

physical sciences. But lawmakers failed for two years to come up with the necessary appropriations. Now, with ARRA money flooding into those programs, there is growing concern that the one-time surge will exacerbate the boom-bust funding cycle that scientists decry.

A need for models

Against that backdrop, John Marburger, who was science adviser to former President George W. Bush for nearly eight years, returned to Washington recently to pitch his proposal for the creation of a new field of academic study that he believes could help the US achieve a more rational science policy. In Marburger's view, faculty and students of "the science of science policy" would create and work with predictive models to help determine the impacts of different policy options, in the same way that econometric models are used to help guide economic policy.

In a lecture at George Washington University on 29 April, Marburger lamented how "narrow advocacy trumps objective planning" in the setting of US science policy. Calling the sudden bonanza for NIH an "extreme example of the irregular style of American science policymaking," Marburger marveled at how Senator Arlen Specter, who was then one of three Republican senators on whose votes ARRA's passage hinged, used that leverage to shower another \$6.5 billion in stimulus spending upon NIH, on top of the \$3.5 billion that had previously been allotted to the agency. In a single year, NIH's allocation, which already accounted for half of all non-defense R&D funding, jumped from \$30 billion to nearly \$40 billion.

"I would like to change this," Marburger said. "I would like to have science policy tools that are so credible that their products are embraced by [science] advocates as well as the technocrats. Having the predictive power of physics or quantum mechanics or Newton's laws is out of the question for policy analysis, but I believe we can move the standards for science policy analysis and implementation closer to what already exists in the world of economic policy." Today's S&T policymaking process is inadequate, he argued, because nearly all the thousands of experts who sit on the hundreds of federal advisory committees "are advocates for specific projects, programs, or fields of science."

A quick response

Marburger, who has returned to the physics faculty at Stony Brook University, first began in 2005 to call for S&T policymaking to be set aside as a sepa-

rate field with its own schools, professors, journals, conferences, and "above all, its own standards, developed in open forums and promulgated in the usual ways by professional societies." While claiming little credit for the idea, he said, "there was in fact an immediate response," with actions, including the formation of a "science of science and innovation policy" program in NSF's Office of Social, Behavioral, and Economic Sciences. That program has now awarded several rounds of grants totaling \$23.4 million, and an interagency task group with representation from 17 agencies was convened in 2006 under the auspices of the National Science and Technology Council.

Last December the task group issued a road map defining the science of science policy as "an emerging field of interdisciplinary research, the goal of which is to provide a scientifically rigorous, quantitative basis from which policy makers and researchers can assess the impacts of the nation's scientific and engineering enterprise, improve their understanding of its dynamics,

and assess the likely outcomes."

The road map report argues that the rationale for specific scientific investment decisions "lacks a strong theoretical and empirical basis. Accordingly, given the magnitude of the federal investment and the importance of that investment to our nation, science policy decision makers must have at their disposal the most rigorous tools, methods and data that will enable them to develop sound and cost-effective investment strategies." The document identifies 10 major science questions tied to three main themes: understanding science and innovation, investing in them, and using the science of science policy to address national priorities. Whether anything comes of the recommendations remains to be seen. William Valdez, the Department of Energy official who cochairs the task group, told the American Association for the Advancement of Science's annual science policy forum on 30 April that the Obama administration had extended the task group's lifetime by six months; a decision for the longer term is pending. **David Kramer**

Austria averts CERN withdrawal

With the Large Hadron Collider set to start experiments this fall, "now is possibly the best time in the history of CERN to be a member," said the lab's director general, Rolf Heuer. Yet on 7 May, Austria's minister of science and research, Johannes Hahn, proposed that his country withdraw from the organization.

A squeezed budget and a need to renew "competitiveness and sparkle in the fields of science and research" were the reasons Hahn gave in a letter published on 14 May in many Austrian dailies. "Seventy percent of [our] funding for international cooperations in natural sciences goes to CERN," said Nikola Donig, a ministry spokesman. The ministry intended to redirect the €16 million (roughly \$22 million) it currently contributes to CERN (about 2% of CERN's budget) to fund research grants and membership in five smaller international natural and social science projects: the European Southern Observatory and participation in the European Extremely Large Telescope; the European X-Ray Laser Project, XFEL, in Hamburg, Germany; FAIR, the Facility for Antiproton and Ion Research at the Center for Heavy Ion Research in Darmstadt, Germany; the Common Language Resources and Technology Infrastructure; and the Biobanking and Biomolecular Resources Research Infrastructure.

Within a week of the ministry's surprise announcement, many prominent physicists had written letters decrying the suggestion that Austria quit CERN, and more than 20 000 people had signed a petition urging Parliament to reject the proposal. "That's about two orders of magnitude more than the number of particle physicists in Austria," said Walter Kutschera, an emeritus professor of nuclear physics at the University of Vienna. "It's about the worst moment to pull out of the biggest science experiment on the globe." (The letters, petition, and other materials are on the Save Our Science website hosted by the nuclear and particle physics section of the Austrian Physical Society at <http://sos.teilchen.at>.)

