MR. GUMBINER: Good morning, everybody, and thank you, Dr. Merzbacher, for that kind introduction, and thank you to the Academies and the I-Group for this invitation. I am pleased to be here.

I am going to kick things off with a decidedly low-tech presentation. I hope it will be preparing you for, I am sure, the exciting ones that are to follow.

As Dr. Merzbacher said, the State Department has taken on an increasingly important role in international science activities. Now, science and technology cooperation has always played a role in our foreign policy, an important role in our international relations, as this distinguished audience is well aware. But I think it is safe to say that this administration, the Obama administration, and under Secretary of State Clinton, we have certainly raised it to a new level. This administration has more Nobel laureate appointees than any in recent memory. I think we can see it not only through rhetoric but through action, that this is of great importance to the President, great importance to our secretary of state.

Let me start off with a few quotes that illustrate it. And I want to emphasize, too, that it is not only about quotes, because those of you who have had the pleasure of having to discuss this or listen closely to President Obama, I think you come away with a sense that this is something that really comes from inside, that he is a true believer in science and technology as a motor not only of domestic development but also international.

When he spoke at the Academies in April 2009, President Obama stated that "science, technology, and innovation proceed more rapidly and more cost-effectively when insights, costs, and risks are shared. So many of the challenges that science and technology will help us meet are global in character. That is why my administration is ramping up participation in and our commitment to international science and technology cooperation across the many areas where it is clearly in our interest to do so." So that lays out a broad philosophical underpinning.

Now let's turn to two quotes from Secretary of State Clinton. One was in July 2009 at the State Department, where she stated that "science diplomacy and science and technology cooperation between the U.S. and other countries is one of our most effective ways of influencing and assisting other nations and creating real bridges between the United States and counterparts." As Dr. Merzbacher mentioned, this is a very important tool that we have, and I will go into a few of the other ways we see this as promoting U.S. interests and global interests.

Let's now take a look at a more recent statement from the Secretary of State. Just the past week there was a USAID conference on transforming development through science, technology, and innovation that was here in Washington. In her remarks she stated, "We really appreciate your willingness to work with us and to help us make the case that we need more investment in science and technology and development; and it is important, no matter what the global challenge you decide to pursue: scarcity of food or water or climate change and lack of energy and electrification or health and disease, whatever it might be. Innovation, science, technology must again become fundamental components of how we conduct development work, and the only way we can do that is with your help," speaking, of course, to an audience of science and technology professionals.

As is quite evident, this commitment from the United States government comes from the top, and it is oft repeated; these aren't just one-off comments.

As I am sure some of you know, going to the development piece, which I won't address directly here, USAID has reinvigorated its science and technology advisor and is setting up a score of new activities in science and technology related to development.

What is the importance to us? I would say it offers four concrete benefits: It opens doors, solves problems, it builds lasting relationships, and it promotes democratic values. Let's explore these a bit further.

S&T international cooperation opens doors. In many countries where political and economic relations are difficult or complex, scientists can and do work together to find answers and promote human advancements that extend well beyond politics and borders. We have seen this throughout history. We saw it during the Cold War. The scientific relationships built up behind the Iron Curtain were of great significance and without a doubt helped ease the transition when the Iron Curtain came down.

Today we see it in many countries around the world. In Cuba, Syria, Iran, to name a few, American science is working to bring down barriers. It is not only a bilateral phenomenon. Science is an important multilateral tool. In the Middle East we are assisting and often participating in scientific collaboration among Israeli, Palestinian, and Arab scientists. Utilizing the science relationship allies to help third countries is also an area of increasing attention. I was recently in Korea, and we talked about joining forces with Korean researchers to help in the Lower Mekong region. So this is also a tremendous tool that we have, that we can build on to help in other parts of the world.

Science and technology collaboration solves problems. I don't think I need to elaborate that much with this distinguished audience. The scientific challenges that we face today around the globe are formidable. It is essential for the international scientific community to work together to address these global challenges.

International cooperation expands researchers' access to information, ideas, and facilities. Data generated by one researcher often feeds into other research, even those that are across disciplines. By working together globally we are generating world-class science and providing opportunities to develop international common standards. By cooperating we also facilitate more rapid advancement of scientific knowledge and discoveries.

So it is evident that in today's world -- and again, in this audience I think that goes without saying -- that this is a key to solving the increasingly significant problems facing the global community.

The science and technology collaboration also establishes lasting relationships. Science has always transcended borders, but the present level of global interaction among scientists is unprecedented. The global communication revolution, coupled with today's open innovation model, empowers scientists to have ongoing contact and exchange ideas with scientists worldwide.

