# TESTIMONY BEFORE THE HOUSE SCIENCE SUBCOMMITTEE ON RESEARCH AND SCIENCE EDUCATION

## HEARING ON SCIENCE DIPLOMACY

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Dr. Nina Fedoroff
Science and Technology Adviser to the Secretary of State
and the Administrator of USAID

## MAKING SCIENCE DIPLOMACY MORE EFFECTIVE

Chairman Baird, Ranking Member Ehlers, and distinguished members of the Subcommittee, thank you for this opportunity to discuss science diplomacy at the U.S. Department of State. The U.S. is recognized globally for its leadership in science and technology. Our scientific strength is both a tool of "soft power" – part of our strategic diplomatic arsenal – and a basis for creating partnerships with countries as they move beyond basic economic and social development. Science diplomacy is a central element of the Secretary's transformational diplomacy initiative, because science and technology are essential to achieving stability and strengthening failed and fragile states.

S&T advances have immediate and enormous influence on national and global economies, and thus on the international relations between societies. Nation states, nongovernmental organizations, and multinational corporations are largely shaped by their expertise in and access to intellectual and physical capital in science, technology, and engineering. Even as S&T advances of our modern era provide opportunities for economic prosperity, some also challenge the relative position of countries in the world order, and influence our social institutions and principles. America must remain at the forefront of this new world by maintaining its technological edge, and leading the way internationally through science diplomacy and engagement.

*The Public Diplomacy Role of Science*

Science by its nature facilitates diplomacy because it strengthens political relationships, embodies powerful ideals, and creates opportunities for all. The global scientific community embraces principles Americans cherish: transparency, meritocracy, accountability, the objective evaluation of evidence, and broad and frequently democratic participation. Science is inherently democratic, respecting evidence and truth above all.

Science is also a common global language, able to bridge deep political and religious divides. Scientists share a common language. Scientific interactions serve to keep open lines of communication and cultural understanding. As scientists everywhere have a common evidentiary external reference system, members of ideologically divergent societies can use the common language of science to cooperatively address both domestic and the increasingly trans-national and global problems confronting humanity in the 21st century. There is a growing recognition that science and technology will increasingly drive the successful economies of the 21st century.

Science and technology provide an immeasurable benefit to the U.S. by bringing scientists and students here, especially from developing countries, where they see democracy in action, make friends in the international scientific community, become familiar with American technology, and contribute to the U.S. and global economy. For example, in 2005, over 50% of physical science and engineering graduate students and postdoctoral researchers trained in the U.S. have been foreign nationals. Moreover, many foreign-born scientists who were educated and have worked in the U.S. eventually progress in their careers to hold influential positions in ministries and institutions both in this country and in their home countries. They also contribute to U.S. scientific and technologic development: According to the National Science Board's 2008 Science and Engineering Indicators, 47% of full-time doctoral science and engineering faculty in U.S. research institutions were foreign-born.

Finally, some types of science – particularly those that address the grand challenges in science and technology – are inherently international in scope and collaborative by necessity. The ITER Project, an international fusion research and development collaboration, is a product of the thaw in superpower relations between Soviet President Mikhail Gorbachev and U.S. President Ronald Reagan. This reactor will harness the power of nuclear fusion as a possible

new and viable energy source by bringing a star to earth. ITER serves as a symbol of international scientific cooperation among key scientific leaders in the developed and developing world – Japan, Korea, China, E.U., India, Russia, and United States – representing 70% of the world's current population..

The recent elimination of funding for FY08 U.S. contributions to the ITER project comes at an inopportune time as the Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER Project had entered into force only on October 2007. The elimination of the promised U.S. contribution drew our allies to question our commitment and credibility in international cooperative ventures. More problematically, it jeopardizes a platform for reaffirming U.S. relations with key states. It should be noted that even at the height of the cold war, the United States used science diplomacy as a means to maintain communications and avoid misunderstanding between the world's two nuclear powers – the Soviet Union and the United States. In a complex multi-polar world, relations are more challenging, the threats perhaps greater, and the need for engagement more paramount.

