Science representatives seek to ease tensions in Middle East

US science delegation visits Syria with hope of improving bilateral relations. Similar overtures with Iran suffer a setback.

Members of a US scientific delegation visiting Syria in March were expecting only a perfunctory handshake from President Bashar al-Assad. Instead, the 10 US visitors began their scientific diplomacy mission at the top, conversing for 90 minutes with the ophthalmologist-turned-ruler about the role of science and education in meeting national economic and social needs.

It may have helped that Assad's father-in-law took part in arranging the visit. Still, as Vaughan Turekian, director of science diplomacy at the American Association for the Advancement of Science (AAAS) and one of the visitors, observed, it came as a pleasant surprise that the Syrian president "could talk with some level of comfort and detail about the role of science and technology to economic development."

Cold war origins

Scientific cooperation was a frequent tool for defusing tensions between the superpowers during the cold war. In recent years the concept has been extended to help thaw relations between the US and many Muslim nations in the Middle East. Although Secretary of State Hillary Clinton has not explicitly proposed ramping up scientific diplomacy, her science adviser, Nina Fedoroff, said cooperation between scientists of nations having poor or nonexistent diplomatic relations is "immensely important." Fedoroff, a molecular biologist, believes that connections between US and Soviet physicists helped to "keep the cold war cold."

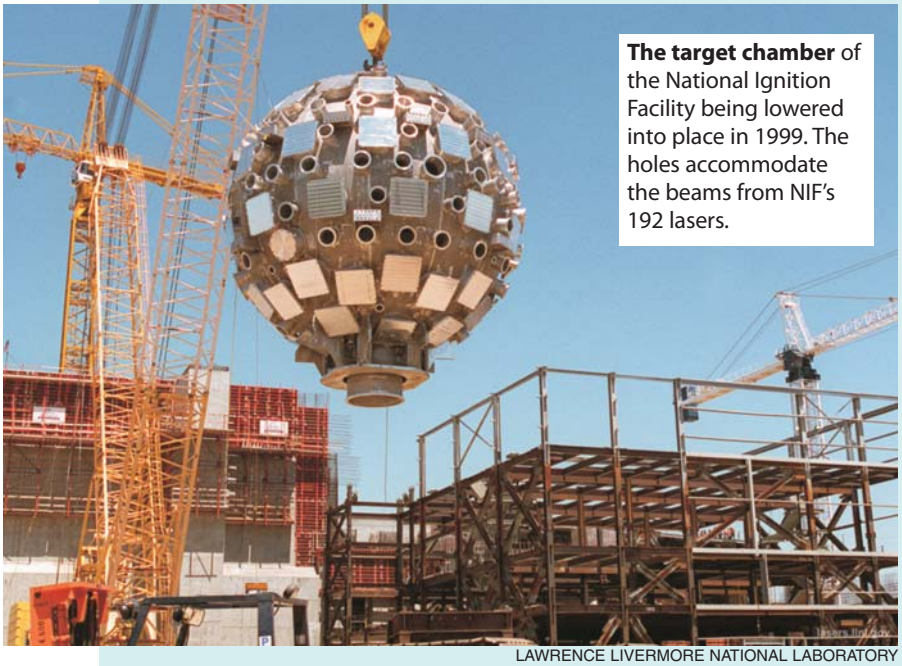
Fedoroff speaks from experience. She served on the founding board of the International Science Foundation, a nonprofit organization that was established in 1992 with $100 million from billionaire George Soros to find new jobs for Soviet scientists after the breakup of the Soviet Union. Fedoroff also recalled organizing, 30 years ago, the first US–Soviet workshop on agricultural biotechnology, jointly sponsored by the science academies of the two nations. The US–Russian collaborative relationship, she related, is about to

LLNL's laser fusion facility complete, but will it work?