But with all of the technology, there is still no substitute for face-to-face collaboration. Many Fulbright scholars have told me that the opportunity to conduct research abroad was a life-altering experience. These types of international exchanges lead to lifelong connections that scientists benefit from throughout their careers.

International cooperation, as the President suggested, also allows us to share the cost of science. This is especially the case for large-scale facilities where individual countries or individual institutions find the cost of going alone formidable if not prohibitive.

For example, the ITER Project, which is an international fusion research and development collaboration, serves as a symbol of international scientific cooperation among developed and developing countries whose combined populations constitute 70 percent of the world's current population. Certainly no single country could afford to be engaging in such an aggressive program.

Finally, we use and see how science and technology cooperation promotes democratic values that are important to all of us. Scientific discovery is based upon open and fluid discussion. Conclusions are drawn based on fact. When a group of scientists meets to resolve a problem, it doesn't matter what their national origins are, their ages, ethnicity, gender, political views. What matters is getting the problem solved. So it promotes the values and approach to international relations that are very close to the core of what the United States seeks to promote internationally.

It comes again probably as no surprise to this group but surprises others that when polls are taken about international culture, the most popular attributes of the United States

or attributes of United States society, consistently, is not Hollywood, it is not Disney World, as many people might assume. It is science. U.S. science and technology is regularly considered -- even among countries that otherwise have a negative attitude toward the United States – as the most respected attribute of American culture and society.

Now let me turn a little bit to the role of the State Department and what we do. As was also mentioned in the introduction by Celia, science is a growing priority at State. We have two main institutional ways we promote science. One is the Bureau of Oceans and International Environmental and Scientific Affairs (OES). That's the bureau that I pertain to. Dr. Kerri-Ann Jones is our assistant secretary of state. The OES Bureau covers the gamut, everything from the bottom of the ocean on into space, an immensely varied and broad charge for the bureau.

I have three separate offices that I am in charge of as Deputy Assistant Secretary for Science, Space & Health. One is Science and Technology Cooperation, the other is International Health and Biodefense, and the third is Space and Advanced Technology. Once again it is very broad and far-reaching because we are global in our coverage. The entire Bureau has some 150 employees who are following the myriad issues that touch the way science and environment are managed globally. When you talk about biodiversity, you talk about international negotiations, environment, climate, that is institutionally governed through this bureau.

Secondly, there is a Science and Technology Advisor to the Secretary of State, which grew out of some of the concerns expressed by the scientific community and a very excellent report generated here at the National Academies that deals with the necessity for the Secretary of State to have an advisor on science and for other bureaus and offices throughout the Department to be able to turn to scientific expertise to help in their day-to-day business.

Dr. Nina Federoff is now completing her three-year term as science and technology advisor and will soon be departing. We are in the process of looking towards

selecting the next Advisor. This differs from the OES bureau in the sense that the Science and Technology Advisor manages a small staff, whose function is to perform in an advisory capacity as a link between U.S. science and what we do at State Department. The STAS office is less bureaucratic, does not negotiate or perform formal diplomatic functions.

But I am happy to say that science at State does not just stop with these two Bureaus and offices. We are seeing increasing interest and use of scientific expertise throughout the Department, including our regional bureaus, who are taking on more scientists, through our fellows programs, whether they be AAAS, Jefferson fellows, or Franklin fellows. We are looking towards increasing that activity overseas, bringing more science into our embassies. And of course, part of our recent activity, too, involves taking Science Envoys around the world as part of the President's "Cairo Initiative."

So all across the board within State Department, the role of science and scientists in international affairs is on the rise.

We, of course, are not a science ministry. We differ that way from many countries who have science ministries that govern and control official policy. Our purpose at State Department is to provide a coordinating role. We work closely with over 20 technical agencies that actually do and support the research, and we try to give an umbrella and an oversight to ensure that our foreign policy goals are being met and that the research generated from federal monies is consistent with our overall foreign policy.

This bottoms-up approach has served us well. It spurs creative research, it spurs innovation. I know we have been back and forth on the best structure. We certainly at State feel that this has been a very sound way to promote our scientific expertise and also give our researchers and give our agencies where the expertise lies the greatest amount of freedom and independence to do their groundbreaking work.

One of the most important aspects that we do in our bureau is to negotiate and implement bilateral  It is done out of the Office of Science and Technology Cooperation. We

currently manage 47 such agreements with another 10 that are waiting in the wings. These operate independent of, but often in conjunction with, an increasing number of strategic dialogues that contain science and technology components. For example with Pakistan, with India, with Russia, and of course China, as well as other major partners, our highest level consultations and discussions now contain a science and technology component.

