

ties are the only ones in the Southern Hemisphere generally available to US astronomers.)

According to the McCray report, roughly half of US astronomers rely entirely on NOAO for telescope access, and nearly all rely on these national facilities to some extent. But many users of small telescopes feel that closing national small telescopes puts them at an unfair disadvantage. "By and large, astronomers from institutions that rely on NOAO use smaller telescopes—their whole science agenda is geared this way because those are the telescopes that NOAO has made most available," says Wesleyan University's John Salzer.

Moreover, many fear that, for astronomers at small colleges especially, reduced telescope access will have a snowball effect: With less telescope time available, it will become harder to get research grants, and that will make it harder to get tenure. As a result, small schools won't be able to sustain active astronomy research. And, whereas access to NOAO facilities is free, with time allocation based on scientific merit, many astronomers share Salzer's concern that "getting access [to private observatories] will be more a matter of connections, and less science-driven."

"The big losers will be grad students," says Columbia University's Joe Patterson. "About half the nation's PhD-granting universities don't have their own observatories. I restructured my observing years ago because I saw this coming. I now use a network of amateur, 10- to 12-inch telescopes in backyards around the world. But this isn't really feasible for students."

Seeking solutions

So are there really enough good, privately owned telescopes that are also well-instrumented? And will the institutions that run them open up access to the broader astronomy community?

About 100 astronomers met to discuss these concerns at a workshop held in October at Lowell Observatory in Flagstaff, Arizona. A follow-up workshop was held in Toronto at the American Astronomical Society's January meeting. "Every avenue of cost savings including multi-institution collaboration, public-private partnerships, and novel operating strategies [should be considered]," urged Lowell director Robert Millis in a letter to Hugh Van Horn, head of NSF's astronomy division, after the October workshop. "As a private observatory, we are not directly influenced by what happens at Kitt Peak. But maybe we can help," says Millis.

Increasingly, institutions are form-

ing consortia to jointly buy and operate small and intermediate telescopes. One example is SARA, a 0.9-meter telescope on Kitt Peak that five southern universities took over from NOAO in 1990. Each member pays about \$10 000 annually, and gets at least two months of observing time per year. "We would like to add a couple more consortium members," says Terry Oswalt, of the Florida Institute of Technology. On a smaller scale, Vassar College is one of six colleges that will buy time on the 0.6-meter Schmidt telescope on Kitt Peak after NOAO withdraws its share in this telescope on 1 October. "Each college will pay \$2500 and get a week," explains Vassar astronomer Debra Elmegreen. But, while privatization guarantees members of the owner institutions time on the telescope, it's no solution for people at less well-off colleges and universities. In addition, for a given project, astronomers often need a variety of telescopes, not just one.

"One good thing that came out of the small-telescope workshops is the idea to create a network of small privately owned telescopes, and to apply centrally for time on them," says Iowa State University astronomer Lee Anne Willson, who chairs the AURA Observatories Council (AURA, the Association of Universities for Research in Astronomy, operates the national observatories for NSF) and chaired the Toronto workshop. The North American Small Telescope Cooperative (NASTeC), an informal network that

uses the World Wide Web, may be a start. Hosted by the SARA consortium, NASTeC lists small and intermediate telescopes and their capabilities, and astronomers can contact telescope owners directly via the Web site (<http://www.valdosta.peachnet.edu/~hpreston/sara/nastec.html>). The site currently lists 67 telescopes, about a third of the total number of telescopes that could potentially be shared via a network such as NASTeC, estimates NASTeC's volunteer coordinator Heather Preston, an astronomer at Valdosta State University in Georgia. NSF's Van Horn believes that "NASTeC has the potential to fill an important niche as an information source. Possibly NOAO could play the clearinghouse role."

"NOAO and AURA are encouraging community involvement in figuring out what to do with NOAO telescopes when they are no longer supported as national facilities," says Willson. "We are trying to find solutions that minimize or reverse the impact on the community of budget-driven premature closures of Kitt Peak telescopes. The 1.3 meter could become a test case." NOAO closed the 1.3 meter, the best infrared telescope on Kitt Peak, last year, and will invite proposals for its operation this spring.

University of California, Santa Cruz, astronomer Garth Illingworth sums up the situation: "Given the fiscal and political realities, the bottom line is that we live in changing times, and we have to adapt."

TONI FEDER

The Physics Chanteuse Blends Cabaret and Science

In the darkened banquet hall, the performer has center stage. From her green satin gown to her elbow-length gloves to her rhinestone jewelry, the husky-voiced redhead seems every bit the glamorous showgirl. But there's a twist: Her songs, her jokes, her banter are all about physics. To an audience of physicists, it's quite a show.

Introducing Lynda Williams, the Physics Chanteuse. A performance artist who also happens to hold a master's degree in physics, she has been taking her cabaret-style act to physics meetings around the country.

"I've never heard anything like that," raved Gary Prinz of the Naval Research Laboratory, who caught her show during the 44th Midwest Solid State Conference, held at the University of Nebraska at Lincoln, last Octo-

ber. "Physicists tend to be, I don't know, not very colorful—you rarely think of them showing up in night clubs. But she's stylish, she's got a lot of stage presence."

Roger Kirby, chair of the physics department at UNL, agreed. "The audience got a big kick out of it. The puns and plays on words are quite witty. It was something unique and really fun for us."

