawn in the face of an unconventional attack.

What challenges do you face in reaching those who do not have access to communication technology, and how do you address these challenges?

Stating the importance of effective partnerships, Savitsky recommended working with organizations that have far more resources than one's own. By seeking to amplify the efforts of organizations that are already involved, organizations may be better able to accomplish their goals. With regard to the distribution of technology, he explained that relief workers often carry laptops, which help distribute important information to those who need it most. Mobile phones also offer promise for the future as greater numbers of people, even in developing countries, are beginning to carry them.

Moderator-Led Discussion:

The following question was posed by Yannis Yortsos, Dean of the USC Viterbi School of Engineering.

How is science diplomacy affected by the disparity of capabilities, experience, knowledge, and resources between countries, and what occurs when that disparity disappears and the playing field becomes level?

Savitsky addressed this question by pointing out that the traditional forms of research still apply, but that players may need to better focus on identifying their own strengths. In the case of the United States, strengths lie in advanced medical technology, the quality of scientists, freedom of speech, expression, and information, and the power of entertainment and digital media. In his view, the world will be a better place when the technological playing field is level.

Shaunfield stated that despite the trend towards a level playing field, there will always be new areas of science and technology to explore and develop. In the future it will be even more important to work with policy makers to find areas in which collaboration can be used in a beneficial manner.

Lunch Discussion: Cold War Cooperation

Overview

Dr. Nicholas J. Cull, Director of USC's Master of Public Diplomacy program, sat down with world-renowned theoretical physicist **Dr. Kip Thorne,** Feynman Professor of Theoretical Physics, Emeritus, California Institute of Technology, to discuss scientific exchange during the Cold War. Describing Dr. Thorne as a lynchpin of U.S.-Soviet scientific exchange, Cull proceeded to interview him in an effort to better understand a classic case of science diplomacy in action. Their discussion is paraphrased below.

(Left to Right) Nicholas J. Cull and Kip Thorne

Can you help us understand the tradition of international cooperation in the field of theoretical physics? Isn't the post-war period of noncooperation an aberration?

During the 1920s and '30s, Thorne explained, theoretical physicists moved quite freely between countries. Both Soviets and Americans traveled to Western Europe to conduct joint research and learn. The basic laws of quantum mechanics were established during this period. Lev Landau, the "father" of theoretical physics in the Soviet Union, originally received his training in Western Europe around the same period as Robert Oppenheimer, father of the atomic bomb. During this time, communication was free and extensive.

What went wrong?

Thorne identified several major events as having led to a collapse in communication and collaboration, including Stalin's purges, the Second World War, and the descent of the Iron Curtain.

Would you say that the non-communication of the 1950s has roots on both sides of the Cold War?

Thorne agreed with this statement, but argued that most of the problems stemmed from the Soviet side. Scientists such as Lev Landau were thrown into prison, where they died during the purges of the 1930s. The types of things occurring in the USSR were almost unbelievable and ultimately ended up blocking communication.

How does the roadmap to new scientific cooperation begin?

Thorne stated that in 1956 and 1957 we began seeing the initial steps to scientific exchange. His own father participated in the first agricultural exchange between the United States and Soviet Union during the summer of 1958. Additionally, his father-in-law had met Nikolai Semenov, a famed Soviet chemist who was a powerful member of the USSR's Academy of Sciences. These early exchanges began to break down previous attitudes and perceptions, but did not come without their challenges. During this period, members of the first Soviet agricultural scientific delegation visited Thorne's parents' home in Logan, Utah. The delegation was escorted by a translator, who was actually a CIA agent, and included a scientist who turned out to be a KGB agent. However, these first steps indicated the beginning of a link between the two nations' scientific communities after roughly 15 years of little direct communication.

It is evident that the Soviets were keen to have scientists in the United States. This became apparent after Khrushchev began opening academia. How did this post-Stalinist process play into your involvement?

Thorne recalled an international meeting on general relativity in 1968 that he and a number of western colleagues attended in Tblisi, Georgia. He spent one afternoon in a hotel room with a number of accomplished physicists. These included John Wheeler, a developer of the American hydrogen bomb, and both Andrei Sakharov and Yakov Zel'dovich, who together had worked on developing the Soviet hydrogen bomb. The four men spent their time in the bugged hotel room discussing science.

Can you share a bit more about your interaction with Zel'dovich?

Thorne explained that many of the people who designed the first nuclear weapons had next moved into the field of relativistic astrophysics. Since the basic principles of the two fields were similar, this provided an area of open research with common interests.

After the Tbilisi conference, Zel'dovich invited Thorne to come to Moscow for six weeks the following summer to participate in scientific interaction. This invitation was extended on a personal level, and was completely independent of any official exchange program. Noting that these personal invitations were his only type of interaction (with the exception of participation in one formal negotiation of an exchange program), Thorne argued that in retrospect, the official exchange programs were not as important as the personal invitations scientists extended to one another. According to Thorne, during his time in Moscow Zel'dovich took him to a park where he was confident they could not be bugged, and told him, "You know, Kip, Russia is a wonderful country. My friends no longer disappear in the middle of the night never to be heard from again." The contrast of this period to the Stalinist era was a matter of night and day and, according to Thorne, was insufficiently appreciated in the West.

Can you provide an example of an event during which scientists on both sides were able to work together for mutual benefit?