But our standard agreements cover federally funded research. They do not cover activities that are funded through private means. They create a framework for bilateral cooperation. We facilitate the exchange of scientific results; increase access to data, ideas, and facilities for researchers; address taxation issues; and respond to the complex set of issues associated with economic development, security, and stability.

The agreements allocate intellectual property (IP) arising from cooperative activities and encourage the wide dissemination of scientific and technical information of a nonproprietary nature resulting from the cooperation. In addition, both partners agree to use best efforts to facilitate the movement of people and equipment.

Traditionally, these agreements have focused on scientific research cooperation. Recently we have established technology business accelerators in a few countries around the world in order to help entrepreneurs find reliable partners, provide financial means to create market-ready products, and assist in the development of business plans to attract venture capital interests. This is an ongoing, fluid process. Often these agreements are pretty standard and stock. I know certainly in terms of the IP annex, which many of you have probably had the pleasure or lack thereof, of having to deal with, we are constantly taking a look and seeing whether or not there are times to make changes and alterations. We certainly welcome your input and discussions on these as well as other aspects of a standard agreement. Again, these are meant to facilitate your work; they are meant to give our researchers the greatest access possible to international activity.

One area that often causes confusion on these agreements is financial. When a country negotiates an agreement with the United States, no matter how often you state there is no specific money attached, they don't believe us. They think the nature of negotiating an agreement with the United States means that a check is stapled to the back automatically. So we continuously remind our partners that, with a couple of rare exceptions, our funding of international science and technology is managed through the annual budgets of our research agencies and not directly through our umbrella agreements.

An additional point of confusion is that U.S. science agencies generally only often have annual budgets, rather than multiyear budgets common in many other developed countries. We need to explain this clearly as to why we need to keep going back to the well each year. Also, our funding cycles are at times difficult to coordinate with partner countries.

We also need to be clear in conducting international science that many U.S. science agencies have a primarily domestic mandate and resources devoted to international projects may be limited. Some agencies directly fund foreign partners, such as the National Institutes of Health (NIH), while others, such as the National Science Foundation (NSF), only fund the U.S. partner. We now have a recently concluded NSF-U.S. Agency for International Development (USAID) agreement to permit NSF to fund the domestic part of a collaborative research, while USAID has the capacity to fund the international portion.

There is also the sticky problem of visas, which again some of you may have encountered. Certainly in the post-9/11 world we are dealing with a different animal.

I remember, in the aftermath of 9/11, I was actually in Tel Aviv at the time, posted at our embassy there, and Congress had initiated a law whereas if you were born in certain countries, you could not get a visa until you went through an extensive security check that lasted 6 months or so. You can probably guess which countries were the target of Congress' instructions. I recall that the deputy to the Israeli Agricultural Research Institute was a very distinguished gentleman in his early seventies who had been born in Iran. His family, as an

Iranian Jewish family, left when he was one year old. When he came up to renew his visa that he had had his whole life, there was no discretion given to the State Department for that kind of situation. So here was a gentleman in his early seventies, with visas his whole life, was born in Iran and lived most of his life in Israel, and we were forced to deny his visa and put him through about a 6-or-8-month security check before we could get it.

Thankfully, those rare kinks have been solved, but I know that there are other situations in terms of the research community where providing visas creates at time-frustrating delays. We at the State Department, and certainly on the scientific side, are doing all we can to help facilitate. Obviously, there are serious and real security concerns as well. They have to be balanced out by the government as a whole. But the administration stands ready and committed, to the extent possible, to promote and develop a fluid exchange of research. So we are trying to ease that concern and ease those processes to the extent we can.

Finally, let me just say that as your work on developing a primer for international cooperation proceeds, you may refer to some materials produced by the Organization for Economic Cooperation and Development, OECD. The OECD has addressed best practices in international research cooperation in several activities. Two of these activities are ongoing. The Global Science Forum is in the advanced stage of developing a compendium on issues and options for establishing large-scale facilities. This will delineate issues that should be addressed in establishing large international research infrastructures. The issues include legal and administrative structures, funding, contributions, project management, personnel and equipment. We expect this work to be completed by the end of the year.

The OECD's Committee on Science and Technology Policy is in the intermediate stage, also, of developing best practices for multilateral research cooperation. The Global Science Forum has completed work on dealing with allegations of research misconduct in international projects, which I am sure will be of interest.

Thank you again for the invitation. The next two days of discussion are going to provide a great opportunity to explore some of the challenges encountered in international scientific cooperation. As we look around the world in seeking answers to the great challenges faced by our leaders, from climate change to sectarian conflict, to job creation, science and technology plays a prominent role across the board. The deliberations of this important meeting it will be of tremendous interest to our President and the entire administration.

Thank you again, and we look forward to a very productive discussion.