*Using Science Diplomacy to Achieve National Security Objectives*

The welfare and stability of countries and regions in many parts of the globe require a concerted effort by the developed world to address the causal factors that render countries fragile and cause states to fail. Countries that are unable to defend their people against starvation, or fail to provide economic opportunity, are susceptible to extremist ideologies, autocratic rule, and abuses of human rights. As well, the world faces common threats, among them climate change, energy and water shortages, public health emergencies, environmental degradation, poverty, food insecurity, and religious extremism. These threats can undermine the national security of the United States, both directly and indirectly. Many are blind to political boundaries, becoming regional or global threats.

The United States has no monopoly on knowledge in a globalizing world and the scientific challenges facing humankind are enormous. Addressing these common challenges demands common solutions and necessitates scientific cooperation, common standards, and common goals. We must increasingly harness the power of American ingenuity in science and

technology through strong partnerships with the science community in both academia and the private sector, in the U.S. and abroad among our allies, to advance U.S. interests in foreign policy.

There are also important challenges to the ability of states to supply their populations with sufficient food. The still-growing human population, rising affluence in emerging economies, and other factors have combined to create unprecedented pressures on global prices of staples such as edible oils and grains. Encouraging and promoting the use of contemporary molecular techniques in crop improvement is an essential goal for US science diplomacy.

An essential part of the war on terrorism is a war of ideas. The creation of economic opportunity can do much more to combat the rise of fanaticism than can any weapon. The war of ideas is a war about rationalism as opposed to irrationalism. Science and technology put us firmly on the side of rationalism by providing ideas and opportunities that improve people's lives. We may use the recognition and the goodwill that science still generates for the United States to achieve our diplomatic and developmental goals. Additionally, the Department continues to use science as a means to reduce the proliferation of the weapons' of mass destruction and prevent what has been dubbed 'brain drain'. Through cooperative threat reduction activities, former weapons scientists redirect their skills to participate in peaceful, collaborative international research in a large variety of scientific fields. In addition, new global efforts focus on improving biological, chemical, and nuclear security by promoting and implementing best scientific practices as a means to enhance security, increase global partnerships, and create *sustainability.*

The Office of the Science and Technology Adviser (STAS) is actively involved in long-term strategic planning and dialogues about the importance of science, engineering, and technology to the future security our nation. The STAS Global Dialogues on Emerging Science and Technology have focused on emerging technology outside of the U.S. The most recent conference this March focused on the development of geographic information systems for sustainable development in Africa and will promote greater U.S.-African regional cooperation on this issue.

Another broad Department initiative has been the Iraqi Virtual Science Library. The Iraqi Virtual Science Library (IVSL), launched on May 3, 2006, is a digital portal that provides

80% of Iraqi universities and research institutes with access to an outstanding collection of millions of full text articles from over 17,000 premier scientific and engineering journals and their archives, in addition to technical content and educational resources through an innovative open-source internet platform developed with Sun Microsystems. Its goal is to help rebuild the educational and scientific infrastructure in Iraq and reintegrate Iraqi scientists and engineers into the global scientific community.

Recognizing the need to rebuild the science and engineering infrastructure in Iraq, a group of American Association for the Advancement of Science (AAAS) Science & Technology Policy Fellows began the IVSL (https://ivsl.org) project in 2004. The IVSL is now an interagency collaboration with members from the U.S. Departments of State and Defense. The project is funded by the Defense Threat Reduction Agency, the U.S. State Department, and the Civilian Research and Development Foundation, the generous donations of publishing companies and professional societies, and partnerships with the U.S. National Academy of Sciences, other departments and agencies of the U.S. Government, Sun Microsystems, the Massachusetts Institute of Technology, Useful Utilities, and Vitalect Technologies.

