Senior Scientists on Soft Money Feel Pinch of Tight US Research Budgets

It's no secret that funding for physics research in the US is tight. One often-overlooked casualty of the funding squeeze is the university senior researcher whose salary comes out of a grant—and whose position becomes vulnerable when the cash flow slows. When such senior "soft-money" research positions are cut, not only do individuals suffer from losing their jobs well into or late in their careers, but experts are often lost to the field.

Since they usually don't have teaching duties, senior researchers can devote their time to research. "They are the backbone of many of our experiments," says Maris Abolins, a physics professor at Michigan State University whose view is widely shared. "It's hard to imagine working successfully without a cadre of people who give [the experiments] continuity. I think it's a very poor place to cut." Moreover, as Lawrence Jones, a professor of high-energy physics at the University of Michigan notes, "The job market is tough partly because these career non-teaching positions are drying up."

Senior-level soft-money positions go by a bewildering array of labels. They include research professor, senior scientist, senior postdoc and research associate, to name a few. At some universities, there is a research professor track parallel to the tenure track, with reviews and promotions, but with service replacing teaching; at others, the position is more like that of a protracted postdoc. In terms of scientific independence, responsibility, salary and the university's commitment should grant money dry up, senior soft-money positions vary greatly.

And, although senior researchers are often regarded as being of "faculty quality" by their tenured colleagues, in important ways they are not equal: For the most part, they don't have a vote in departmental or university matters, and they don't have the same job security that regular faculty members have. People may stay on soft money beyond the postdoc because they don't want to teach, but more often it's because there are not enough faculty positions to go around.

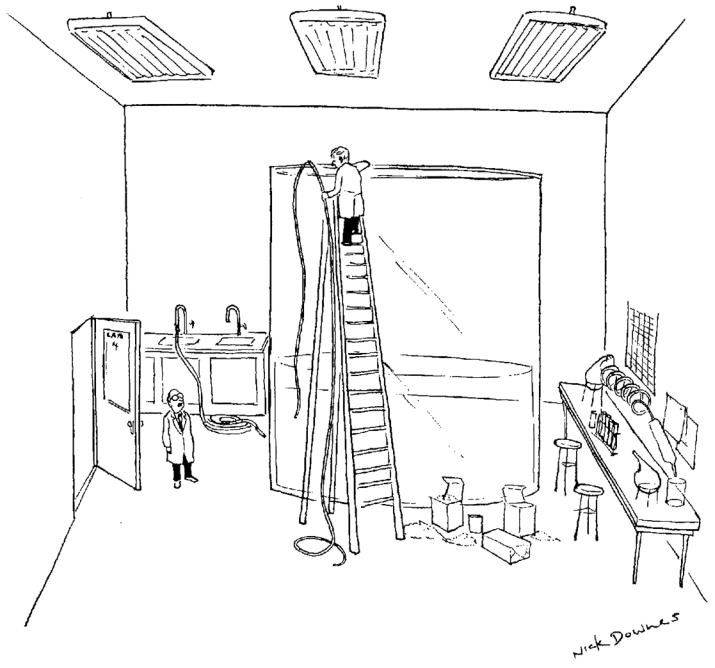
No hard numbers

Senior research positions are scattered across all physics subfields, but they seem to be most common in subfields for which experiments are large and long-lasting, such as astrophysics, high-energy physics and nuclear physics. Rolf Lehming of the National Science Foundation's statistics division estimates that the total number of university positions in physics and astronomy for which tenure was "not applicable" for 1995 was about 1400. (This number does not include postdocs, lecturers or adjunct professors.) But, says Lehming, because of differences in institutional practices, and differences in perceptions of what ought to be called soft money, it's difficult to know what types of positions are being counted. "Some of us at NSF have been breaking our heads over how to study the soft-money people" for a long time, he says. Lehming also cautions that "the statistics are too thin to go into subfields."

There are no hard numbers, but anecdotal evidence suggests that there is increasing pressure to cut research faculty in some subfields of physics.

In high-energy physics, for example, the Department of Energy (DOE) supports perhaps 50–70 such positions, guesses P. K. Williams, the agency's senior program officer for high-energy physics research at universities. And NSF probably funds about 15 more, hazards Marvin Goldberg, one of the foundation's two program officers for high-energy physics. Goldberg estimates that this number is down 30–40% compared to five years ago.

Take, for example, RW, who's been a research professor in high-energy experimental physics at a state university for 25 years. (RW has asked that his name and affiliation not appear in this article.) He's working on ATLAS, one of the experiments being built for the Large Hadron Collider at CERN. But at the start of this year, he was threatened with a 50% salary cut. RW says his tenured colleagues—the principal investigators for the grant he's on—explained that they agreed to his getting only 6 months of salary under pressure from their NSF grant officer. "I was told that I could mess up the grant by demanding my full salary, which I had the right to do," adds RW, who has "grant tenure," an informal agreement within the



"I don't care how big it is, growing sugar crystals on a piece of string is still 'small science.' "

physics department that his salary has first dibs on the group's research grant. So far, his salary has been made up by teaching and by stretching and reallocating other departmental money. But, whereas a regular faculty member would teach one course per quarter, "I'd have to do three to earn my keep," says RW. "There'd be no time for my research job."

