Einstein: A Stage Portrait

"So here I am, 'Relativity himself.'. . . I wonder if they called Sir Isaac Newton 'Gravity himself' or Louis Pasteur 'Rabies himself.' " Albert Einstein mutters this aloud one evening to a houseful of guests he's invited over so he can counter false stories about himself in the press and set the record straight. That's the premise of Willard Simms's 1984 *Einstein: A Stage Portrait*, a one-man show that actor Tom Schuch has been performing for four years. Not surprisingly, in 2005, the World Year of Physics, Schuch has been in heavy demand across North America in schools, physics departments, and professional society gatherings.


LARRY GIBBONS

Actor Tom Schuch plays the violin in *Einstein: A Stage Portrait*.

A chalkboard is covered with calculations on unified field theory. A violin lies on a table. A few family photos sit on shabby furniture. Letters are piled everywhere. A 67-year-old Einstein wears a suit but no socks. He finds an apple in his jacket pocket, takes a bite, and puts it back. He demonstrates his trick of taking off his vest without removing his jacket. And all the while he talks.

Einstein talks about having learned to talk late, having been a slow learner, and getting kicked out of school. He talks about the physics he was doing while working in a Swiss patent office. About his two wives, and how his love letters included references to parallelism, the kinetic energy of molecules, and Boltzmann's theory of gases. He talks about leaving his job in Berlin in the early 1930s because of the Nazis' persecution of Jews, and about coming to the US. He remembers going for ice cream with his son. He talks of the letter he wrote to President Franklin D. Roosevelt encouraging the US to build an atomic bomb, and of his nightmares that mankind will destroy itself with the bomb. He tells of Israel's inviting him to be its first president, and says, "I am deeply committed to helping the cause of Israel in every way possible, and one of these ways is never to be its president."

The hour-and-a-half-long play is woven largely from actual quotes and facts from Einstein's life; for schoolchildren, Schuch performs a condensed version, minus the politics. "Einstein was such an icon. We all know his crazy hair and $E = mc^2$," Schuch says. "The play puts his feet on the ground and shows that he had to work hard at what he did. That he had a great sense of humor. That he loved his sailboat. He neglected his family. All of these elements coagulate and give a sense of Einstein as a person."

Besides playing Einstein, Schuch's main tie to physics is his birthplace: Los Alamos. Schuch's father worked as a technician at the New Mexico weapons lab; earlier he had made the carbon bricks for the first nuclear reactor, built by Enrico Fermi beneath the football stadium at the University of Chicago.

As a lifelong actor, Schuch says he had been perpetually seeking work. "I was looking for something I could grow into, and one day, in an industry rag, I happened on a list of one-man shows. I tracked down the author of *Einstein*, and I liked the script. Einstein found me."

Toni Feder

protection to ensure that the US is not at a disadvantage in investing in S&T manufacturing and marketing. It also calls for a stronger R&D tax credit to encourage more private investment.

Worrisome indicators

The report includes "worrisome indicators" intended to drive home the importance of the recommendations. "For the cost of one chemist or one engineer in the United States, a company can hire about five chemists in China or 11 engineers in India," the report says. "Chemical companies closed 70 facilities in the US in 2004 and have tagged 40 more for shutdown," the report continues. "Of 120 chemical plants being built around the world with price tags of $1 billion or more, one is in the United States and 50 in China."

The concern on Capitol Hill is how to get the report's recommendations, which cut across the jurisdictions of many different House and Senate committees, included in funding bills. The debate in recent weeks has been whether to introduce the proposals in a single bill or to break them up, submit them to the appropriate committees, and hope some are funded. In an appendix near the end of the report, the authors give cost estimates for implementing all of the recommendations. The low estimate is $500 million, the high more than $5 billion.

"I've been worried about this [competitiveness] problem for 15 years or more," said Augustine, who chaired the report committee. "But given the budget problems, the report is sailing into a strong headwind."

Jim Dawson

Peace Prize Goes to ElBaradei and Nuclear Watchdog Agency

Combating nuclear proliferation and improving reactor safety are highlighted by this year's Nobel Peace Prize.

The phone didn't ring on 7 October for Mohamed ElBaradei, director general of the International Atomic Energy Agency. Instead, he found out with the rest of the world from a television announcement that he and the IAEA would equally share the 2005 Nobel Peace Prize.