Thorne noted that during the 1950s and '60s, Soviet scientists such as Evgeny Lifshitz and Isaak Khalatnikov were performing research on the origins of singularities more commonly known as black holes. They had proposed that these do not necessarily appear during the implosion of a star, and claimed to have mathematical proof that this was the case. On the other side, British physicist Roger Penrose had also produced proof that singularities do occur in these instances, contrary to what Lifshitz and Khalatnikov had proposed. The two sides finally confronted each other in June of 1965 at an international conference Thorne attended after receiving his PhD. The confrontation brought no resolution and Thorne continued regularly visiting Moscow for six months to a year at a time. By 1971, Thorne himself argued to Lifshitz and Khalatnikov that Penrose was correct. Having discovered their mathematical error, Lifshitz presented a manuscript to Thorne to carry out of the Soviet Union for publication in Physical Review Letters. This manuscript contained the admission of their mistake, and the promise to remove their original claims from the textbook "*The Classical Theories of Fields*." They handed the manuscript directly to Thorne because the Soviet declassification process would have taken months.

Can you describe an instance where Western scientists benefited from collaboration with counterparts in the USSR? In particular, can you speak about Vladimir Braginsky?

Thorne was introduced to Vladimir Braginsky by Zel'dovich. Braginsky was an experimental physicist, working on technology for the detection of gravitational waves. At the same time, in the United States, Joseph Weber was working on similar technology using an entirely different approach, and announced that he had evidence of the existence of these gravitational waves. During his time collaborating with Braginsky and his superb team on the technology, Thorne was quite impressed with their work. By the mid 1970s, Thorne had been convinced by Braginsky that the technology could succeed, leading to the creation of a similar group at Caltech that would work alongside MIT to create the Laser Interferometer Gravitational Wave Observatory (LIGO).

Braginsky had become a major source of key ideas for the American version of the gravitational wave project. When the Soviet Union collapsed, Caltech provided funding to support his research group, because it valued this research and needed the information it provided. George Soros also funded Braginsky for a time, and his work is now supported by the National Science Foundation.

How was scientific exchange affected by the ebb and flow of high politics, especially during the time of the Soviet invasion of Afghanistan and the American boycott of the Moscow Olympics?

Thorne said that continued contact with people like Zel'dovich and Sakharov, both of whom were highly decorated and well connected to insiders in the Soviet government, was extremely valuable. These leading scientists had friends who were staff members of the Politburo or the Central Committee of the Communist Party. The information they received through contact with the West was fed directly to the Soviet government.

After the invasion of Afghanistan, Sakharov's dissidence had crossed a political line within the Soviet Union, and he was sent into exile to Gorky. The United States shut down official scientific exchange with the Soviets, which Thorne viewed as a mistake, but individuals still continued to travel to Moscow as "tourists" while attempting to support the dissident movement. As Thorne himself continued to travel to the Soviet Union, he found himself in a situation where he promised to deliver letters from Sahkarov's family to his wife, Yelena Bonner, who would in turn deliver them to Sakharov. When Thorne informed Braginsky of his plans, Braginsky became upset, worried that as a guest of Moscow University, Thorne would implicate him and his colleagues. After speaking to a friend on the staff of the Politburo, Braginsky learned that Bonner was under embargo and would be unable to receive the letters directly from Thorne. Braginsky was advised to take the letters from Thorne and pass them on to another Soviet physicist, Evgenii Feinberg, who would be able to deliver them to Bonner, thereby circumventing the blockade.

Yet despite labeling the official U.S. scientific boycotts a mistake, Thorne contended that along with the simultaneously continuing personal invitations by scientists, this form of exchange was the right mix. The Soviets were admonished on an official level, while individual scientists still managed to bring information through. According to Thorne, this type of information would enlighten mid-level management in the Soviet Union about their dismal economic situation, and ultimately result in the collapse of the USSR.

Can we isolate the ideas of best practice and apply them to other relationships? Did scientists in these peer-to-peer connections hold special credibility and trust?

Agreeing that this was indeed the case, Thorne stated that the Soviets held a new respect for science after the detonation of the atomic bomb, and wanted their own scientific efforts to be respected by the rest of the world. Nuclear weapons and the physicists who worked on them provided the credibility the Soviet Union was seeking. The close communication that could be witnessed between the scientists of both nations added a degree of credibility that politicians and diplomats were incapable of providing.

Do multiple collaborations in different fields help create better understanding?

Thorne said he believes this is certainly true, but in the case of the Soviets, the best cooperation occurred with physicists, as they had the highest connections. Elements of other scientific exchanges were also useful. In 1977, Thorne participated in the negotiation of an official physics exchange. During this negotiation, the United States was able to succeed in convincing the Soviets to allow the receiving side of an exchange to review the proposed list of scientists and approve them before they were sent. This was a breakthrough, as in the past, “party hacks” and other non-scientists would often be sent to the United States, while prominent legitimate scientists were kept at home The new development in policy led to official exchanges that were highly organized and previously not dreamed of as possible. Thorne continued by explaining that these developments led to the transformation of young scientists in their 20s and 30s into leaders in their fields. However, while communication with the Soviets had reached a much broader level, work in fields outside physics proved much more difficult.

What were your impressions of the U.S. Government’s actions during your exchanges?

