

Pakistan Reshuffles Weapons Program

Pakistan became the world's seventh declared nuclear power in a showdown with India in 1998. Now, Pakistan has moved its nuclear weapons program out of the Pakistan Atomic Energy Commission (PAEC) and into the new National Defense Complex (NDC). The move separates the country's unclassified and clandestine nuclear programs.

At the same time, the government reassigned two top figures from the bomb program. Pervez Musharraf, the general who took over Pakistan in a bloodless coup two years ago, appointed Abdul Qadeer Khan, the father of Pakistan's nuclear weapons program, and Ishfaq Ahmed, chairman of the PAEC, as his special science and technology advisers. The positions have the rank of a cabinet minister.

Khan is frequently described as a national hero and is widely regarded as being an irreplaceable leader of Pakistan's weapons program. He has headed the country's premier uranium enrichment facility, the Khan Research Laboratories (KRL), since the 1970s, and has said he doesn't want to leave. "Dr. Khan was very unhappy and complained publicly of being mistreated," according to Pervez Hoodbhoy, a high-energy physicist at Quaid-I-Azam University in Islamabad. Hoodbhoy says he believes that the new appointments for Khan and Ahmed are compensation for being forced out of the nuclear bomb program. In an effort to dispel such rumors, General Musharraf gave a speech praising Khan shortly after the appointments were announced.

Replacing Khan and Ahmed are two scientists who are relatively unknown outside of Pakistan. Javed Mirza, an experimental nuclear physicist who served as Khan's deputy, is the new head of the KRL. And Pervez Butt, a nuclear engineer, has taken over as chairman of the PAEC, which now conducts only civilian research. The NDC, the new center for military research, is headed by Samar Mubarakmand, a nuclear scientist from PAEC who helped develop Pakistan's medium-range ballistic missiles. He reports not to General Musharraf, but to the National Security Council, which oversees Pakistan's nuclear weapons program. Mubarakmand insists publicly that no domestic or international interference in the program will be tolerated.

Some analysts argue that the



ABDUL QADEER KHAN (second from right) and other scientists from the Khan Research Laboratories stand in front of Ras Koh Hills nuclear test site moments after Pakistan's 1998 nuclear tests.

PAKISTAN INSTITUTE FOR AIR DEFENSE STUDIES

changes reflect a signal by Pakistan that it is willing to put its nuclear material under international safeguards and move closer to signing the Comprehensive Test Ban Treaty. Pakistan has been under intense pressure from the World Bank and the International Monetary Fund to reduce its military program. However, Uzair Haque, a representative of the government-run Pakistan Institute for Air Defense Studies, disputes this interpretation. "At first, the political opposition in Pakistan was under the impression that this was the beginning of a rollback of Pakistan's nuclear program," he says. "This is not the case."

PAUL GUINNESSY

Bush Appoints Venture Capitalist as Technology Adviser

Silicon Valley venture capitalist Floyd Kvamme, a Republican activist, has been named cochair of the President's Committee of Advisors on Science and Technology (PCAST). Kvamme is a partner at the Menlo Park, California, high-tech firm Kleiner Perkins Caufield & Byers, and takes over the job held in the Clinton administration by John Young, former president of Hewlett-Packard.

Kvamme, who holds a master's degree in electrical engineering from Syracuse University, was described as "one of the most visionary venture capitalists in Silicon Valley" by a White House spokesperson. Kvamme is currently on the board of directors of seven high-tech companies, and is the chairman of the Washington-based Empower America, a conservative advocacy group. Early in his career he worked for National Semiconductor and Apple Computer.

During Bush's presidential run,

Kvamme served as a leader of the campaign's High Tech Advisory Committee and he and his wife, Jean, contributed \$243 000 to Republican candidates and committees during the 2000 elections.

President Bush announced Kvamme's appointment on 28 March during a White House meeting with more than 100 technology industry executives. "Science and technology have never been more essential to the defense of the nation and the health of our economy," Bush told the executives as he announced Kvamme's appointment. "I will hear the best scientific and technological advice from leaders in your field. And I can think of no better coordinator than Floyd."

While Kvamme's position in PCAST will keep the president in touch with the technology industry, the other cochair is held by the science adviser, who serves as the link to the basic sciences. As of early April, that position, previously held by Neal Lane, remained unfilled.

KVAMME



CAROLYN CADES

First Light for Keck Interferometer

A faint star in the constellation Lynx was the first object observed by astronomers using the two newly linked, 10-meter Keck telescopes on Mauna Kea in Hawaii. The world's largest optical interferometer has the resolving power of an 85-meter telescope. Interferometers have existed for years in radio astronomy, but the technology required to link large-scale optical telescopes has only recently been developed (see PHYSICS TODAY May 1995, page 42). Eventually four 1.8-meter outrigger telescopes will be added to the interferometer, increas-



KECK OBSERVATORY

OBSERVING IN TANDEM: The Keck telescopes now see in stereo.

ing its resolving power to 135 meters.

