

Chrys Chrysosostomidis, who directs the MIT Sea Grant program, is currently on sabbatical and touting Sea Perch in Europe.

Kelly Cooper, the outreach program director at ONR, says the US Navy has an obvious vested interest in expanding the pool of engineers. The number of Americans graduating from engineering programs each year, 70 000, is being dwarfed by China's 900 000 and India's 350 000.

Cooper says that since Sea Perch was added to the course work of an introductory marine engineering course at the University of Michigan, the class size has "maxed out" at 42 students, compared with the 20 to 25 which had been typical. Wilbur says 58% of the teachers who've been trained use the program for at least two years.

Virtual field trip

There's no limit to the optional equipment that could be loaded onto the basic Sea Perch. Some places add video cameras, and simple designs for home-made pressure sensors are available.

One school fashioned a hydrophone from a microphone, a film can, and some wiring, says Wilbur. So equipped, that Sea Perch was able to track down the source of the racket produced by a buzzer inside a submerged plastic bottle. The University of Hawaii streamed video from a coral reef to a website, giving students anywhere in the world a virtual field trip. With the further addition of a global positioning system receiver, the vehicle can be sent back to the precise location on the reef where it was, to provide an opportunity to see how the numbers of various organisms may change over time.

The Society of Naval Architects and Marine Engineers has embraced the Sea Perch program. Susan Giver, SNAME's director of outreach, is working to expand Sea Perch nationally. The school Sea Perch programs are expected to become self-sustaining, and after the first year, schools will be expected to pick up an increasing fraction, if not all, of the costs, says Giver. That transition has already occurred at the Philadelphia-area schools.

David Kramer

DOE aid to Russian weapons scientists said to abet Iran

A US program aimed at preventing former Soviet nuclear weapons scientists from migrating to other nations' nuclear programs may be benefiting Iran's effort to develop nuclear weapons, two key lawmakers have charged.

Representatives John Dingell, chairman of the House Committee on Energy and Commerce, and Bart Stupak, who chairs its subcommittee on oversight and investigations, accused the Department of Energy of having subsidized two Russian nuclear institutes that are helping Iran build its first power-generating reactor. The State Department has asserted that the reactor at Bushehr has provided cover for Iran to obtain sensitive technology for its weapons development effort. The two Michigan Democrats said that the two Russian institutes involved with Bushehr—the Scientific Research Institute of Measurements and the Federal Scientific and Industrial Center of Nuclear Machine Building—have together received \$3.4 million in funding from DOE's Initiatives for Proliferation Prevention (IPP). The 13-year-old program was designed to provide work to weapons scientists who were left unemployed by the collapse of the Soviet Union.

But Energy Secretary Samuel Bod-

man told the committee that the projects cited, and all the department's scientific engagement projects, "are not enhancing the Iranian nuclear program." All IPP projects, he testified, are "vetted through a very vigorous interagency effort and are fully consistent with US law and policy." All projects "are of a pay-for-performance nature," in which payment is made after the product is delivered, he said.

Bodman acknowledged that he had "no doubt that there are inconsistencies" between his assurances on the Bushehr reactor and the State Department's position. "I will tell you what I have been told," an exasperated Bodman told Dingell, complaining that Dingell and Stupak had notified him of their concerns only 15 hours before he was due to appear at the previously scheduled 7 February hearing. Bodman added that he had directed a top deputy to look into the matter in detail and report back to him.

The US has been "in dialog" with Russia for years regarding Bushehr and Iran's nuclear aspirations, Bodman said, and the reactor under construction will be covered by International Atomic Energy Agency safeguards. A long-term nuclear-fuel supply arrangement

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requires for Russia to take back the spent reactor fuel, thereby reducing the possibility that Iran could recover weapons-usable fissile materials.

At a 23 January hearing of Stupak's subcommittee, the Government Accountability Office claimed that the IPP had exaggerated its accomplishments. The GAO said it was unable to substantiate DOE's claim that the program had helped create 2790 long-term private-sector jobs in the former Soviet republics.

DOE says it has expended \$309 million through the IPP to engage 16 700

weapons scientists since the program began in the Clinton administration. But the GAO found that more than half of the 6450 former Soviet scientists in its sample who were involved with the IPP said that they had had no weapons experience.

The IPP currently supports 115 projects at more than 100 institutes in Russia and other former Soviet republics. Most of the projects involve US industry partners, and many have resulted in the commercialization of products such as land-mine detectors, needle-free injectors, radioisotopes for cancer treat-

ment, and prosthetics. But the GAO maintained that the commercialization scorecard was suspect since it relied on unaudited statistics provided by the institutes and industry partners.