Thorne explained that his professor and mentor, John Wheeler, had been appointed by President Nixon to the Advisory Committee on Arms Control and Disarmament in the late 1960s. Thorne said he was never debriefed by the FBI or CIA because people like Wheeler saw the value of scientific exchange and discouraged the CIA from confronting him. However, Thorne contends he did have evidence of his phone line having been bugged when he had visitors.

One notable exception was an FBI agent who had been assigned to ensure that Thorne’s Soviet guests were where they were supposed to be. Coming by to check on the location of Braginsky during a visit, the FBI agent asked if he could step into Thorne's office and ask him about the Soviet scientist. Thorne invited the agent in and, much to the agent's surprise, immediately introduced him to Braginsky, resulting in complete silence for a period of time. After finally breaking the ice, the agent and Braginsky were able to speak semi-cordially. Later, Thorne challenged Braginsky to do the same thing, as every time he had an interaction with Thorne, whether it was for dinner or collaborative work, Braginsky was debriefed by the KGB. He never followed suit.

Thorne also brought attention to the dilemma certain younger scientists faced during the exchanges, as they were sometimes worried about not having good information to provide to the KGB. The precarious situation this put them in highlights the difficulty they faced regarding the virtually involuntary decision to cooperate with the Soviet government. While these scientists loathed the regime, their valued ability to travel abroad as scientists placed them in a situation where they were forced to compromise.

With regards to your relations with the Soviet government, can you explain the time you were placed on a blacklist?

During one incident, Thorne was asked to write a letter to Soviet authorities asking that a prominent mathematician, who happened to be a Soviet dissident, be allowed to travel to the West in order to attend an important conference. As a result, Thorne was placed on a Soviet blacklist, but was ultimately removed after his high level scientific colleagues in the USSR pushed to "pry" him off the list.

Can you explain your involvement in Steven Hawking's visit to Moscow?

In the 1970s, Steven Hawking developed the second law of black hole mechanics, and as a result many scientists in the Soviet Union wanted to meet him. However, they were apprehensive about dealing with Hawking's disabilities, so Thorne volunteered to assist him during the visit. At this time, Zel'dovich had developed his own theories in regard to the behavior of waves around black holes, and made speculations without any actual proof. Intrigued by Zel'dovich's theories, Hawking's subsequent research led to the development of the theory of Hawking Radiation. Many in the West sided with Hawking's findings, but Zel'dovich was a hold-out until Thorne finally convinced him to accept Hawking's research. Zel'dovich's concession led to the acceptance of Hawking's theory by the wider Eastern community of scientists, demonstrating, as Thorne pointed out, the power of combined research and intellects to reach an ultimate truth.

Panel 3: Lessons For The Future

Overview

This panel discussed the lessons learned through past and current applications of science diplomacy, and formulated an understanding of how it can most effectively be supported and deployed in future. Panelists involved in the advocacy process and with experience in the field offered firsthand accounts of both the difficulties and the promise behind efforts to make projects successful and bring science diplomacy to the policy forefront.

Moderator

Joel Whitaker, Senior Adviser, Center of Innovation for Science, Technology, & Peacebuilding, United States Institute of Peace

Panelists

Cathleen Campbell, President and CEO, U.S. Civilian Research & Development Foundation

Matthew Rojansky, Executive Director, Partnership for a Secure America

(Left to Right) Matthew Rojansky, Cathleen Campbell, Joel Whitaker

As chair of the third and final panel, Mr. Joel Whitaker began by identifying some of the difficulties posed by the science diplomacy endeavor. Science and technology as tools for peacebuilding are not always fully available to people working in the field of conflict prevention. There are a variety of other interests at stake, and players who have a bigger hand in the pot. For instance, the military always leads in research and development because the funding allotted to the military is enormous. Additionally, private industry is also heavily involved, performing research and development for business purposes and profit.

For diplomats, the toolkit of science tends to be much smaller. Noting that science often clashes with the national interests that drive politics, Whitaker argued that the most successful science diplomacy initiatives tend to be those that are least politically controversial. Yet, Whitaker noted, at the same time those involved in the field should be prepared to push the envelope to tackle some of the most contentious politics and the most difficult international relationships. One key question Whitaker sought to understand was how far science diplomacy advocates can influence governments and politicians to use science for international diplomatic collaboration.

Encouraging Science Diplomacy and Engagement:

Cathleen Campbell, President and CEO, U.S. Civilian Research and Development Foundation (CRDF)

Ms. Cathleen Campbell stated that the U.S. Civilian Research and Development Foundation stands at the intersection between science, foreign policy, and national security interests. Founded as a result of the 1992 Freedom Support Act, CRDF was established as an endowed non-profit organization intended to support international science collaboration with countries of the former Soviet Union. Considering the large number of scientists in these countries, it was deemed vital to keep their large and strong scientific community, rife with weapons knowledge, engaged in civilian pursuits. Campbell noted that unfortunately, Congress initially failed to provide the promised endowment, and three years passed before enough political will was generated to secure the funding needed for CRDF's opening in 1995.

CRDF has several main purposes: supporting international science collaboration, engaging scientists to support nonproliferation, and linking research with higher education and the marketplace. Creating links between research and higher education was of significant importance in areas of the former USSR, where research was excluded from the educational process and performed instead at the Academy of Sciences. Since its establishment, CRDF has supported collaborative research and engaged in institution-building throughout Russia, establishing equipment centers, programs on innovation and commercialization of technology, and nonproliferation programs. It has subsequently awarded 300 grants with a collective value of $400 million. CRDF recognizes that the scientific approach to problem solving provides focus to science and work that can transcend political, economic, and cultural divides. Much like the previous speakers, Campbell recognized that many of the world's most pressing problems have scientific solutions.

