PHYSICS TODAY, June 1998, page 56). But, says Z director Jeff Quintenz, "when the cost came in at over $1 billion, with DOE's other mortgages, it was clear X-1 was a nonstarter." So Sandia settled instead on ZX, which was designed to produce about one-third the power, at about one-fourth the cost, of X-1. The price would have been lower largely because ZX would have produced less radioactive waste than X-1, so, Quintenz says, waste handling would be minimal, and ZX could be built at Sandia using existing infrastructure, whereas the plan was to build X-1 on a green field site, probably in Nevada. ZX would have combined efficient production of hard x rays from pulsed power with fusion implosion, he continues, "and would be a reasonable step if it answered some of the physics questions. That's how we scoped ZX."

Sandia plans to keep using Z, however, both to push pulsed power further, and to test the effects of radiation on weapons parts—including those MESA makes. The lab recently inherited the Beamlet laser—a prototype for Lawrence Livermore National Laboratory's National Ignition Facility. Says Quintenz, "We now have the third or fourth most energetic x-ray source as a diagnostic for the world's most powerful and energetic one. We can take a picture in x rays during a z-pinch."

In the national inertial confinement fusion program, pulsed power has always been a bit of an underdog, continues Quintenz. Not getting to go ahead now with ZX "is just another hurdle. The goal is high-yield fusion. That's what's required by the weapons program. We've got to get there somehow." Cook too believes that a successor to Z will be built someday: "The technological development of pulsed power is so impressive—it's not incredible, because it's been achieved—I know it's only a matter a time. The real bugaboo is where the money will come from."

**TONI FEDER**

# Scientists' Counsel Counts in Congress

"People outside of physics always ask how my work is going to benefit society," says particle physicist Greg Jaczko, the American Institute of Physics' 1999–2000 congressional science fellow. As one of 26 scientists and engineers in the Congressional Science and Engineering Fellowship program run by the American Association for the Advancement of Science, Jaczko will spend the next year analyzing and crafting science and technology policy as a congressional staffer. "One of the things I really like about the fellowship is having the opportunity to make some direct impact in the short term," he says. AIP, the American Physical Society (APS), the American Geophysical Union (AGU), and the Optical Society of America (OSA) are among the 21 professional societies that sponsor congressional science fellows each year.

Among the legislation before Congress that AIP member societies were following with interest at press time were bills that would slash the budgets of NASA's Earth and space science programs; establish a biomedical imaging institute at the National Institutes of Health; revive an office of noise control within the Environmental Protection Agency; and allow local education agencies to waive federal guidelines for science teachers' professional development. Yet few members of Congress can claim a background like Representative Rush Holt (D–N. J.), former assistant director of the Princeton Plasma Physics Laboratory and APS 1982–83 congressional science fellow. Because few lawmakers have scientific training, "it's better to have informed input . . . by persons at the right hand of members of Congress, than not to have it at all, or solely from outside sources," says Steve Nelson, associate director of AAAS's science and policy programs. "That's one of the main functions of the fellowships." In recent years, however, many societies have seen the number of applicants drop; APS didn't even award a fellowship this year.

## Key decisions

The hope is that by placing scientists in staff positions, the fellowships will lead to more informed debate on technical matters and "raise the sophistication level in Congress on these issues," says Peter Rooney, who as APS's 1997–98 fellow worked for Senator Joseph Lieberman (D–Conn.). Staff "make lots of key decisions, and wield a lot of influence behind the scenes," he adds. For Rooney, the fellowship served as a professional stepping stone: With the support of several prominent senators, he founded the Washington, DC–based Forum on Technology and Innovation, which conducts nonpartisan briefings for lawmakers and their staffs on technology-related issues. The fellowship

MALCOLM TARLTON/AIP

MILDRED PORTER

RECENT CONGRESSIONAL SCIENCE FELLOWS Lowell Ungar (left) and Peter Rooney, who is now director of the Forum on Technology and Innovation. Rooney is shown briefing (from left) Richard Perle of the American Enterprise Institute, and Senators Bill Frist (R–Tenn.) and John D. "Jay" Rockefeller (D–W. Va.) on computer export controls.

provided "an unparalleled opportunity for networking," he says.

AIP 1998–99 fellow Lowell Ungar learned about wielding power behind the scenes while in the office of Representative Edward Markey of Massachusetts. Working for the Democratic minority, Ungar found that "there's a lot one can do that's not legislative. Much of the power of Congress is the ability to get information to the press." His own publicity and letter writing campaign was instrumental in restoring a counterterrorism program at US nuclear power sites—a program Ungar says is unique in testing whether plants could respond effectively to threats of sabotage. AIP 1997–98 fellow Kathryn Clay, who worked in the office of Senator Daniel Moynihan (D–N. Y.), discovered her physics training was useful in unexpected ways as she calculated the costs to New York dairy farmers of lost milk production due to severe winter storms. "I was the only one in the office who was comfortable taking the diverse components of the problem and putting them into an equation," she recalls. "Once I got into it . . .my background did let me make a contribution."

