

Delaying the mission is unfortunate.”

Putting off the trip may mean seeing a snowball when we do get there: In 1989, Pluto made its closest approach to the Sun in 247 years, and as it moves away its atmosphere is expected to collapse and freeze. It's not clear when that will happen, but “a few years' delay could easily make the difference between arrival when Pluto has an atmosphere and when it does not,” Stern says.

An exciting, limited vision

NASA's “better, faster, cheaper” motto is at the base of the Pluto problem, says Michael Drake of the University of Arizona, who chairs the agency's subcommittee on Solar System exploration. “Frankly, we went too far on the cheap side,” he says, referring to last year's double loss of the Mars orbiter and lander. “The process of reevaluation is a no-brainer: Increase reliability. That means increased testing. That drives up costs.” Internal costs for the Pluto–Kuiper Express and Europa Orbiter missions grew by about 20%, according to NASA officials. But the extra cost, they add, is mostly for launch vehicles and power supplies, which NASA buys.

Did it have to come down to a choice between Pluto and Europa? “No,” says Lunine. “It's a false dichotomy. There may have been ways to trim the entire planetary program to preserve all the missions.” For its part, the American Astronomical Society's planetary sciences division is asking NASA to request more money from Congress, although division chair Robert Nelson admits that the chances of getting an increase are slim.

“I support going to Europa first, but we shouldn't throw out Pluto in the process,” says Drake. “Currently, the paradigm driving the space sciences program is, Are we alone in the universe? We are looking for Earthlike planets, life on Mars, life on Europa. It's an exciting, and limited, vision. I think we should not be driving the space program on a single paradigm.” Adds Lunine, “My concern is that the space program is becoming politicized—a tool to fuel public interest in science—which can cause an imbalance. We do not understand nature to the extent that we are ready to focus in on just two targets.”

At press time, planetary scientists were preparing to meet in late October, and hoped to rescue the Pluto mission. Perhaps, Drake says, “by putting it out for competitive bid.”

TONI FEDER

Study Calls for Better Conditions for Postdocs

It's official: Postdocs are underpaid, they often lack health care and other benefits, and the duration of postdoctoral training is increasing. But the lot of postdocs could improve, if they—and their advisers, host institutions, funding agencies, and professional societies—heed the advice in *Enhancing the Postdoctoral Experience for Scientists and Engineers*, a recent report by the National Academies' Committee on Science, Engineering, and Public Policy (COSEPUP).

Over the past 20 years, the number of postdocs in the US has more than doubled, to roughly 52 000. At some universities they outnumber students, and more than half of US postdocs are foreigners. COSEPUP surveyed 40 institutions—universities and government and private labs—and found that conditions for postdocs vary greatly among disciplines and from institution to institution. Says Mildred Dresselhaus, an MIT physicist and head of the Department of Energy's Office of Science, who chaired the COSEPUP study, “One of the obstacles was that there was almost no data—institutions didn't even know how many postdocs they had.”

Postdocs can fall between the cracks, says Caltech vice provost David Goodstein, who is responsible for postdocs' welfare at the university. “They are the least protected of all classes in the academic world. Nobody particularly looks after postdocs, who are extremely vulnerable—they can't get another job if they fall out with their adviser.” Adds University of Southern California president Steven Sample, who chaired a 1998 study on postdocs for the Association of American Universities, “The postdoc has become the de facto terminal academic credential in the sciences. The PhD has become a way station toward full membership in the research community. I find it very encouraging that a second study [on postdoctoral training] has found basically the same thing that we had. It makes it more likely that something will be done about it.”

In some ways, postdocs fare better in physics than in other sciences. For example, the median annual salary in 1997 for academic postdocs in physics was \$34 000, compared to \$27 000 in the life sciences, which has both the most and the longest postdoctoral appointments. But the reliance of

postdocs on a single adviser, and other concerns detailed in the COSEPUP report, apply across all science and engineering fields: “Postdocs need better mentoring, better compensation, more information on employment opportunities, more assistance in planning their careers, and opportunities to learn a number of career skills,” according to the report. (The full report is available for free on the Web; see <http://national-academies.org/postdocs>.)

The COSEPUP guidelines give “a more savvy approach to making the best use of those important years of the training process,” says Dresselhaus. The report advises postdocs to ask prospective advisers about their authorship policies, whether they have adequate research money, and if

To enhance the postdoctoral experience, the COSEPUP report says postdoc advisers, institutions, funding organizations, and disciplinary societies should

- ▷ award institutional recognition, status, and compensation commensurate with the contributions of postdocs to the research enterprise

- ▷ develop distinct policies and standards for postdocs, modeled on those available for grad students and faculty

- ▷ develop mechanisms for frequent and regular communication between postdocs and their advisers, institutions, funding organizations, and disciplinary societies

- ▷ monitor and provide formal evaluations (at least annually) of the performance of postdocs

- ▷ ensure that all postdocs have access to health insurance, regardless of funding source, and to institutional services

- ▷ set limits for total time of a postdoc appointment (of approximately five years, summing time at all institutions), with clearly described exceptions as appropriate