Exploring several of CRDF's endeavors, Campbell began with those undertaken in Russia. After the release of a study on the former Soviet Union's most urgent research needs, CRDF started the Basic Research and Higher Education Program in 1998, which established 20 research and education centers at Russian universities. These centers aimed to integrate science and research, and were established at various universities based on a competitive selection process. The centers provide equipment, training for young scientists, fellowships for post-doctoral students, and English language training. The program has been enormously successful, as indicated by the Russian government's buy-in. Adopting this model for the independent establishment of fifty additional centers and using it as a basis for the creation of new research universities, the Government of Russia has contributed 50% of the funding for CRDF's centers. CRDF has also placed a strong emphasis on the training of young scientists, who are viewed as the future of their country. Unlike in the United States, scientists and engineers in Russia often assume positions of leadership, rendering these early connections invaluable.

CRDF also created the Southern Caucasus Cooperative Research Program, which involves partnerships with foundations established in Georgia, Azerbaijan, and Armenia. Campbell described the launch of a research grant competition that involved project teams from all three countries. Three hundred participants submitted 15 proposals, and grants were awarded to two project teams. One of the projects featured cooperation between Azerbaijan and Armenia, which are technically still at war. Scientists in both countries exchanged research results and interpretations of data which led to the discovery of new gold-mining prospects in both countries, some of which span national borders. A second project created a network of microbiology and biotech programs designed to address problems of food safety, energy, and ecology, helping sustain civilian and professional ties in the region.

Five years ago, CRDF made the decision to begin working in countries other than the former USSR, and has since focused heavily on the Middle East. In Iraq, CRDF worked to establish the Iraqi Virtual Science Library, which has resulted in participation by all public universities as well as nine government ministries. The virtual library system provides electronic access to more than 3,500 scientific journals from 12 major publishers. Since it was established, more than 7,000 Iraqis have registered to use the system. According to Campbell, by mid-2009 statistics demonstrated that roughly 30,000 articles had been downloaded monthly, totaling more than one million. Additionally, while Iraqi scientific journal publications totaled 80 in 2005, publications in 2008 had tripled to nearly 240. The success of this program has also provided a model that led to the launch of a similar pilot project at Kabul University in Afghanistan.

Also in Iraq, in partnership with the U.S. Department of State, CRDF helped launch the Iraqi Scientist Engagement Program, which featured three large conferences and two training sessions in Baghdad. Topics for the conferences included soil salinity, water management, food safety, and solar energy, while training focused on remote water monitoring equipment, and chemical safety and security for oil refineries. Multiple ministries came together during this project to make recommendations. Campbell noted that the remote water monitoring equipment provided by CRDF was marked as the first technology that was transferable under the U.S.-Iraq Status of Forces Agreement. Campbell stressed Iraqi scientists' hunger for information and resources by explaining their dedication under extreme circumstances. In 2009, a solar energy conference was held at the Iraqi parliament building, during which a major insurgent bombing took place. Many scientists attending the conference were forced to abandon their cars up to four miles away, and wait hours to pass through the checkpoint to enter the Green Zone. Nonetheless, by that afternoon 75 scientists were present, and by the third day there were 120 participants, including Iraq's Minister of Science and Technology.

Continuing her presentation, Campbell remarked that "Science is a common language that can foster immediate bonds, professional and personal ties." The Iraq Engineering Enhancement Program, also started by CRDF, has created a public-private partnership that brings Iraqi engineers to the United States for three to six months to work in American companies and universities, and with the Army Corps of Engineers. Efforts in Syria are beginning to take shape as well: CRDF recently held a workshop which brought in experts from the U.S. and the region to discuss areas for scientific collaboration on agriculture in dry areas. In North Korea, as mentioned earlier in the day, CRDF participated in creation of a consortium for areas of scientific collaboration.

Campbell offered a number of lessons learned through CRDF's experience. First, she stipulated that how the work is done is as important as the goals. Having partners is extremely valuable, especially when working in a country for the first time, or where major political factors are to be considered. CRDF has subsequently found establishing overseas offices to be particularly useful. Second, projects must be started with the intention of long-term commitment. Third, the power of NGOs is noteworthy. Some countries or people are more comfortable working with NGOs which can open doors that allow them to work with institutions to which they might not otherwise have access. Fourth, sustainability is important, with the goal of ultimately being able to hand off the project to other partners. Lastly, communication is essential, particularly with partners, stakeholders, and funders.

In closing, Campbell offered a number of parallel challenges faced by those engaging in science diplomacy efforts. First, administrative aspects are enormously taxing. CRDF has spent a great deal of time on issues such as visas, export controls, and OFAC licenses. These are issues about which CRDF constantly pushes for change. Second, long-term commitment is the exact opposite of what interests policy makers and funders. Third, science diplomacy efforts will require a system to analyze their impact. A framework for systematic analysis does not yet exist, and we are thus far only able to rely on anecdotal evidence. Fourth, communication presents an interesting challenge, as can be demonstrated by the sensitivity of certain issues in difficult environments. In some cases, projects may need to stay under the radar in order to prevent their elimination or to protect individuals involved in the project. On the other hand, policy makers and funders may want to hear about the projects or publicize their success, creating a difficult dichotomy of interests. Finally, there is an ongoing need for more leadership in advocacy for science diplomacy. While CRDF continues to push Washington for more engagement, it has been an uphill struggle and few people have been able to grasp its importance. Campbell stated that CRDF has pushed for establishment of a global science fund, but in the reality of Washington politics it is simply not a priority at this time.