Earth scientist David Hunter, who was the AGU fellow in 1998–99, says he became fascinated by the parliamentary maneuvering he encountered while working on an amendment for Senator James Jeffords (R–Vt.) to increase solar and renewable energy appropriations. Even though the amendment, which was supported by 54 senators, was defeated on the Senate floor, Hunter plans to continue policy work, possibly remaining on Capitol Hill. Materials scientist Merrilea Mayo, on the other hand, returned to the Pennsylvania State University as an associate professor after taking a year's sabbatical to work for Lieberman. Mayo, a 1998–99 fellow sponsored jointly by OSA and the Materials Research Society (MRS), saw language she drafted, asserting the importance of R&D to the military, end up in the fiscal 2000 Defense Authorization Act that was passed by both the House and Senate. Mayo says the experience gave her "a much better feeling than the average academic as to what issues, fields, and subfields are likely to receive funding, and from whom, over the next five years." The fellowship is a great opportunity for faculty "to use the sabbatical system," says APS 1993–94 fellow Duncan Moore. "It should be one of the things faculty members, particularly midcareer, think about doing."

### To Apply

Information about AIP, APS, AGU, and OSA's congressional fellowships, including how to apply, is available on the Web at http://www.aip.org/pubinfo (AIP); http://www.aps.org/public_affairs/fellow.html (APS); http://www.agu.org/sci_soc/policy/congress_fellow.html(AGU); http://www.osa.org/aboutosa/policy/news/intro.htm (OSA). Application deadlines for the 2000–2001 term will fall early in 2000.

He says that recipients of federal research grants, like himself, "have a moral obligation" to get involved in public service. Moore, who holds an endowed chair at the University of Rochester, is now serving as associate director for technology in the White House Office of Science and Technology Policy.

### A broad perspective

Past congressional science fellows have a solid track record in societal and policy issues, as well as in research. This year's crop is no exception: Arriving in Washington with the new class of fellows in September, AIP's Jaczko came equipped with experience in collective bargaining for the graduate employee union at the University of Wisconsin—Madison, in high school physics teaching as part of an Upward Bound program, and in research done in four countries. AGU's new fellow, Bryan Hannegan, an Earth system scientist from the University of California, Irvine, has been president of several student organizations, including the boards of the University of California Student Association and the National Association of Graduate-Professional Students. This year's OSA/MRS fellow, Arun Seraphin, holds a PhD in electronic materials, has been an official in various professional societies, and before starting his fellowship was a policy researcher at the Institute for Defense Analyses.

**AUDREY T. LEATH**

## Search for Extraterrestrials Is This Planet's Largest Computing Project

The number of data crunchers for SETI@home, a project that sifts radioastronomy data looking for signals from extraterrestrials, passed the one million mark in August—less than three months after it got started.

SETI@home looks at data in a 2.5 MHz–wide band centered on the 1420 MHz hydrogen line. The data are collected around the clock by the 300-meter telescope at Arecibo Observatory in Puerto Rico, and sent in batches to the University of California, Berkeley, where SETI@home and other projects in the search for extraterrestrial intelligence (SETI) are headquartered.

That's where the one million—and counting—data crunchers come in. Small chunks of data, sorted by frequency and sky position, are sent to them over the Internet, and their computers use a previously downloaded program to calculate the power spectrum. The analysis can run when the computers would otherwise be idle; typically, people set the program to run as a screen saver. The results are sent back to SETI@home headquarters, and the remote computer is automatically assigned a new set of raw data. At press time, SETI@home boasted participants in 224 countries. Says project director David Anderson, "It's the world's biggest supercomputer—it's much more powerful, and much cheaper, than anything that existed before." Applications for this type of distributed computing will be found in many areas of science, he predicts.

How would a signal from extraterrestrials be recognized? If extraterrestrial signals are leaked from another civilization, "it would be impossible to guess what frequencies to look for," says SETI@home science chief Dan Werthimer. "But if a signal is sent deliberately, I think it would be easy to figure out." Since all known astrophysical signals are spread over a broad frequency range, he continues, "we are looking for a spike in the spectrum. We compare signals from the same part of the sky at different times—multiple detection would really get our attention."

"We've been doing SETI for 20 years," says Werthimer. "So far, no signals have made us jump up and down. All of the strong signals have turned out to be satellites." But this doesn't worry SETI enthusiasts. "I'm still optimistic because the technology is growing so fast," says Werthimer. And if the search for extraterrestrial life happens to turn up a new astrophysical phenomenon, he adds, "that would be exciting. It wouldn't bother me."

SETI@home is funded by the Planetary Society (which was