After 12 years of construction, and a price tag that nearly tripled from $1.2 billion to $3.5 billion, the National Ignition Facility (NIF) has officially been declared complete. The massive instrument, housed at Lawrence Livermore National Laboratory in a building the size of three football fields, consists of 192 individual laser beams, all to be precisely and simultaneously focused on a tiny capsule containing a BB-sized pellet of deuterium and tritium fusion fuel. Researchers are hopeful that the device will create on a laboratory scale the conditions that occur in the secondary, fusion stage of a nuclear weapon. NIF will also be used for astrophysics and energy research. Program managers say that NIF is capable of narrowing each of its beams from about 40 centimeters square into a spot about one-half millimeter in diameter at the center of the target chamber. Such control is crucial to NIF's mission to attain ignition—the point at which the amount of fusion energy exceeds what it took to create the reaction.

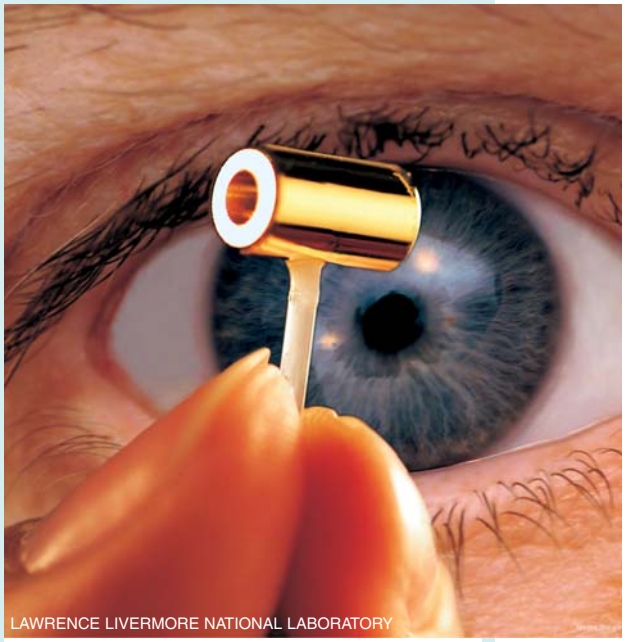
In March the lab announced that NIF delivered 1.1 megajoules of UV light to the center of the 10-meter-diameter target chamber, but that is well below the original design goal of 1.8 MJ. Actual ignition experiments won't get under way until next year. But critics, including Stephen Bodner, former head of the Naval Research Laboratory's inertial confinement fusion program, predict that it will fail to work.

David Kramer



The target chamber of the National Ignition Facility being lowered into place in 1999. The holes accommodate the beams from NIF's 192 lasers.

LAWRENCE LIVERMORE NATIONAL LABORATORY



LAWRENCE LIVERMORE NATIONAL LABORATORY

A capsule containing fusion fuel, called a hohlraum, is about the size of a pencil eraser. The National Ignition Facility's laser beams will enter through the openings at each end to produce x rays that will implode the fuel, causing it to undergo fusion.

celebrate its 50th year as a stabilizing force.

"I would love to see a more official scientific cooperation program [at State], and I will work hard to enhance [scientific exchanges]," Fedoroff said. She adds that exchanges are especially useful for addressing issues such as wildlife and water management that transcend national boundaries.

An unofficial visit

US government officials did not participate in the scientific mission to Syria. The science trip came about through the efforts of multiple nongovernmental organizations, including the Washington-based Center for the Study of the Presidency and Congress and the British Syrian Society, whose cochair, London cardiologist Fawaz Akhras, is the father of Assad's wife. Akhras acted as head of the Syrian scientific delegation throughout the four days of meetings held with the US team. Syrian-born British businessman and philanthropist Wafic Said provided his Boeing 737 to whisk the US delegation to Damascus and back. The US team also included Nobel laureate biologist David Baltimore, immediate past board chairman of AAAS.

The two teams identified water, energy, and agriculture as topics of mutual interest for possible collaboration. According to Turekian, Assad said that he hopes to build a Western-style system for bringing innovations to the marketplace. Other topics addressed included assistance for Syrian hospitals to win accreditation, establishment of a Syrian–American institute to help develop programs for medical technicians and nurses, and an examination of how the US visa system hinders scientific exchanges.