Building a Science Diplomacy Constituency:

Matthew Rojansky, Executive Director, Partnership for a Secure America (PSA)

Emphasizing the word "partnership" within his organization, Partnership for a Secure America, Mr. Matthew Rojansky argued that bipartisanship in Washington is often nothing more than an afterthought. The term is regularly applied to efforts that result in nothing more than the minimum amount of support that is required in the U.S. Congress to pass legislation. His organization believes that if the process can be fixed, the results will be better. PSA has released statements on various issues that aim to create a high level of bipartisan consensus, using experts in their fields and members of both parties to create a safe political space that eliminates the ability of partisan politics to create taglines for its proponents.

Rojansky acknowledged that science diplomacy as a policy priority is a difficult sell. Other issues on the political plate, such as detainee abuse or nuclear disarmament, often retain important and overshadowing attention. So how does science diplomacy earn a spot at the table? According to Rojansky, science diplomacy must be sold as a tool that can have tremendous impact on the issues we are already focused on, including climate change, energy security, WMD proliferation, poverty, disease, and conflict prevention. Linkages must be created that directly attribute science diplomacy to the potential resolution of these salient issues. That being said, Rojansky noted that as a tool, diplomacy is a means, not an end. Since a picture of the desired result in conflict resolution is not always clear, the best tools and diplomacy can assist in developing a previously ambiguous but mutually beneficial end result.

Rojansky then delved into the role of government and the process of advocacy for issues like science diplomacy. Citing President Obama's 2010 State of the Union Address, Rojansky brought attention to the President's statements on working with Muslim countries to create scientific innovation. Rojansky emphasized that the President of the United States has the power of a major bully pulpit, and it is important for him to back up his words with action. But Congress must also lend support, as it holds the power of the purse and the ability to enable the President to execute his policies and programs. Additionally, statements from congressional leaders can also be powerful, and Congress is equally important for helping to clear regulatory hurdles such as sanctions or export controls. Members of Congress also act to supervise projects by stepping back and providing a big-picture analysis, making sure funds are spent appropriately and effectively.

Yet the process of actually pushing through any legislation, let alone that related to science diplomacy, is extraordinarily difficult. Rojansky explained that most bills in Congress die quickly. Many are eliminated after massive public discourse, while others get rushed through without any real debate because they are merely compromises over completely unrelated issues. The hearing process in committee, during which important questions should be asked and key ideas developed, often doesn't matter at all. Rojansky argued that many committee hearings are mostly ceremony and tradition, during which the ranking member often vacates the room, leaving only one member of Congress present for the sake of continuing the procedure. Filibuster has also become a serious issue, often leading to drawn-out negotiations involving a few senators in order to gain the bare minimum necessary to reach cloture. The reality of this political process, Rojansky posited, is that very little is likely to happen with regard to implementing effective science diplomacy legislation.

Rojansky continued by highlighting the need to not "ram things through" with a narrow partisan majority. When this occurs, the very important goal of securing sustained long-term funding is unlikely to be achieved. Perceptions that a project is part of a partisan agenda will likely result in its eventual elimination. Therefore, projects must include bipartisan vocabulary and validators, or advocates such as senior scientists, Nobel Laureates, and political leaders. Additionally, it is often wise to cater to one's audience by emphasizing short term interests and incentives. While science diplomacy is a long-term commitment, identifying short-term benefits will help make programs attractive to those who may be able to offer funding.

Rojansky then proposed a set of key communications concepts to promote science diplomacy and build a constituency. First, the concept of smart power has a significant draw, and data from polls showing that members of the public hold positive attitudes toward American science provide the kind of information that legislators love to quote in their speeches. Secondly, while the concepts of the freedom agenda and democracy promotion have lost their luster in recent years, science diplomacy sells as part of a broader effort to promote scientific values. These values happen to dovetail nicely with American values that have been difficult to sell. Yet most importantly, the language of national security seems to hold the most strength as a selling point in Washington. Rojansky suggested that many problems ultimately boil down to national security issues, and members of Congress want to know if proposed projects will help assure the safety of the American people. On a more specific level, however, using science to address WMD proliferation can be extremely tricky. While it can be argued that science diplomacy allows us access we would not normally have to countries with WMD-related issues, it is very easy for these programs to be viewed as nefarious. WMD-abatement-related science diplomacy must be structured extraordinarily carefully, and involve close communication with the national government.

Rojansky offered a few tactics to both employ and avoid. Explaining that Congress loves solid examples in which investment has yielded significant returns, the Cold War serves a science diplomacy advocate well. It is a case that everyone understands, and one that was conducted at relatively little cost. The value of Track II diplomacy can also be argued, as it serves as Turekian's "pilot light" or insurance policy for a relationship. The connections made in Track II efforts often provide rich, honest intelligence and can produce concrete actions, as the individuals involved in these interactions are often well-connected in their home countries. However, language that refers to science diplomacy as foreign assistance should be avoided, as this concept is not very popular, particularly during periods of economic slowdown.

