

Florence fetes Galileo

It's no surprise that Florence, Italy, where Galileo lived much of his life, is hosting many activities in celebration of one of its most famous sons during the International Year of Astronomy 2009, which marks 400 years since Galileo first pointed a telescope at the night sky.

The city's Institute and Museum of the History of Science has created two major exhibitions. One—Galileo, the Medici and the Age of Astronomy—opened in April at Philadelphia's Franklin Institute as part of the IYA event "100 Hours of Astronomy" (see *PHYSICS TODAY*, April 2009, page 20) and will be on display through early September. The other, in Florence from March through August, is Galileo: Images of the Universe from Antiquity to the Telescope. That show's curator, Paolo Galluzzi, describes it as including "items of both science and art to tell the story of how man looked at the sky from the Egyptians to Galileo's age." It's at a temporary site because the museum is under renovation until later this year, when it will reopen as Museo Galileo. It holds the largest collection of original Galileo artifacts, including two telescopes, an objective lens, and home-built instruments.

About 80 km away in Pisa, Galileo's birthplace, an exhibition titled *The Telescope and the Brush* looks at "how interested

Galileo was in art, and how much his discoveries influenced art," says Galluzzi. As examples, Galluzzi points to a painting by Peter

Paul Rubens of the myth of Saturn devouring his child. "He portrayed Saturn made of three bodies, exactly as Galileo described them," says Galluzzi. And in a 1612 painting of the immaculate conception (at left) by Ludovico Cigoli, "for the first time, immediately after Galileo's discoveries, the Virgin is standing on a crescent Moon that was a Galilean Moon, with mountains and valleys."

An international conference held in Florence in late May re-examined Galileo's conflicts with the Roman Catholic Church in terms of history, philosophy, and theology. Topics ranged from the views of various popes through the ages to Galileo as seen during the Nazi time. Other activities include filming the sky with a replica of Galileo's telescope.

In Florence, says Galluzzi, "Galileo is a very important piece of our tradition, not only in science but also in literature—he is one of the greatest writers of Italian literature. And he was a very good musician, so there are also

musical events devoted to Galileo and to the polyphonic approach to music. He was a universal person." The IYA activities, he adds, have gotten "a very warm reception. People are enthusiastic."

Toni Feder



ARCHIVIO FOTOGRAFICO DELL'ISTITUTO E MUSEO DI STORIA DELLA SCIENZA FIRENZE

of subsidies and incentive programs. A tariff program used in Germany and Spain provides producers of renewable energy substantially higher rates than those charged by suppliers of conventionally generated power. Both countries are beginning to roll back their tariffs.

Stimulating demand for PVs may be the most important action that govern-

ment can take to nurture the US industry, said Eric Peeters, global executive director of Dow Corning Corp's solar solutions division. He noted that greater demand for PVs will spur companies to make the investments needed for higher-volume manufacturing processes, which will bring down unit costs. "The solar industry is very young and immature, which means that it is

very inefficient," Peeters said, pointing out that half the polycrystalline raw material used to make PVs is lost as scrap during the manufacturing process.

Demand for PVs can be stoked, Peeters said, with mechanisms such as renewable energy mandates for the utility side and tax credits, rebates, and other incentives for the consumer side.

David Kramer

Marburger calls for a new academic field of study in 'the science of science policy'

Science adviser to George W. Bush says researchers, models, and decision tools could bring more rationality to science budgets and policies.

Anyone following the year-to-year development of US science and technology (S&T) policy would have to conclude that the process is chaotic, ad hoc, and pays little heed to long-term planning. One need only look at the National Institutes of Health, whose budget, after a five-year doubling that

ended in 2003, steadily declined in inflation-adjusted terms for the next five years. Now, mainly as a result of funding provided by the American Recovery and Reinvestment Act (ARRA), NIH is getting a windfall of \$10 billion—a 38% increase over 2008.

A second disconnect between science

policy and its implementation occurred with the passage of the America COMPETES Act in 2007. In response to expert advice that the US lead was slipping fast in a variety of measures of science and innovation, the law authorized a 10-year doubling of federal R&D programs covering basic research in

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-