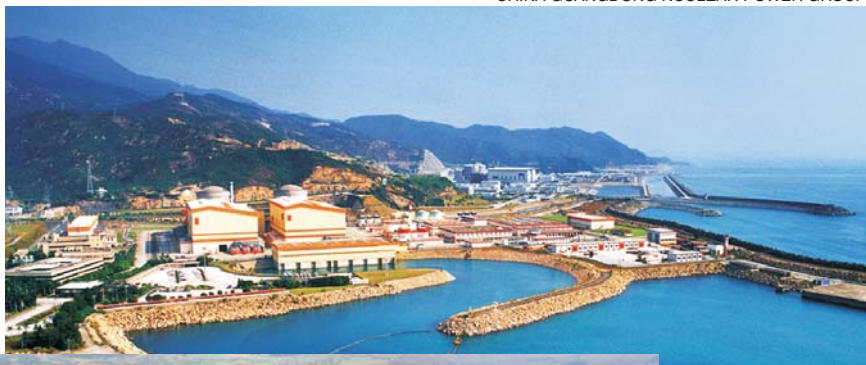




Underground experiments will monitor neutrinos from nuclear power plants in China (above) and France (left).



ÉLECTRICITÉ DE FRANCE

also been considered in Brazil, Japan, and the US. Still early in the planning stages, an experiment at Angra

systematic errors in the detectors," says project co-spokesman Yifang Wang of the Institute of High Energy Physics in Beijing. The Daya Bay experiment is also deeper underground and has a larger detector volume and more total power—and more antineutrinos—from its source reactors.

What Double Chooz lacks in sensitivity, it hopes to more than make up for in speed. The experiment is slated to be up and running in late 2008; Daya Bay would follow a year or so later, and both would take data for about three years. "If [Double Chooz] measures a finite value for θ_{13} first, then it does steal some thunder," says Brookhaven National Laboratory's Laurence Littenberg, a physicist on the Daya Bay experiment. But, he adds, "it's possible that we can be on the same time scale to get to the same sensitivity. They have to do a certain amount of civil construction, too, and the Chinese are very fast."

If $\sin^2 2\theta_{13}$ turns out to be smaller than 0.03, then Daya Bay's greater sensitivity could trump. The measurement is tricky, "so if different instruments at different locations get the same answer, that would be perfect. It would build our confidence," says UC Berkeley's Kam-Biu Luk, co-spokesman for the Daya Bay experiment.

Other experiments in the same vein as Double Chooz and Daya Bay have

dos Reis in Brazil would aim to push the sensitivity to below the Daya Bay limit. As a side project, the Angra detector might be used to develop a means to monitor nuclear reactors, says David Reyna of Argonne National Laboratory (ANL), who is involved in both Double Chooz and Angra. "The [energy] spectrum can tell you the ratio of uranium to plutonium in the reactor fuel."

Japan's KASKA, which would have aimed for a sensitivity down to 0.015, was denied funding in September, and the project's researchers have joined Double Chooz.

And an experiment using the Braidwood nuclear reactor in Illinois as its antineutrino source was scrapped last spring, when DOE put its weight behind Daya Bay. "Cost was a big driver," says the agency's Staffin. "We are trying to get the most for our precious funds." Several scientists suggest that pressure from high up in the US government to collaborate with China, and a bad public image of Braidwood in the wake of a tritium leak last year, also played a role in DOE's going with Daya Bay.

Small angle, big implications

The immediate goal of the reactor neutrino experiments is to home in on θ_{13} . The measurement also bears on the broader questions of neutrino mass hierarchy and *CP* violation. Says de Ker-

ret, "The mixing between three kinds of neutrinos has three parameters. The two angles that have been measured are big, and the third is very small. This is a big surprise, because with quarks the corresponding angles are all small. Nobody understands this difference." The big angles correspond to strong mixing and hint that *CP* violation by neutrinos might explain the universe's imbalance of matter and antimatter.

"If you measure a nonzero θ_{13} , it will tell you something about all of these things, but then you have to sort it out," says ANL's Maury Goodman, US co-spokesman for Double Chooz. A measurable θ_{13} could be used to optimize the accelerator experiments in the works, NOvA in the US and T2K in Japan—which themselves can estimate θ_{13} , but not as cleanly as a reactor experiment—and to lay out the next steps in neutrino research. But if θ_{13} is ultimately found to be zero, says Luk, "we cannot extract a *CP*-violating phase. In that case, we have to scratch our heads."