Somewhat more fortunate is Jim Matthews. After eleven and a half years as a University of Michigan associate research scientist working on experiments such as the Auger Project to study high-energy cosmic rays, he left this fall to take a tenure-track faculty position at Louisiana State University. Things got tough in Michigan after the professor who was the group's principal investigator retired, Matthews says, because DOE, which funded the group, didn't want to transfer the grant to someone on soft money. "Our funding agent was pretty helpful. He wasn't our enemy, but he made it clear that we [Matthews and the other research scientist on the project] had to find our own salaries." The University of Michigan paid part of Matthews's salary as a "stopgap measure," and he and the other research scientist kept the DOE grant. But when Matthews got the offer from Louisiana State, he took it. "I know a lot of people on soft money. It's a real scramble," he says. "I was fortunate to land on my feet."

There are other stories, but there are no hard numbers. Nevertheless, there is a widespread sense in at least some fields within the physics community of growing pressure to cut senior research positions. "It's hard to quantify, but there's been increasing pressure for the order of a decade," says Michigan's Jones.

Easy targets

And soft-money positions are by definition easy targets for spending cuts. In high-energy physics, for example, the two main funding agencies' budgets for university research are not even keeping up with inflation: DOE's has dropped from about $95 million in fiscal year 1993 to less than $90 million this year, and NSF's has been $40–45 million a year for the past five years. "Salaries are generally a large chunk of a research grant, and when the funding agencies come and say you have to cut back, you can save a lot of money" by reducing the number of people on a grant, says Matthews.

But many in the physics community feel that the funding agencies, particularly NSF, have been too aggressive about routing out senior researchers. For instance, CERN-based UCLA high-energy physics professor Peter Schlein's long-standing NSF support was cut by 65% between 1992 and 1994. As a result, Schlein says, his research program shrank dramatically, and he was forced to let go two of his three senior researchers. "[NSF] was quite explicit" that they would not fund three senior researchers, says Schlein. "This hurts science."

Not surprisingly, NSF denies having a policy to cut back on senior researchers. "That would be age discrimination," says Goldberg. But, he concedes, "It's close to [NSF's] physics division practice. There is pressure on those kinds of appointments." Representatives from both NSF and DOE say that grant applicants must justify senior research positions more strongly than in the past. "People are starting to scrutinize senior postdocs, partly with our urging," says DOE's Williams. But, he adds, "It's not really our call. We don't micromanage. All we can do is jawbone, and say to look at everything."

The bottom line is that senior researchers on soft money never have had job security, and they are caught between funding agencies and universities—both of which face tight budgets these days. The funding agencies argue that the universities should do more to help support senior researchers. But universities mostly can't, or won't, provide permanent employment for senior researchers who have had their Federal funding cut. "In the absence of any binding legal document," says Michigan State's Abolins, a university may keep the person on for a while, but "then washes its hands of [the problem]." (DOE's high-energy physics advisory panel, or HEPAP, is looking at this issue in the context of broader infrastructure problems, and will release a report early next year.)

The funding agencies also argue that postdocs, which are much cheaper, should be favored over senior researchers. "Given the educational mission of NSF, our bias is toward people who are at the start of their careers," says Patricia Rankin, NSF's other program officer for high-energy physics. "It's a hard choice, but it's often better to shut down a senior position than [lose] 2–3 postdocs." But many in the physics community object that postdocs cannot be compared to more experienced researchers. "There is a huge difference between someone with 15 years of experience and a young postdoc," says UCLA's Schlein. "They're not in the same league." Heidi Schellman, a physics professor at Northwestern University, agrees, and asks, "Where are the postdocs to go?"

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Web Site Brings Work of Women Physicists to Light

The 20th century has seen not only the breaking down of many of the barriers that had long prevented women from doing physics, but also an increasing number of important contributions to physics being made by women. To bring those contributions to light, a group of physicists has been compiling an on-line archive that describes and documents the achievements of women.

Although other Web sites and books deal with female scientists, most focus on personal histories and are aimed at the layperson, says Nina Byers, the UCLA physics professor who is overseeing the project. By contrast, Contributions of 20th Century Women to Physics (CWP) is a Web site (http://www.physics.ucla.edu/~cwp/) that concentrates on scientific contributions, listing the women's major discoveries and providing references to published papers. The site, initiated to help mark the American Physical Society's centenary in 1999, uses physicist volunteers to research and verify each citation. "For those women who are still alive and can do so, we are asking them to describe their important contributions and identify the papers that document them," Byers says.

A browse through the CWP Web site can turn up unusual bits of history. One such item is a June 1936 letter from Robert A. Millikan to the president of Duke University, written around the time that Hertha Sponer joined the physics faculty there. The letter suggests that the school's money would be better spent hiring male, rather than female, physicists. Millikan's advice notwithstanding, Sponer remained at Duke until her death in 1968.

Caroline Herzenberg, a physicist at Argonne National Laboratory who has long been interested in the history of women in science, says that through the CWP project, she learned of "a number of interesting women with whom I wasn't previously acquainted." She hopes the site will be expanded to include more younger women; because of funding and personnel constraints, it is limited at present to those whose major contributions came before 1975.