On the bright side, there are a few legislative efforts currently underway to bring science diplomacy to the forefront. Senator Richard Lugar (R-IN) has been pushing through S.838, which seeks to establish a science envoy program. This has already partly been realized through the recent appointment of three science envoys by Secretary of State Hillary Clinton. In the House, Representative Brian Baird (D-WA) has been pushing H.R.1736, which would create a committee to identify and coordinate international science and technology cooperation in order to strengthen U.S. domestic science and support foreign policy goals.

Rojansky closed by offering a few tips for citizens who wish to serve as science diplomacy advocates. These include being informed, participating as an informed spokesperson through events such as student conferences and exchanges, using tools such as social networking, and calling one's representative in Washington.

Moderator-Led Discussion:

With your perspective on various science diplomacy related initiatives in Washington, what are the pitches that have worked?

Ms. Campbell noted that different pitches resonate differently with different people, and argued that it can be difficult to ensure the survival of a project when a new administration is seeking funding to create projects of its own. The most effective argument, as Campbell sees it, is security-based. As director of an organization which has managed to survive into its third administration, she believes that by arguing for the U.S. to engage scientists from countries which have WMD knowledge and experience, it is easier to keep them working on civilian, rather than military projects. Additionally, it can be argued that in order for the U.S. to remain competitive, it must be able to compete globally, and this sometimes means gaining access to the best talents and knowledge from other countries.

Mr. Rojansky explained that while the use of data in science diplomacy advocacy may be a small component, it must also be completely robust. If there are holes in one's data, the opposing side will blow them completely out of proportion, as can be seen in recent developments regarding climate change. But aside from the data, it is more important to cater to parochialism and to the short-term interests of Congress. High level people with the ability to call members of Congress are vital, and finding a local connection that produces a quotable heartfelt story can be extremely useful. He also suggested that although seeing projects in the field personalizes science diplomacy and allows people to become passionate about it, congressional rules regarding staffers make this difficult. Lastly, a single bad example where money has been used in science diplomacy with little return can have a severe detrimental effect despite mountains of good examples.

Q & A

Has CRDF engaged in any programs with Iran? If it were to, how would it go about doing so?

According to Ms. Campbell, there have been no projects in Iran so far. However, Iranian scientists have been present at various CRDF workshops and conferences in other countries. She expressed interest, in principle, explaining that it would be necessary to find the right approach at the right time. If a project were to be undertaken, it would likely begin slowly with a workshop bringing scientists together to identify potential areas of collaboration.

In advocacy for science diplomacy, can you explain the strategy to engage elite policy makers as opposed to the general population?

Mr. Rojansky explained that PSA rarely works outside the Washington, D.C. area, and said that foreign policy is determined by about sixty people in Washington, and this is unlikely to change. In general, voters simply don't become motivated about issues like science diplomacy, so efforts are better spent closer to the policy circle. Another problem is that conflict prevention, per se, is an issue of the "dog that didn't bark." If a conflict is being prevented, it hasn't occurred and the costs cannot be calculated, rendering it a very difficult sell. Instead, Rojansky proposed that the scientific side of the issue may serve as part of a better recipe. Elite international scientists should be recruited, and advocates must do a better job of publicity when scientific collaboration is successful.

Does CRDF have any projects in South Asia or Africa?

Ms. Campbell answered, while CRDF does not currently have programs in these areas, she explained that it is also a matter of finding funders with particular interests. Although CRDF is unable to be everywhere at once, she expressed hope that it will be able to engage with scientists in Asia, Africa, and the Middle East as part of follow-up to President Obama's Cairo speech. However, CRDF has worked with Libya, and seeks to work with African countries more heavily in the coming years, with the hope of expanding its university-based programs.

Where can science diplomacy engage nuclear civilian assistance abroad? Can it help seek sources of alternative energy for nations seeking to take the nuclear route?

Ms. Campbell stated that CRDF currently has a Civilian Nuclear Cooperation Initiative that is designed to engage U.S. specialists with foreign counterparts in countries that have decided to take the nuclear option. This is done to ensure that nuclear energy is undertaken safely and with good expertise. While CRDF does not support nuclear proliferation, Campbell argued that "if the train has left the station," CRDF must seek to help ensure things are done properly and safely.

Concluding Remarks

Philip Seib, Director, USC Center on Public Diplomacy at the Annenberg School

In concluding the conference, Philip Seib reflected on the presentations of the day and drew attention to the seriousness of science diplomacy. As President Obama's speech in Cairo made significant commitments to the Muslim world, this cannot be forgotten. Efforts must be made to fulfill these commitments, lest the United States faces a more serious lack of credibility than it already does in many parts of the world.

Seib argued that science can be effective in the prevention of conflict. As seen during a recent trip to Damascus, Seib's interactions with colleagues consistently revealed that a major cause of any potential regional war could be water-related issues. The efforts that are being undertaken to help address these issues were clearly evident in Ms. Shaunfield's presentation. Further establishing the case that science diplomacy works, Seib returned to Dr. Winick's presentation, stating that under different circumstances an Iranian and an Israeli politician might not sit within 20 feet of each other. However, at SESAME, Iranian and Israeli scientists sit next to each other on friendly terms.