Knowing the press was camped outside of ElBaradei's office in Vienna, Austria, the chair of the prize committee, Ole Danboly Mjopes, skipped the customary telephone call because he didn't want the news to get out prematurely. At 11:00am, Mjopes said in front of the cameras: "At a time when disarmament efforts appear deadlocked, when there is a danger that nuclear arms will spread both to states and to terrorist groups, and when nuclear power again appears to be playing an increasingly significant role, the IAEA's work is of incalculable importance."

The news stunned ElBaradei, who said in a press conference that he had sat down to watch the announcement on television "fully aware that we would not [win] because I did not get the call. . . . And then I heard in Norwegian 'the International Atomic

Energy Agency' and my name, and I was just on my feet with my wife, hugging and kissing and full of joy and surprise."

Law and diplomacy

ElBaradei was born in Cairo, Egypt, in 1942. He earned a law degree at the University of Cairo in 1962 and a doctorate in international law at New York University in 1974. After spending time in Egypt's foreign service bureau and teaching international law on security and peace issues at the United Nations Institute for Training and Research, he moved to the IAEA in 1984. As director general, a position he has held since 1997, he has a reputation for skillful diplomacy and consensus building.

In the press conference, ElBaradei said that the award, given to a cause that is "not very fashionable today," sends a strong message to "keep doing what you're doing, be impartial, act with integrity, speak the truth." In his announcement, Mjopes emphasized that the award was intended as a boost to disarmament, not as a "kick in the shin" to any nation or leader, as some people in both Iran and the US have conjectured.

Over the past 30 years, on decadal anniversaries of the 1945 dropping of

IAEA

Mohamed ElBaradei

atomic bombs on Hiroshima and Nagasaki, the Nobel Peace Prize has gone to groups and individuals campaigning against nuclear proliferation. In 1975, the prize went to Russian physicist Andrei Sakharov, who designed the Soviet Union's hydrogen bomb and later became a peace activist (see PHYSICS TODAY, May 2000, page 37); in 1985, to the International Physicians for the Prevention of Nuclear War; and in 1995, to Joseph Rotblat and Pugwash Conferences on Science and World Affairs (see PHYSICS TODAY, December 1995, page 61).

The anniversary is useful in bringing attention to nonproliferation, says Irving Lerch, former director of international affairs for the American Physical Society. "Sometimes we need to be bludgeoned so that our attentions are refocused."

An embattled agency

Refocusing would be welcomed at the IAEA, where six months ago ElBaradei was fighting the Bush administration's attempts to stop him from serving a third term as head of the agency. The five-year conference review of the Nuclear Nonproliferation Treaty (NPT) had just ended in disarray (see PHYSICS TODAY, May 2005, page 30). Talks held with Iran by the UK, France, and Germany and, separately, the six-nation talks with North Korea led by China and including the US, were going nowhere. And during the summer the US and UK both struck agreements with India, which has never signed the NPT, to supply technology to India's civilian nuclear programs, international efforts to stem proliferation of nuclear weapons notwithstanding. Those events were

all undermining the role of the IAEA.

The IAEA was set up in 1957 in response to President Dwight D. Eisenhower's call to the United Nations to create a program to promote the "Atoms for Peace" initiative—to spread the benefits of peaceful nuclear technology, while limiting military applications of that technology. The 139-nation agency works directly with governments and industrial partners in safeguarding nuclear material and developing safety and security standards at facilities involved in nuclear activity. "The IAEA is the only institution with this capability," says Lerch, "but it is limited since—at the insistence of the five legacy nuclear powers [the US, France, the UK, Russia, and China]—weaponization does not fall under the mandate of the agency." After the breakup of the Soviet Union, the IAEA increased efforts to stop the trafficking of nuclear material and took on the task of securing nuclear material in the newly formed republics. Nearly every UN member has signed the NPT, which forms the legal basis of the IAEA. But in 1974 India conducted a "peaceful" test nuclear explosion whose eventual impact was to weaken the treaty.