Toni Feder

Scientists go political in new organization

Ongoing frustration with the trivial role science has played in the current congressional elections, combined with a deeper sense that the Bush administration is ignoring and misusing science, has led a group of prominent scientists to form a national political advocacy organization with the intent of influencing elections and government policy.

Within a few weeks of its creation in September, Scientists and Engineers for America (SEA) claimed nearly 5000 members. The group's 19-member board of advisers includes eight Nobel laureates and President Bill Clinton's former science advisers, physicists John Gibbons and Neal Lane.

The new organization evolved from a political group formed by several of the same scientists prior to the 2004 presidential election to support Senator John Kerry's bid for the White House. "The theme all the way along has been frustration that the key [science] issues are not debated in the campaigns," said physicist Henry Kelly, president of the Federation of American Scientists and a founder of SEA. "It's one thing [for scientific organizations] to write position papers, and it is another thing to get candidates to answer questions about where

they stand on key science policy issues."

Although the earlier organization, in which Kelly also played a central role, drew a strong and critical response from the administration and some Republicans on Capitol Hill (see *PHYSICS TODAY*, August 2004, page 32), it formed too late to have much influence on the outcome of that election, said physicist Burton Richter, the former head of SLAC and one of SEA's advisers. "But that effort got people thinking about developing a longer-term organization that looks to stay in the business of making science part of the political process," he said.

Kelly said his intention is to make SEA a nonpartisan organization that won't hesitate to criticize either Republicans or Democrats if they ignore or distort science for political purposes. The small SEA staff was scrambling in mid-October to post on the organization's website background information and key votes of candidates in critical con-

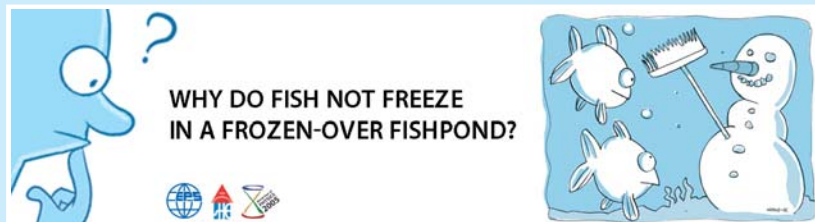
gressional races in which issues important to science are in play, said Mike Brown, SEA's executive director.

Elections in Maryland, Virginia, Michigan, Ohio, and a few other states are being targeted because of debates over stem cell research, global warming, and intelligent design. "We can't endorse candidates," Brown stated, "but we can challenge statements made by candidates."

He cited a recent letter signed by Republican Senator George Allen, who is running in a tight race for reelection against Democratic challenger Jim Webb in Virginia. The letter "said there is little evidence linking global warming to human activity," Brown said. "As long as politicians can do that, say things like that, there is work for us to do. A big part of the challenge for us is to frame the debate, to develop the communication skills to get the voters to be aware of the issues."

Although Brown, an attorney who

Explaining everyday physics, everywhere



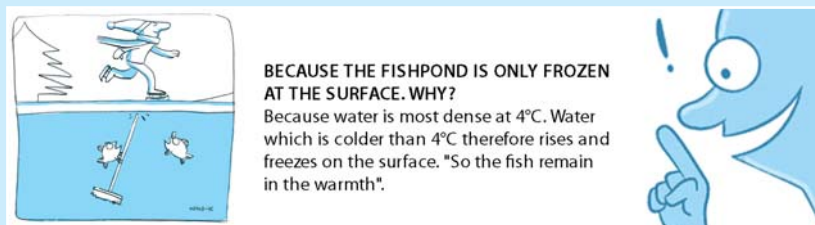
Why does food cook faster in a pressure cooker? Why do tires squeal on braking? Can a rainbow be circular? These and 47 other questions—and their answers—form the core of "Science in Public Areas," a public-education campaign unveiled on 9 October by the European Physical Society.

A poster with one of the questions might be placed at the entrance of a bus, and a second poster with the answer at the bus's exit, for example. Or the posters could go at the beginning and end of a line at a theme park or theater, at swimming pools, in train stations, and so on, says Ophélie Fornari, project leader of EPS activities.

The campaign aims to improve the public perception of physics and physicists, to explain "simply and in an amusing manner" basic principles of physics, and to excite the curiosity of the general public and of young people in particular, Fornari says.