Yet what is the leverage that can be applied to secure the international support of science diplomacy? According to Seib, it is simply in their national interest to do so. Returning to Dr. Thorson's explanation that North Korea had dropped notions of self-reliance with regard to scientific achievement, Seib explained that countries will subscribe to science diplomacy because they must. Therefore, in order to advance science diplomacy, advocates must appeal to nations' parochial interests.

Returning to Dr. Turekian's concept of science diplomacy as the "pilot light" of a relationship, Seib contended that while it keeps relationships and hopes alive, we must seek to move beyond this. A pilot light, on its own, does not accomplish much. It is therefore important to work with young scientists and create advocacy early at the junior and senior high school levels. Chemistry classes needn't solely teach science – they can teach what science can achieve, and how it can make the world a better place. Universities can also have a big impact, as they offer credibility and resources that allow them to influence the next generation. In addition, as an alternative to the difficult governmental route of which Mr. Rojansky spoke, the private sector is augmenting its role in science diplomacy.

Unfortunately, it has also become clear that certain areas of the world, such as sub-Saharan Africa, get much less attention. Seib contended that this is a shameful reflection of the reality of many national priorities, and it is clear that numerous problems in this region could benefit from scientific collaboration. He believes that American public diplomacy has become too centered on the Middle East, and that the United States has made a huge mistake by neglecting Russia in recent years. Seib closed by suggesting that the breadth of our commitment to science and science diplomacy is important, and we must realize that it cannot be tied to whichever political issue is currently most pertinent –we must look beyond that.

Appendix A

SCIENCE DIPLOMACY AT A GLANCE

This section highlights key takeaways and lessons learned from the speakers, panelists and moderators at the Science Diplomacy and the Prevention of Conflict conference held at the University of Southern California in February 2010.

Public Diplomacy Benefits of Science & Science Diplomacy:

- "Science diplomacy could serve as the "pilot light" of international relationships, a light that would keep burning after all other avenues were extinguished" – *Vaughn Turekian*

- "Science must strive to move beyond what is thought of as possible" – *Philip Seib*

- "Although science diplomacy can be utilized to prevent conflict, it tends to be neglected as an important aspect of diplomacy. Science diplomacy takes place at the intersection of events and trends, and so it doesn't neatly fit into traditional analytic categories, nor does it fit into the standard and familiar organizational silos" – *Ernest J. Wilson III*

- "Science diplomacy as a well thought out policy must be factored into bilateral relations" – *Varaprasad Sekhar Dolla*

- "Science is not merely about honesty and truthfulness, but also about tolerance. Tolerance creates trust by accepting that there are alternative paths to outcomes, and out of trust comes a reduced likelihood of conflict" – *Stuart Thorson*

- "Science is a tool that is important for the individual development of each country. Science, in combination with economic development, has succeeded in bringing forth positive signs despite other evident difficulties" – *Varaprasad Sekhar Dolla*

- "Many of the world's most pressing problems have scientific solutions" – *Cathleen Campbell*

- “Science is a common language that can foster immediate bonds, professional and personal ties” – *Cathleen Campbell*

- “Science cooperation and collaboration can benefit those beyond the immediate scientific community” – *Jill Shaunfield*

- “Science diplomacy must be sold as a tool that can have tremendous impact on the issues we are already focused on, including climate change, energy security, WMD proliferation, poverty, disease, and conflict prevention” – *Matthew Rojansky*

- “Science plays a very basic and important role in diplomacy as the future holds problems that will be faced on a global level. From increasing populations to renewable energy, no political decision can be made regarding these issues without an agreed-upon international scientific basis” – *Jörn Lauterjung*

Advocacy:

- “Reaching out directly to the people through such projects ultimately creates grassroots advocates for positive diplomatic engagement” – *Eric Savitsky*

- “We need more leadership in advocacy for science diplomacy” – *Cathleen Campbell*

- “Advocates must do a better job of publicity when scientific collaboration is successful” – *Matthew Rojansky*

- “In order to advance science diplomacy, advocates must appeal to nations’ parochial interests” – *Philip Seib*

- “The language of national security seems to hold the most strength as a selling point in Washington” – *Matthew Rojansky*

- “In addition to understanding the technological elements of [scientific collaboration], it is important to understand its international aspects and the standards it has set for cooperation in a historically unstable regions” – *Herman Winick*

Challenges to Science Diplomacy – and how to overcome them:

- "Science diplomacy efforts will require a system to analyze their impact. A framework for systematic analysis does not yet exist, and we are thus far only able to rely on anecdotal evidence" – *Cathleen Campbell*

- "There is a significant need for resourcing and sustainability. A great deal of planning is required for collaborative projects….the political leadership of the host country must see a clear benefit, which can be difficult to identify on long-term projects" – *Jill Shaunfield*

- "Projects must be started with the intention of long-term commitment… sustainability is important" – *Cathleen Campbell*

- "Create a framework for a more systematic use of science diplomacy in conflict management" – *Sheldon Himelfarb*

- "By incorporating private support with the knowledge provided by academia, projects are more likely to find good sources of funding" – *Eric Savitsky*

- "The connections made in Track II efforts often provide rich, honest intelligence and can produce concrete actions, as the individuals involved in these interactions are often well-connected in their home countries. However, language that refers to science diplomacy as foreign assistance should be avoided, as this concept is not very popular, particularly during periods of economic slowdown" – *Matthew Rojansky*