- ▷ invite the participation of postdocs when creating standards, definitions, and conditions for appointments

- ▷ provide substantive career guidance to improve postdocs' ability to prepare for regular employment

- ▷ improve the quality of data, both for postdoctoral working conditions and for the population of postdocs in relation to employment prospects in research

- ▷ take steps to improve the transition of postdocs to regular career positions

they'll help when it comes time to look for a job. It favors limiting cumulative postdoctoral appointments to about five years. Besides that, however, the report's recommendations to advisers and institutions are broad: Spell out what's expected of a postdoc, and provide grievance procedures, career

counseling, and other benefits. Says Dresselhaus, "It may be necessary for the funding agencies to require coverage of the basic needs of postdocs, such as medical insurance. That may mean that fewer postdocs can be funded. There are real changes implied by this report."

TONI FEDER

Saying "No" to Top Government Jobs

Later this month, phones will start ringing in offices of corporations, universities, and private organizations across the country as the transition team for the new president begins its effort to lure scores of science and technology experts into government service. And while those receiving the calls may be tempted by the opportunity to become an undersecretary, a commissioner, or even a director in some powerful federal agency, many will say, "No."

The reason, according to a new report by the National Academies, is that "an increasingly complex web of restrictions makes it difficult for appointees to enter government service and then resume their careers after government service." The report, a brief document designed for quick digestion by government headhunters, is the latest in a string of studies by various groups published during the past 12 years recommending that the process of presidential appointment and Senate confirmation be made less burdensome to prospective jobholders.

The report, *Science and Technology in the National Interest: The Presidential Appointment Process*, was put together by a panel of former government science and technology officeholders under the direction of Mary Lowe Good, a former undersecretary for technology at the Department of Commerce. It focuses on about 80 senior science and technology positions in the government that require presidential appointment and Senate confirmation—everything from the president's science adviser to the head of NASA, to the administrator of the Federal Aviation Administration.

The report recommends that the new administration move quickly to get appointees in place, particularly the president's science adviser. Once in place, the science adviser should help fill what the report identifies as "the 50 most urgent science and technology presidential appointments."

Filling those positions is problematic, however, because the approval process is notoriously slow, intrusive,

and unpleasant for candidates. "A term in Washington for scientists and engineers often means two steps backward for every step forward along a career path," says panel member John McTague, a retired Ford Motor Co executive who served as acting director of the Office of Science and Technology Policy under President Reagan. McTague says scientists who join the government "may lose touch with the cutting edge of their field and find themselves in an irreversible career shift toward management."

The approval process for a candidate includes filling out lengthy forms and opening up one's life—both public and private—to intense FBI and IRS scrutiny. Candidates must also meet increasingly restrictive ethical standards that can require them to forgo pension benefits, sell stocks and options, and sever ties with the industries from which they come. "Sensible standards are clearly necessary to prevent conflicts of interest, but the number and complexity of employment restrictions have risen to a point where they deter potential candidates," McTague says.

There are difficulties in all sectors, but industry is particularly affected. The report notes that during the Reagan and Bush years, 25% of the science and technology appointees were from industry, compared to only 12% under Clinton. The decline is due to ever-tightening restrictions, not to which political party holds the White House. The full report, as well as background documents, can be found on the Web at <http://www.national-academies.org/presidentialappointments>.

Until reforms take place, people who receive job offers from the next president might want to pick up *The Survivor's Guide for Presidential Nominees*, a book being published by the Brookings Institution's Presidential Appointee Initiative. The guide will be available on the Web on 15 November at <http://www.appointee.brookings.org>.

JIM DAWSON

Soleil Rises: French Synchrotron Gets Go-Ahead

France's science community is reveling in the decision to build a synchrotron light source on French soil, announced on 11 September by research minister Roger-Gérard Schwartzberg after years of flip-flopping by changing governments and steadfast lobbying by scientists. Schwartzberg chose the Paris suburb of Ile de France from among nearly a dozen competing regions as the site for the new synchrotron, Soleil (French for "sun").

When he became research minister this past March, Schwartzberg hinted that he would revisit building Soleil, which his ousted predecessor, Claude Allègre, had canceled in favor of joining the UK synchrotron Diamond (see PHYSICS TODAY, January, page 50, and May, page 53). In July, Schwartzberg said he was "95% certain" to approve Soleil, and the focus shifted to where it would go.

Expecting Soleil's presence to boost the local economy, several regions offered to pay the Fr 1.2 billion (about \$160 million) construction cost if they got to host the synchrotron. Ile de France, home to the country's existing synchrotron, the Laboratoire pour l'Utilisation du Rayonnement Electromagnétique (LURE), won out because of nearby academic and industrial labs, particularly in genome research, and because of its accessibility to scientists. The runner-up was Lille, in northern France, which has no major scientific facilities. "People at LURE are extremely happy that it will be built, and built nearby," says the synchrotron's director, Robert Comes. "Even if one wants to decentralize France, that doesn't



SUPPORTERS CELEBRATE the decision to build a third-generation synchrotron, Soleil, near Paris.