"Science in Public Areas" grew out of a World Year of Physics 2005 activity organized by Hisa Eksperimentov, a science center in Ljubljana, Slovenia. Posters can be obtained, in English, French, or German, with your logo added for a donation or by joining EPS as an associate member; without added logos, the posters are available free of charge. For more information, contact o.fornari@eps.org or visit <http://www.eps.org/sponsor.html>.

Toni Feder



has run congressional campaigns and worked on Capitol Hill, sounds like what he is, a political organizer, several of the scientists involved in the organization are also sounding political.

"I believe in what this new organization plans to do," said Lane, currently at Rice University in Houston, Texas. "It's long term, not just one election. In science we're long past the time when we can assume that policymakers will give science a higher priority than anything else, so we have to continue to show them why it should have a high priority. We need to be much more active [in the political realm] and much more visible. We have to make sure the candidates recognize the issues and respect the integrity of science."

In addition to posting a mission statement and a national agenda on its website, SEA organizers have developed a "bill of rights" for scientists and engineers. It calls for scientists to have the right to openly and freely discuss and publish any unclassified research "without fear of intimidation or adverse personnel action," and states that "the federal government shall never intentionally publish false or misleading scientific information nor post such material on federal websites."

The bill of rights says that appointments to federal scientific advisory committees "shall be based on . . . scientific qualifications, not political affiliation or ideology." It also says the federal government "shall not support any science education program that includes instruction in concepts that are derived from ideology and not science."

Nearly all of the points in the SEA bill of rights reflect concerns about abuses of science that have arisen during the Bush administration. "There is rather broad frustration with the administration's attitude toward science," Richter said. "The administration has an 'adopt what you like, ignore what you don't like, and suppress the rest' attitude toward science."

Presidential science adviser John Marburger has repeatedly and emphatically denied any abuse of science by the Bush administration (see *PHYSICS TODAY*, May 2004, page 29), but many scientists are unconvinced. Indeed, Lane called the abuse of science in the current administration "unprecedented."

But regardless of who is in the White House or controlling Congress, he said, "We want to be sure that they know what science is and that it hasn't been manipulated or confused to point to the wrong answer."

Lane said that most of the people currently involved with SEA are "probably Democrats," and that he expects the organization to be attacked as "liberal" by politicians and others who don't like the positions SEA takes. "Everybody is entitled to his or her opinion," he said. "What we will do is explain what our organization is about and that we are supporting sound science."

Jim Dawson

APS undergoes changing of the guard

Amid efforts by the American Physical Society to determine how best to handle the changing nature of scientific publishing, its largest enterprise, two of its three operating officers are stepping down from their longtime posts.

Retiring editor-in-chief Martin Blume will be succeeded next March by Gene Sprouse, while Thomas McIlrath was replaced as treasurer on 1 October by Joseph Serene. Both Blume and McIlrath had served at their posts for 10 years.

APS executive officer Judith Franz, the society's other coequal officer, said the retirements, though announced si-



multaneously, are unrelated. Blume and McIlrath were hired at around the same time and were employed under renewable five-year contracts.

Sprouse and Serene are beginning their new positions as APS moves ahead with Free to Read, its open access program announced in September. Although the society is launching the new initiative at the same time it is undergoing a change in command, Franz predicted a smooth transition for the new officers and said they'll bring a fresh perspective to the society's leadership. "When you gain new people, you gain new ideas," she said.

Serene came to his APS post after retiring from a 13-year stint at Georgetown University, where he was a tenured physics professor. He chaired the physics department from 1993 to 1998. Sprouse is a tenured physics professor at Stony Brook University, where he chaired the physics department from 1990 to 1996.

Serene and Sprouse said they could not predict how Free to Read will unfold or how it will affect APS publishing revenues. Under the program, payment by any person or organization of a one-time fee for a particular APS journal article makes the article available online to all readers at no cost. The society is charging \$975 for articles in *Physical Review A-E* and \$1300 for letters in *Physical Review Letters*. Articles in *Reviews of Modern Physics* will be considered on a case-by-case basis.

APS introduced its first open access journal, *Physical Review Special Topics: Accelerators and Beams*, in 1998, and a second, *Physical Review Special Topics: Physics Education Research*, last year.

"It's very hard to see how it's going to play out," Serene said of the society's newest publishing initiative. "We want to become involved [in open access] without threatening the future of our journals."

"We support the move to more open access to our content," Sprouse agreed. "But we must find a sustainable way to fund [our] operation."