STAS has been also closely involved in Project Horizon, in partnership with other bureaus at State, as well as the DOD, USAID, the intelligence community, and other US technical agencies. Project Horizon is a strategic, scenario-based planning project to focus on the future of 21st century global affairs and transformational diplomacy. The purposes of Project Horizon are threefold. First, it is to develop strategic interagency capabilities in which the U.S. Government should consider investing in to prepare for the threats and opportunities that will face the nation over the next 20 years, including building and integrating our operational capacity to respond to contingencies and support country transitions effectively. Second, it is to provide participating agencies with a scenario-planning toolset that can be used to support both internal agency planning and planning across agencies. Third, it is to provide a starting point for an institutionalized interagency planning process. Project Horizon anticipates that the Department of State will have a critical need to strengthen the ability of the Department to focus on shaping the environment for our international relations. Science, technology, and engineering are key components of the Horizon blueprint for the future of the Department's statecraft.

*Increasing Science Literacy at State*

Just as we may use S&T diplomacy outside of State, it is also important to build science literacy within the Department of State and USAID in order to maintain our "intellectual security". Our diplomats will be called upon increasingly to exhibit science, engineering, and technology expertise and presence in fulfillment of their duties.

As the Secretary of State's Advisory Committee on Transformational Diplomacy noted, the Department of State should expand its investment in science, engineering, and technology expertise in order to enhance its presence and global engagement in the formulation of new international laws, standards, and practices in emerging scientific fields such as climate change, genetics, and nanotechnology. We seek to increase the number of scientists in the Department through promotion and coordination of the American Association for the Advancement of Science Diplomacy Fellowships (30 fellows for 2007-2008), professional science society fellowships (2 fellows), and Jefferson Science Fellowships (8 for 2007-2008). The Department is also actively promoting the Embassy Science Fellows Program (37 from 7 agencies in 33 posts in 2007) to place scientists in posts overseas, and developing science, engineering, and technology student internships at the Department of State. These initiatives provide important technical capacity within the Department, and STAS is actively working, in partnership with the Bureau of Oceans, Environment, and Science (OES), to make scientific, engineering, and technical capacity more widely accessible to the Department and overseas embassies and missions.

The Department should expect all Foreign Service officers and other officials of the Department and Agency for International Development to achieve a minimum level of scientific literacy and awareness in matters relating to foreign policy to perform their duties effectively. This is obvious for issues such as global health, nanotechnology, space and advanced research, environment, and energy, but comes into play in other ways as well. Science literacy is also essential to understanding and dealing with issues such as arms control and nonproliferation, including chemical and nuclear weapons and their delivery systems, and for counter-terrorism. The STAS office is working with the Foreign Service Institute to broaden science literacy within the Foreign Service.

Finally, STAS provides appropriate advice to policymakers in the Department on emerging scientific issues, and to help reach political consensus on challenging issues. It does so by bringing together scientists within the State Department, other agencies, the private sector, and the academic communities.

## THE ROLE OF SCIENCE AND TECHNOLOGY AT USAID

Development can directly support diplomacy and science is an integral part of development. The foci of our foreign assistance are building self-sustaining economies and poverty alleviation, transforming agriculture and resolving food insecurity, solving global health problems, climate and environment, as well as building democracy and supporting the rule of law. Science and technology have a role to play in all of these.

Science, engineering, & technology are eagerly desired by developing countries and remain among the most admired aspects of American society. Access to S&T is a key component of innovation, which in turn, is a key component of economic competitiveness in all countries, at every stage of development. Investments in science and technology have long been recognized as a key element of development strategies to lift people out of poverty and onto a path of self-sufficiency and sustainable growth.

### *Enhancing Science at USAID*

Nearly all aspects of development require science and technology or would benefit from them, and this will only grow in the future. Yet USAID has suffered steep declines in S&T capacity, staffing, and funding, particularly in overseas missions, where such knowledge is crucial to the development of foreign assistance programs that fully respond to local needs. In parallel, so too has the Agency's support for research to develop a new generation of technologies and practices to address these emerging or deepening problems of development. These shortfalls have hurt the Agency's ability to achieve its mission.