Austria's "solidarity with the other European countries and its reliability as a partner are at stake," said Christian Fabjan, head of Austria's Institute of High Energy Physics. He and others also worried that in Austria, fewer young people would be drawn to physics, industry would suffer, and particle physics would die. "While we have an important program at KEK in Japan," said Fabjan, "it is fair to say that particle physics in Austria needs a strong connection to CERN to be viable. Without such a connection, particle physics will fade away on a time scale of 5 to 10 years."

Fabjan and others were pinning their hopes on the petition swaying Parlia-

Nuclear museum reopens in New Mexico

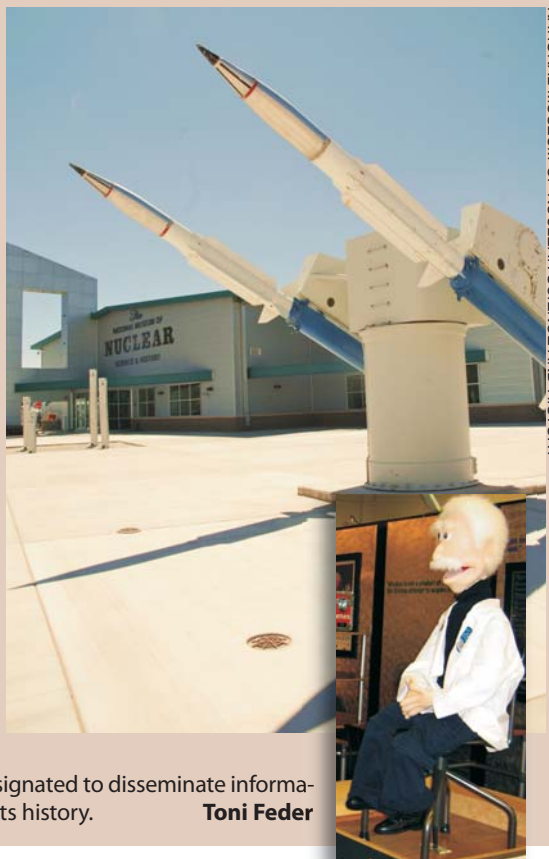
A naval surface-to-air missile launcher graces the entrance of the National Museum of Nuclear Science and History, which reopened this spring in a new location in Albuquerque, New Mexico.

The development of nuclear weapons and peacetime uses of nuclear reactions for food irradiation, medicine, and energy are featured at the expanded museum. Among the artifacts on view are a sample of ekanite, a gemstone high in radioactive thorium; the 1942 Packard limousine that transported J. Robert Oppenheimer and other scientists to and from Los Alamos during the Manhattan Project; and casings for the nuclear material from the Little Boy and Fat Man atomic bombs the US dropped on Hiroshima and Nagasaki during World War II.

Uranium mining is the focus of one exhibition. In another, visitors can juggle the proportions of nuclear, coal, wind, solar, and other forms of energy to see the effects on the cost of electricity and on greenhouse gas production. And then there is Little Albert (inset), a computer-controlled, interactive puppet that explains basic physics to visitors. If you ask, for example, "What is energy?" Little Albert replies, "Energy makes things happen. Energy makes things move or get hotter. You know how when you are riding a bike your legs turn the pedals which cause the bike to move forward? The energy moves from your legs to the bike."

The museum originally opened 40 years ago at Kirtland Air Force Base as part of Sandia National Laboratories, but after the terrorist attacks in 2001, it had to move to remain open to the public. The museum is now independent and congressionally designated to disseminate information on nuclear science and its history.

Toni Feder



NATIONAL MUSEUM OF NUCLEAR SCIENCE AND HISTORY

ment and on talks between the ministry of science and research and CERN. "I believe there is room for negotiation. I think CERN will have to move, Austria will have to move, and the Austrian scientific community will have to move," Fabjan said.

But ministry spokesman Donig said the talks with CERN would be to minimize the damage of withdrawing. For example, he said, "We will talk about how to make sure that the people from Austria working at CERN have perspectives. And we would like to continue sending people to CERN with scholarships to do their PhDs." The protests, he added, "show that we have to make clearer that we are going into other international partnerships and

that other things we plan to do will help foster industry and make Austria more visible as a science partner."

On 18 May, however, the science and research minister's plans to quit CERN were quashed. The country's Social Democratic chancellor, Werner Faymann, said that the ministers of his party would not vote to withdraw, which means that the necessary unanimous vote would be impossible, and that the issue would not go to Parliament. "If an agreement can't be reached, things stay as they are," Hahn acknowledged after meeting with the chancellor. He added that the debate would be a stepping-off point for a close look at the country's participation in international projects.

Toni Feder

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www.arscryo.com

Tel: 610-967-2120

E-mail: ars@arscryo.com