The light from the two telescopes is collected in an underground tunnel for analysis. In that tunnel, a series of mirrors is adjusted so that the optical paths at the midpoint are equal to within a nanometer. Tests on the Lynx star reveal that the linked telescopes can accurately track the star for as long as 10 seconds.

Many of the techniques used with the Keck interferometer were adapted from the Palomar Testbed Interferometer in California, says Mark Colavita of NASA's Jet Propulsion Laboratory. "We're all pretty excited to have met this milestone."

Testing will continue for the next several months. Limited scientific research, including the search for extrasolar planets, is expected to begin this fall. **PAUL GUINNESSY**

Faculty Retirements, Recruitments Rise

The fabled flood of physics faculty retirements is turning out to be more of a trickle, according to the latest academic workforce survey conducted by the American Institute of Physics. In 1999, the retirement rate topped 3% for the first time; despite increases in deferred retirements, it should continue to increase slowly over the next decade.

Recruitment for physics faculty has also been increasing. An estimated 41% of physics departments were looking to hire tenured or tenure-track faculty for 2001, up from 34% in 1999. Of course, academic recruitment is a complicated business, and positions can take years to fill, or have their funding cut before a suitable candidate is found. Still, the proportion of departments that actually hired new tenured or tenure-track faculty jumped to 35% in 2000, after hovering around 25% in recent years.

Despite the rise in the total number of new hires, the fraction of jobs going to women fell. Only 14% of academic physicists hired in 2000 were women, down from 17% in 1998. What did increase was the number of new hires that earned their PhDs outside the US—they now make up more than a third of the new full-time faculty at PhD-granting departments.

The *2000 Physics Academic Workforce Report* is available free from the American Institute of Physics, Statistical Research Center, One Physics Ellipse, College Park, MD 20740-38442; Email: stats@aip.org; Web: <http://www.aip.org/statistics/trends/emptrends.htm>.

High-School Physics Student Bags Two Competitions

Mariangela Lisanti, a 17-year-old high-school student from Westport, Connecticut, won first prize in a science competition last December for her project "Conductance Quantization in Gold Nanocontacts," taking home a \$100 000 college scholarship. Then, in March, she did it again.

Lisanti received first prize both in the Siemens Westinghouse Science and Technology Competition and in the Intel Science Talent Search—garnering a total of \$200 000 in prize money—for a device that measures voltage across nanowires. Her device, which may be useful in the development of miniature electronics, is made largely from parts available at the local electronics store. It cost only \$35, much less than similar existing commercial products.

Intel has sponsored the 60-year-old science talent search since 1998, when it took over from Westinghouse, the original sponsor of the competition. That same year, Siemens, which bought the Westinghouse power generation business, decided to start a competition of its own. Both contests invite independent original research from US high-school students. But unlike the Intel competition, which is open to all fields, the Siemens competition focuses on the hard sciences, includes team entries, and judges students solely on



LISANTI struck it rich with her project measuring the conductance of gold nanowires.

their projects rather than their overall academic potential.

The prize money has risen substantially in the past couple of years—combined, the two competitions now give out more than \$1.5 million annually. Top scholarships awarded in the Intel competition have more than quadrupled in value over the past 10 years. In an effort to increase participation—about 2000 students took part in the two competitions—Intel now gives each of its 300 semifinalists and their schools prizes worth \$1000. And the 40 finalists in the Intel competition each receive a laptop computer.

LYNLEY HARGREAVES ■



Web Watch

<http://www.spcf.gsfc.nasa.gov/stargaze/Sintro.htm>

Orbital and Newtonian mechanics, solar physics, and space flight are the topics covered by David P. Stern in his educational Web site *From Stargazers to Starships*. Stern, a space physicist from NASA's Goddard Space Flight Center, puts each lesson in its historical context and provides all the necessary mathematical background. The entire site is also available in Spanish.



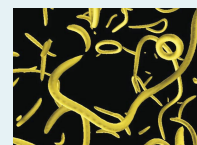
http://depts.washington.edu/hsexec/library_list.html

On behalf of the History of Science Society's education committee, A. Bowdoin van Riper has compiled *Reading the History of Western Science*, a list of about 100 books that he believes offer particularly effective introductions to the history and sociology of science.



<http://vis.lbl.gov>

The goal of the **Visualization Group** at Lawrence Berkeley National Laboratory is to help scientists view and better understand complex multidimensional data. Diverse and interesting examples of the group's work are listed on its Web page under the "Projects" link.



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Compiled by **CHARLES DAY**