- "It is important to emphasize short term interests and incentives. While science diplomacy is a long-term commitment, identifying short-term benefits will help make programs attractive to those who may be able to offer funding" – *Matthew Rojansky*

Exchanges:

- "Six lessons from scientific exchanges with the Democratic People's Republic of Korea:

  Institutional commitment is important; maintain focus, as it is very easy to get off track; participant consistency should be maintained; put things in writing, as it helps to work out linguistic and other differences; don't over-commit; and informal communications can't be conducted at a distance" *– Stuart Thorson*

- "Standards-based academic cooperation does indeed build generalized trust" *– Stuart Thorson*

- "Cooperation should begin in the least controversial areas and can focus on mutual economic gain, as the business field is certainly ripe for such endeavors" *– Varaprasad Sekhar Dolla*

- "The official exchange programs were not as important as the personal invitations scientists extended to one another" *– Kip Thorne*

Listening & Communicating:

- "Scientists have an occasional lack of good communication with the public…they sometimes have difficulty explaining their work to the public. Intermediaries such as science journalists can help to fill this role and better disseminate information" *– Yannis Yorstos*

- "Science envoys will also base their focus on their interests and the needs of the countries they decide to visit. Embassies in target countries will reach out to governments in order to find out if and how they may be interested in setting up collaboration" *– Jill Shaunfield*

- "Nuclear weapons and the physicists who worked on them provided the credibility the Soviet Union was seeking. The close communication that could be witnessed between the scientists of both nations added a degree of credibility that politicians and diplomats were incapable of providing" *– Kip Thorne*

- "Since many countries are looking to science and scientists as a key element of broader economic growth, public engagement is attracting expanding attention. While in the past scientists may have simply advocated their findings and positions within the scientific community, they now must seek open, two-way dialogue with the public" *– Vaughn Turekian*

Appendix B

LIST OF CONFERENCE PARTICIPANTS

Cathleen Campbell, President and CEO, U.S. Civilian Research & Development Foundation

K.C. Cole, Professor, USC Annenberg School for Communication and Journalism

Nicholas Cull, Director, Master of Public Diplomacy program, University of Southern California

Varaprasad Sekhar Dolla, Associate Professor in Chinese Studies, Jawaharlal Nehru University

Sheldon Himelfarb, Associate Vice President, USIP, Center of Innovation for Science, Technology & Peacebuilding / Media, Conflict & Peacebuilding

Jörn Lauterjung, Head, Scientific Infrastructure, German-Indonesian Tsunami Early Warning System (GITEWS), GFZ German Research Centre for Geosciences, Helmholtz Centre Potsdam

Matthew Rojansky, Executive Director, Partnership for a Secure America

Eric Savitsky, Director, UCLA Center for International Medicine

Philip Seib, Director, USC Center on Public Diplomacy

Jill Shaunfield, Science and Technology Policy Advisor, Bureau of Near Eastern Affairs, U.S. Department of State

Kip Thorne, Feynman Professor of Theoretical Physics, Emeritus, California Institute of Technology

Stuart Thorson, Professor of Political Science and International Relations, Maxwell School, Syracuse University

Vaughan Turekian, Director for the Center for Science Diplomacy, American Association for the Advancement of Science

Joel Whitaker, Senior Adviser, Center of Innovation for Science, Technology, & Peacebuilding, United States Institute of Peace

Ernest J. Wilson III, Dean, USC Annenberg School for Communication and Journalism

Herman Winick, Assistant Director and Professor (Research), Emeritus, Stanford Synchrotron Radiation Laboratory Division of the Stanford Linear Accelerator Center

Yannis Yortsos, Dean, USC Viterbi School of Engineering

About the USC Center on Public Diplomacy

The USC Center on Public Diplomacy (CPD) was established in 2003 as a partnership between the Annenberg School for Communication and the School of International Relations at the University of Southern California. It is a joint research, analysis and professional training organization dedicated to furthering the study and practice of global public diplomacy.

Since its inception, the Center has become an ambitious and productive leader in the public diplomacy research and scholarship community. The Center has benefited from unique international support from academic, corporate, governmental, and public policy communities. It has become the definitive go-to destination for practitioners and international leaders in public diplomacy, while pursuing an innovative and cutting-edge research agenda.

USC received the 2008 Benjamin Franklin Award for Public Diplomacy in recognition of the university's teaching, training and research in public diplomacy. The award was one of four inaugural awards from the U.S. State Department.

About the United States Institute of Peace

The United States Institute of Peace (USIP) is an independent, nonpartisan institution established and funded by Congress to increase the nation's capacity to manage international conflict without violence. USIP provides the analysis, training and tools that prevent and end conflicts, promotes stability and professionalizes the field of peacebuilding. USIP is active in peacebuilding efforts on every continent and in unstable regions around the world.

In tandem with its on-the-ground initiatives, USIP conducts research, develops new resources and tools of conflict management, and produces reports and publications used by policymakers, practitioners, educators, and a range of professionals in the U.S. and abroad. USIP trains leaders in the field of peacebuilding and empowers individuals and local communities to prevent conflict, resolve disputes and promote stability.

USIP's Center of Innovation for Science, Technology and Peacebuilding uses input from people around the world to identify promising new practices, conducts research and develops innovative strategies for applying science and technology to the challenge of peacebuilding in fragile states, active conflict and post-conflict societies.

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