What's more, Prinz added, "she gets it all right. At one point, she made a very esoteric reference to some solid-state work, and I thought, There must be twelve people in the world who know about that. She must be a very quick study."

That's science entertainment

Williams refers to her line of work as "science entertainment" because her



PHYSICS CHANTEUSE Lynda Williams serenades Brookhaven's Melvin Month, during her recent performance in Berkeley, California.

aim is to entertain rather than educate: "I think so many subjects in science are interesting and fascinating that they have intrinsic entertainment value." In preparation for each show, she researches the conference topic by looking through journals and interviewing experts. She then composes songs and monologues keyed to the latest research. "I'm not a colleague *per se*, but I have enough background so that I know what I'm talking about."

She also weaves in references to politics and current events, and she plays on both sexual and physics stereotypes with abandon. "Doing my Physics Chanteuse act, I can speak to scientists and address issues that they might not ordinarily think about, like the social implications of what they do or the culture of science," says Williams. "It gives me creative license to say things in a nonthreatening way about issues that are controversial or speculative or humorous."

Her musical repertoire includes original work as well as reinterpretations of standards. For the Lincoln conference, she offered a rendition of Billy Joel's "I'm in a New York State of Mind": "Some folks like astronomy and study galaxies in the local group / Some like quantum gravity, pulling superstrings from the cosmic soup / But I'm pointing my laser at an earthly crystalline / I'm in a solid state of mind." In other songs, she deals with topics ranging from nucleosynthesis to vacuum physics to nuclear waste. "Science isn't sung about much in our popular songs, and so I think it's a great way to tell a story about the work that's going on," Williams says. "And it honors scientists' work too."

At a recent gig at the end of January, Williams performed for attendees at the US Particle Accelerator School in Berkeley, California, during an evening cruise aboard the *Empress Hornblower*. The school's director, Melvin Month of Brookhaven National Laboratory, "liked her show tremendously."

included a tribute to Carl Sagan, who died in late December. Williams says Sagan's unique gift for popularizing science had inspired her to write her first science-related song. At the time, she was a graduate student in physics at San Francisco State University. Prior to that she had worked for several years as a multimedia producer and performance artist, after earning her bachelor's degree in mathematics, with a physics minor, from California State University, Sacramento, in 1987.

"I'd been riding the fence between wanting to be a scientist and wanting to be an artist, and then I realized that I could merge the two together, as a science entertainer," Williams recalls. "Every time I would study something new, I would write a song about it. Eventually I accumulated enough material to put a show together." Among her earlier efforts was a one-woman musical called "Cosmic Cabaret," performed at Climate Theater in San Francisco. She also produced a show on the heliocentric model of the Solar System for the San Francisco State University planetarium.

Though not quite ready to quit her day job—doing engineering technical support for HotWired, the Web-based spinoff of *Wired* magazine—Williams hopes eventually to be doing science entertainment full-time. In addition to her Physics Chanteuse act, which is geared toward specialized crowds, she'd like to produce material aimed at the general public. She's currently at work on a short film, a spoof of the 1970s TV show *Charlie's Angels*. "It's called *Einstein's Angels*, and it features a trio of worldly women physicists who are hired to solve real physics problems—and take out the bad guys, too."

JEAN KUMAGAI

Lynda Williams's Web site is at <http://www.physics.ucla.edu/~ljw/>.

"Her voice is not totally polished," Month allowed, "but she's a great entertainer." Beyond that, he said, "her understanding of the dynamics of the field—the history and sociology of physics—is outstanding. I think she could teach some younger physicists a lot."

For her show in Berkeley, she

Canadian Accelerator Shut Down, Its Director Gets the Boot

Months of anxious waiting and steadily waning hopes that funds might be found to save the Tandem Accelerator Superconducting Cyclotron (TASCC), a world-class heavy-ion accelerator in Chalk River, Ontario, are now over: In mid-January, the Canadian government announced that no replacement funds had been found to keep TASCC running beyond this month (see PHYSICS TODAY, February, page 59). On 31 January, TASCC director John Hardy initiated shut-down procedures.

Later that same day, Hardy was given 25 minutes' notice to clean out his office, and told not to come back. The only explanation he got for the abrupt dismissal was a charge of "unauthorized media activities." Hardy says this refers to his having told reporters of his efforts to save the research facility, but protests that "I've said nothing that, until four or five years ago, wouldn't have been said by company management. It's a sad and degrading end to twenty-six and a half years at the company." A spokesman for Atomic Energy of Canada Ltd, TASCC's parent company, would say only that "the decision was made that John [Hardy] was not required anymore."

The 53 remaining employees (there were over 70 a year ago, when news of possible trouble first surfaced) are receiving termination notices. Most of the 17 physicists have found new positions—at least half of them outside Canada; some of the technical staff will transfer to other departments within AECL, which will now focus exclusively on its reactor business.

The news for AECL's other basic research program, the CMS neutron scattering program, is better: It will be transferred to Canada's National Research Council on 1 April. CMS will be funded jointly by NRC and several ministries for three years, and thereafter by NRC alone.

TONI FEDER

A Front-of-the-Envelope Calculation

Feynman on a postage stamp? A campaign to honor Richard Feynman thus is being spearheaded by Ralph Leighton, a friend and former drumming partner of Feynman's and the son of Feynman's colleague Robert Leighton.