As the next step, the parties agreed to select a Syrian scientist to come to the US later this year for a three- to six-month fellowship at the Washington headquarters of AAAS. That individual will help organize US–Syrian joint activities, put together a program for the AAAS annual meeting, and interact with the broader US science and technology community.

Syria's ambassador to the US, Imad Moustapha, a computer scientist, told a post-visit gathering at AAAS that the trip could mark a "watershed" in bilateral relations that, while always testy, had worsened after the US invasion of Iraq in 2003. Syria has been on the State Department's list of states that sponsor terrorism since 1979. Angered by the alleged incursion of US troops from Iraq into Syrian territory last October, Assad retaliated by closing three US educational and cultural institutions in Damascus. Ironically, those actions were harmful mainly to Syrian citizens aspiring to obtain a Western-style education, noted Theodore Kattouf, a former US ambassador to Syria who accompanied the scientists.

But Moustapha also cautioned that more extensive cooperation will require that scientific activities be separated from the broader political relationship between the countries. That requirement can easily be accomplished by having universities manage the joint efforts, said Norman Neureiter, director of the AAAS Center for Science, Technology and Security Policy and a member of the delegation. Topics of mutual interest, such as agriculture in arid regions and illnesses that occur in the Middle East, must be delineated, he said, adding that cooperation does not imply aid. "We are not in the assistance business," Neureiter emphasized.

Incident in Iran

Syria isn't the only nation in the Middle East where scientists are attempting to bridge the political divide with the West. Most strikingly, American scientists have traveled to Iran several times in recent years on visits that were brokered by the National Academies (see PHYSICS TODAY, May 2008, page 51, and August 2008, page 30). Among the topics discussed on those trips were medicine and public health, water management, earthquakes, and higher education.

But scientific relations with Iran were damaged by an incident in Tehran in December 2008. Glenn Schweitzer, who has arranged numerous trips to Iran as director of the Academies' Central Europe and Eurasia program, was twice detained in his Tehran hotel room and interrogated for a total of nine hours by individuals claiming to be government security officials. The Academies' presidents immediately wrote to protest Schweitzer's treatment and to demand assurances that it would not be repeated. But as PHYSICS TODAY went to press, their letter had gone unanswered. In the meantime, Schweitzer said he has been arranging meetings to be held in third countries. A visit to the US by Iranian scientists also lies ahead, but Schweitzer won't discuss the itinerary for fear that it may not happen. He said the combination of economic sanctions, travel restrictions, and US export controls makes Iranian trips the toughest to pull together.

Hosein Dabiri, a microbiologist at Tehran University of Medical Sciences, was a member of an Iranian delegation

that visited the US in 2007 to discuss food safety. He said that apart from their scientific value, exchanges are useful "to give [a] true view of each country [that] can influence opinions of politicians and the general public." But he expressed frustration with what he describes as the lack of follow-up communication from the US scientists he met. Without ongoing contacts, the delegation meetings had "very limited scientific benefit," Dabiri lamented.

Cooperative approaches

More formal cooperative science and technology programs sponsored by the US have been under way with states in the region that have a cordial relationship with the US. A program with Pakistan has provided funding for 46 mainly applied research projects since its establishment in 2005. The US Agency for International Development and the State Department have contributed $7.5 million in grants that range up to $350 000 each over three years. The Pakistani government has kicked in a somewhat higher amount for the projects, which must involve researchers from both countries. But this year a new round of awards has been delayed as the Pakistanis struggle to come up with their share of the money, said Kelly Robbins, the National Academies staffer who administers the US side of the program.