Stupak and other panel members questioned whether the \$30 million-a-year program is needed in view of the significantly improved Russian economic conditions in recent years. They criticized the lack of an "exit strategy" for the IPP, contrasting it with a similar though smaller program administered by the State Department that has been winding down. **David Kramer**

Hopes dim for DOE science budget reprieve

As the Bush administration sent its final-year budget proposal to Congress, advocates for the physical sciences were still hopeful that lawmakers might restore most of the last-minute cuts they took from current-year Department of Energy science programs.

Raymond Orbach, DOE undersecretary for science, told reporters that "a presidential decision" will determine whether additional funding for DOE's Office of Science will be included in a supplemental appropriations measure the White House will send to Capitol Hill sometime in the coming weeks. Such requests are supposed to cover emergency spending only—in this case, military operations in Iraq—though members of Congress in the past have attached nonemergency riders to the must-pass bill.

Orbach and White House science adviser John Marburger unveiled President Bush's budget request for fiscal year 2009 on 4 February. As they did so, they sought to dampen expectations that Congress will provide additional spending in the current year to either the Office of Science or to NIST and NSF, the other two agencies that were supposed to receive sizable increases under the American Competitiveness Initiative (see *PHYSICS TODAY*, January 2007, page 30). The ACI, introduced by Bush in 2006, proposes to double support for basic research in the physical sciences at the three agencies over 10 years. The act was an effort to rectify what Marburger called the funding imbalance that occurred when the National Institutes of Health budget was doubled over the five years ending in 2003, without corresponding funding for the physical sciences. Although Congress has authorized the ACI increases, it has failed to appropriate the

amounts required to meet the 10-year goal during each of the initiative's first two fiscal years.

Despite Orbach's and Marburger's public statements, there were signs that DOE has been working behind the scenes to restore \$300 million of the \$500 million cut appropriators made to the Office of Science's FY 2008 administration request in December. A three-page document obtained by *PHYSICS TODAY* details how the department would dole out such a supplement.



Orbach

The plan would devote \$110 million to ITER, the full amount that lawmakers cut from the US contribution to the multinational fusion project; spread \$97 million among the national laboratories to increase running time for their synchrotrons, neutron sources, and other user facilities; provide \$69 million to high-energy physics programs to avoid layoffs and furloughs and restore experimental programs at Fermilab and SLAC; and add back \$23 million to nuclear physics programs. Asked about the plan, Orbach said it had been prepared at the request of certain lawmakers to show the impact of the reductions.

Marburger told reporters that more than half of the fiscal year will have gone by before a supplemental spending measure can be enacted, and he said the "relatively benign treatment" that science and technology programs overall received in FY 2008 makes it doubtful appropriators would see fit to provide more money. At a meeting of university research administrators, he said both the administration and Congress are "afraid" to open the supplemental appropriations to nonemergencies for fear of opening the floodgates to requests from other constituencies that felt shortchanged.

Orbach said he would welcome supplemental funding but noted, "We have to deal with realities." Over the past two years, \$800 million that had been sought by the administration for the Office of Science "has been lost to science forever," he lamented, adding that he hopes to avoid a "threepeat" next year. Because it was prepared under the assumption that the FY 2008 request would be enacted, the FY 2009 submission calls for what Orbach admitted "looks like a huge increase" of 19% for his programs. That will be a tempting target for appropriators.

DOE regards itself to be "in arrears" on the ITER project, Orbach said, noting that under an agreement with partner nations, the US is prohibited from backing out of the project during the 10-year construction phase. The department hopes the shortfall can be recouped over the coming years, he said, although the \$214.5 million requested for ITER next year is insufficient to pay off the past-due balance.

Orbach offered reassurances to the Fermilab-based International Linear Collider R&D effort, whose funding Congress slashed from \$60 million to \$15 million this year, effectively shutting down the program. DOE is requesting \$35 million for an ILC program of "reduced scope," plus \$25 million for development work on superconducting cavities that must be completed before ILC construction. DOE is elevating the ILC's status by bringing it within the structured review process the department uses for all major new facilities. But the desired energy range for the ILC won't become evident before some experimental results from Europe's Large Hadron Collider are available, probably in 2010, he said. DOE won't decide whether to take the next step on the ILC until then.

David Kramer