The discovery of Iraq's clandestine nuclear weapons program at the end of the 1991 Gulf War led to a broadening of the IAEA's mandate to include actively looking for covert military programs, and in 1997 the IAEA added a voluntary provision that allowed the agency to inspect undeclared but suspected facilities in member states. "This is where ElBaradei has demonstrated initiative bordering on brilliance," says Lerch. ElBaradei and his predecessor at the IAEA, Hans Blix, who came out of retirement to be the chief UN weapons inspector, "worked hand-in-glove to develop an effective inspection apparatus in Iraq and elsewhere," Lerch says. "So effective, in point of fact, that [Iraqi dictator Saddam] Hussein was persuaded to dismantle his original program to the extent that reinstituting that program became infeasible." Only about half of the IAEA's members, including Iran, have signed the voluntary 1997 provision.

Stopping the bomb

The future direction of the IAEA, and of nuclear nonproliferation efforts more generally, says Wolfgang Panofsky, senior adviser to the National Academy of Sciences Committee on International Security and Arms Control, is tied to the outcome of Iran's determination to build an indigenous nuclear power program, including enrichment and reprocessing of uranium. Under the NPT, signatory countries are allowed to create facilities for a complete nuclear fuel cycle, but such facilities can shorten the time required to develop a military nuclear program, should a state withdraw from the NPT, as North Korea has done.

"ElBaradei has taken the lead in specifically proposing international management or outright ownership [of nuclear fuel facilities] in several of his more recent speeches," says Panofsky. "It is this pursuit of independence and calling the facts as they emerge which in my view has made the award of the peace prize to ElBaradei a very deserved one."

Still, says Pugwash executive director Jeffrey Boutwell, "I'm not sure the award will affect nonproliferation efforts all that much, I'm sorry to say. The award's importance is symbolic, and while it does focus the world's attention briefly on nuclear issues, the impact is not that long-lasting."

But on 7 October, ElBaradei was still savoring the moment. "Overall I think my colleagues and I are going to sleep tonight with a good deal of satisfaction that finally our efforts have been fully recognized." **Paul Guinnessy**

Physicists Seek to Aid Developing Countries

Conference delegates shaped ideas for how physics can contribute to sustainable development in the areas of education, economic development, energy and environment, and health.

The World Conference on Physics and Sustainable Development drew more than 300 physicists from 70 or so countries to Durban, South Africa, from 31 October through 2 November.

The conference was intended "to bring the physics community together and have it make a commitment to working collectively on the problems of sustainability," says Judy Franz, executive director of the American Physical Society and secretary general of the International Union of Pure and Applied Physics. The conference's four leading sponsors were IUPAP, the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Abdus Salam International Centre for Theoretical Physics (ICTP), and the South African Institute of Physics.

The crux of the conference was the drafting of proposals for ways physicists in industrialized countries can work with those in developing countries in four areas: economic development, energy and environment, education, and health. "Our first measure of success," says Amy Flatten, APS's head of international affairs and a conference organizer, "is that the program committees came together around concrete actions. Some will be refined, and some can be started tomorrow. There's a lot of energy coming out of this."

Action plans

The proposals in economic development include forming a network on nanoscience and nanotechnology focusing on water, air, and energy and forming a separate network on physics in agriculture. While the two networks had been considered ahead of time, a third plan, to run month-long courses in entrepreneurship for physicists, was born at the conference. "This is the one we are most enthusiastic about," says committee cochair Peter Melville of the UK's Institute of Physics. IOP will commit money and ICTP will host pilot courses, he adds.

Enhancing efficiency and reducing pollution in transportation, promoting the use of solar energy, and developing inexpensive facilities to generate energy from local biomass for small communities were the aims laid out by the conference delegates who focused on energy and the environment. In Africa today, says cochair Osman Benchikh, who is responsible for energy in UNESCO's division of basic and engineering sciences, "Seventy-seven percent of the population does not have access to electricity. The only option that is really viable and could also be economically viable is renewable energy."

Citing a worldwide shortage of medical physicists, the physics and health group sought ways to accelerate training, says cochair Debbie van der Merwe, director of medical physics at the Johannesburg Hospital in South Africa. "There was a consensus that the same basic education should be offered worldwide." One initiative is a website with educational resources for physicists and engineers in health care (see http://www.wcpsd.org/health/perhd.cfm). In addition, this group sees a need for regional training centers focusing on the physics of radiation therapy and for partnerships among hospitals and medical physicists.