A State Department–sponsored program with Egypt, in which inventions arising from Egyptian academic research are assessed for their commercial potential, is taking a different sort of cooperative approach. Managed on the US side by the University of Texas at Austin IC^2 Institute, an incubator for technology startup businesses, the program selected four candidates for commercialization from more than 400 submissions. Each of those is to receive a grant of at least $15 000 from the Egyptian Ministry of Scientific Research, and the aspiring inventor-entrepreneurs will also get support and training in the business skills needed to bring their inventions to market. The winning inventions are a compound that could regenerate teeth following a root canal or other dental procedure, a bacterial culture to give low-fat cheese the same texture and taste as full-fat, a genetically modified plant for combating whitefly disease in the developing world, and a thermally stable, solid hydrogel support for immobilizing enzymes used in industrial or laboratory processes.

The same model has been applied in Jordan, which, like Egypt, has signed an umbrella science and technology agreement with the US. Robert Senseney, senior adviser for science partnerships in the State Department's Bureau of Oceans, Environment, and Science, said department officials are examining how to apply the approach to help strengthen economies and create jobs in Morocco, Algeria, Tunisia, Libya, Lebanon, and even the West Bank. Syria, which Senseney said has "strong science," would also be a good candidate, but that level of cooperation will probably have to await improvements in diplomatic relations.

In March a subcommittee of the House Committee on Science and Technology approved legislation designed to better coordinate international science and technology activities across federal agencies. The bill would mandate formation of a new, cabinet-level interagency policy coordinating mechanism. The committee acted out of concern that significant opportunities at the intersection of science and diplomacy may be missed through the lack of coordination.

The subcommittee's chairman, Daniel Lipinski (D-IL), said he welcomed the news that John Holdren, new director of the White House Office of Science and Technology Policy, intends to reestablish the position of associate director for international and national security affairs in OSTP. Holdren's predecessor, John Marburger, had eliminated the position.

David Kramer

Medical physics standardizes clinical training

Public safety is the motivation behind new requirements for becoming certified as a medical physicist.

New certification rules intended to improve the quality and uniformity of medical physics training go into effect in a few years. In preparation, the field is scrambling to create enough residency slots for the first classes that fall under the tightened rules.

Starting in 2012, to sit for the board exams the American Board of Radiology will require that people be enrolled in or have graduated from an accredited medical physics master's, PhD, or clinical residency program. At the urging of the American Association of Physicists in Medicine (AAPM), two years later that requirement will be superseded, and test takers will have to be enrolled in or have completed an accredited residency. Passing the ABR exams confers certification that a person is qualified to independently practice radiologic physics and advise physicians about the physical aspects of radiation therapy, diagnostic radiology, or nuclear medicine. Certification for the specialty areas of medical health physics and magnetic resonance imaging is done separately, through the American Board of Medical Physics. Accreditation for degree programs and residencies is by the nonprofit Commission on Accreditation of Medical Physics Educational Programs Inc (CAMPEP).

"All about public safety"

Among other things, medical physicists calculate radiation dose and beam shape for tumor treatment, check that medical imaging equipment—involving x rays, radionuclides, magnetic resonance, computed tomography, ultrasound, and fluoroscopy—is calibrated and used properly, help in selecting new equipment, and train technologists and others to use the equipment. In addition to working in universities, hospitals, and clinics, they serve as independent contractors in practice groups, routinely checking and calibrating mammography equipment or dental x-ray machines, for example. In some cases, medical physicists interact closely with patients.

Each state sets its own requirements for medical physicists. In the four states—Florida, Hawaii, New York, and Texas—that require a license, ABR certification is one way to get it. In many states medical physicists must register to practice. In other states a physicist with no prior clinical training, or even no classroom background in medical physics, might be hired by a hospital or clinic and trained on-site. "A lot of people have learned on the job. Smart people can always get the education they need. But the profession is mature enough for some standards," says Ehsan Samei, Duke University's director of medical physics graduate studies. "There are places that don't do as good a job as they should at making sure their image quality and dose management is where it needs to be," adds CAMPEP chair John Hazle, an imaging physicist at the University of Texas's M. D. Anderson Cancer Center in Houston. Currently, to sit for the ABR exams, a medical physicist "needs three years of experience and someone ready to vouch for you," says Hazle.