The State Department's Science Adviser's recent additional appointment as the Science Adviser to the USAID Administrator highlights the Agency's recognition of the importance of S&T to development, and emphasizes the need to ensure that that U.S. government is using the

best scientific and technological information to solve the world's development challenges. Solving such challenges pays important dividends to the American people.

To address the science and technology issues at the Department of State and USAID and to link policy initiatives with foreign assistance programs, the STAS office is transforming into a joint State Department-USAID Science Diplomacy unit to more effectively engage scientists, engineers, and a variety of technical experts in meeting our diplomatic and development goals and unite STAS' dual roles to the Secretary and the USAID Administrator.

The mission of this office will be to deliver the kind of scientific and technical expertise required by a country to address the critical challenges that threaten it. It will focus on emerging, as well as fragile and failing states in need of technical and scientific expertise. The office will call on the US academic, industrial and USG S & T sector, constituting working groups of scientists, engineers and other technical personnel to address development problems. Its purpose is to ensure that the use of science and technology achieves our goals in public diplomacy, increases the efficacy of our foreign assistance programs, and meets our foreign policy objectives of transformational diplomacy and stabilization of the international system.

## THE ROLE OF STAS RELATIVE TO OES

The State Department's Science and Technology Adviser to the Secretary is one of the Department's principal interlocutors with the national and international scientific community. The Adviser seeks counsel and assistance from the community on foreign policy based science and technology initiatives at the Department of State, but also serves to inform the community of such initiatives, and provide a venue for collaboration.

STAS helps ensure that scientific issues receive attention at senior levels of the Department, including the Secretary. The Adviser provides accurate advice to the Department to help officials understand emerging scientific issues and inform U.S. positions on issues, such as biotechnology and climate change. The Adviser also ensures access for the Department to the expertise and resources of the scientific community.

The Science Adviser works closely with OES and with other bureaus and offices within the State Department on a variety of issues, from promoting international cooperation on science,

engineering, and technology, to meeting with delegations, and crafting policy for international meetings. STAS is both a resource and a collaborator for OES and other and functional and regional State Department bureaus.

Most importantly, the Adviser is a conduit for scientific information to the leadership of the Department. STAS advises and receives policy advice from the Secretary of State, the Deputy Secretary, the Under Secretary for Democracy and Global Affairs (G) and OES Assistant Secretary, on all science, environment, health, technology, engineering, and related research and development activities, and issues that have foreign policy implications. STAS also provides scientific and technical advice and counsel to other Under Secretaries, regional and functional Assistant Secretaries, and other senior staff throughout the Department on issues that involve a scientific, engineering, or technology component, in partnership with OES.

## STAS' ROLE IN AGENCY, NGO, & PRIVATE SECTOR COORDINATION

STAS plays a key coordination role for State in its relationship with the NGO community on scientific, engineering, and technology topics. STAS works actively with professional and scientific organizations, such as the American Association for the Advancement of Science, and the National Academies of Science, Medicine, and Engineering. These relationships provide the Department of State and the Agency for International Development access to the best intellects in the field, and to the frontiers of science.

STAS also maintains close working relationships with the other USG agencies that deal with science- and technology-based issues, particularly, with the White House Office of Science and Technology Policy (OSTP), the National Science and Technology Council within the White House, the National Science Foundation, and the National Institutes of Health, and speaks for the Department in its dealings with those agencies. The Adviser has met with many of her direct counterparts at the Departments of Agriculture, Energy, and Defense, for example, to share ideas about areas of common interest and concern, and to pursue collaborative opportunities.

Finally, STAS is an important link to the private sector, both companies and foundations. Such partnerships leverage State Department and USAID resources to achieve common goals.

Thank you again for allowing me to testify on this important topic.