

social security are dealt with by the member states. "The community does not have the right to go and harmonize. We know very well about these difficulties, we have years of experience but the problems are not caused by community-level trouble," he says.

In January this year, Philippe Busquin, the commissioner for research, revealed his plans for a European scientific community dubbed the European Research Area. One of its priorities will be tackling these barriers to mobility for European researchers.

Campbell Warden, the chairperson of the European Association of Research Managers and Administrators, which campaigns to improve research management, says: "National authorities should take their responsibilities now and start working together to even out these barriers." Warden also mentions: "Many European universities

(and other research institutions) still have a very closed-shop attitude towards favouring the local candidates. This is a matter of serious concern and should be fought with all means."

What is remarkable is that despite the weight of difficulties faced by many Marie Curie fellows, the scheme has achieved notable successes. Harlaftis says the fellowship worked out very well in the end and was important to his career. "I got invaluable technical and scientific know-how in one of the major European observatories, and so made possible my return to Greece by funding a one-year return fellowship. This placed me in a very strong position. I am now competing for the director's position in my institute," he says. ■

Natasha Loder is a news reporter at Nature.

Marie Curie fellowships ▶ <http://www.cordis.lu/improving>
 MCFA ▶ <http://www.mariecurie.org>

22.9% in 1997, down from 26.6% in 1993. And the growing supply of new PhDs continues to exceed the number of available positions. A recent survey in the *Chronicle of Higher Education* estimates the number of natural sciences PhDs in 1996–97 at nearly 9,300. If every one of them claimed an existing (but filled) full-time job, they would represent more than 9% of the full-time natural sciences academic faculty.

Alternative routes

With such slim pickings, astute young scientists are looking elsewhere to launch their careers. National laboratories, technical positions and biotechnology companies all hold promise.

Steven Sloop, one of about 200 postdocs at the Lawrence Berkeley National Laboratory in California, says that government labs provide better postdoc prospects than the academic sector. Long-established collaborations between industry and the national labs give postdocs there a good view of the government-private industry interaction. They also provide opportunities to learn about companies and meet their scientific representatives, says Sloop, a chemist who researches electrolytes for lithium batteries.

Sloop, who has been active in the lab's postdoc society, says that information sharing can break the isolation that all too easily envelops the researcher sequestered in a lab. Organizations also provide useful workshops in interviewing. And when different disciplines meet — materials scientists and molecular biologists, for example — new combinations of ideas can lead in unexpected and fruitful scientific directions.

Sloop plans to take his career in such a direction when his fellowship ends. He is making plans to move to Curitiba in southern Brazil. As the city has some of the most advanced car manufacturing plants in the world, Sloop thinks opportunities exist for hi-tech consultancy work.

The move is not without risk, but as much of the scientific talent in South America is flowing northwards, it is a calculated one. Sloop thinks his chances are good compared with those who stay at home and aim for more conventional goals. "With 200 or more applications from qualified people for a single faculty opening in a research university, any reasonable person develops a contingency plan," Sloop says. "Mine is Brazil."

Sloop's own career odyssey has placed him in a good position to give advice to new postdocs. He advises the prospective postdoc to be scrupulous about researching both the lab and the principal investigator beforehand. "This'll tell you if there is a history of problems, and even if the request raises eyebrows, how they respond will be informative about the atmosphere of the lab," he says.

Postdocs should also ask for periodic reviews of their own work, he believes. This is

Postdocs reject academic research

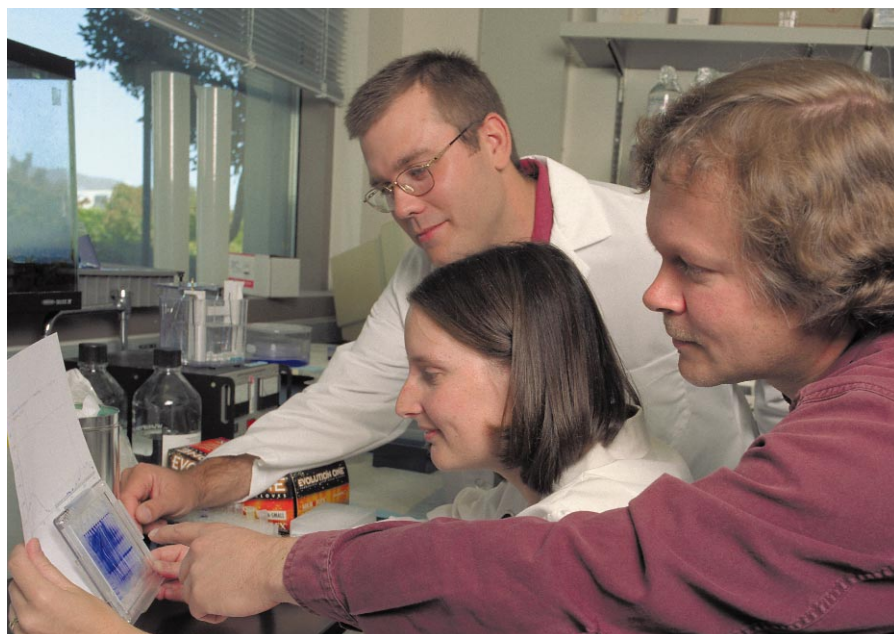
With full-time positions in universities at a premium, postdocs are looking to government labs and industry for jobs, says Potter Wickware.

"Many are called but few are chosen" might be the epigraph of many a US postdoc's search for a tenure-track position in academic research. Although a relatively small number are successful in getting such jobs in universities, too many find themselves consigned to

an academic underclass, with low pay, inadequate benefits and no clear scientific career prospects.

The numbers paint a bleak picture. The 1998 National Research Council report *Trends in the Early Careers of Life Scientists* puts the success rate for recent PhDs at

GENENTECH



Good prospects: many postdocs are turning to the biotech industry for employment.

common in industry but less so in most academic labs. Regular feedback is important so that the postdoc does not get overlooked or taken for granted in the life and work of the lab. "Be willing to ask questions; don't automatically go to the biggest name, but go instead to the best person. Similar philosophies are important. I ask the principal investigator why they became a scientist," he says.

Avoiding pitfalls

Some new PhDs might think twice about doing a postdoc at all. For the candidate set on an academic job, it is probably indispensable, but for those who want a job in industry or in a government lab, it may be superfluous. One good reason to do a postdoc is to tie up the loose ends from a PhD. Another reason might be to do a two-year post-PhD stint in a government or industrial setting to get a close look at government labs and companies. "One can get a lot of visibility in a postdoc fellowship," Sloop continues. "But don't stay too long."

Nancy McNamara prefers her current research assistant position at the University of California at San Francisco (UCSF) to an earlier postdoc post she held there. It seems "more like a real job", she says, because it includes benefits such as sick leave and vacation pay. McNamara, a member of the postdoctoral association, cites past abuses of postdocs at the UCSF, including instances of foreign doctors working as postdoc volunteers for no pay, as reasons to be wary. But she believes conditions for postdocs are improving slowly but perceptibly.

To avoid exploitation, potential postdocs should exercise due diligence before taking a job. "There are some awful principal investigators out there," McNamara says. "Talk to people in the lab, and people who have left the lab. How did they do afterwards? How do they feel about the experience? Are they going on to another postdoc somewhere or are they getting real jobs in industry or universities? Use the web, and network as much as possible."



Sloop: postdocs provide visibility.

Organization pays



After a disagreement with her principal investigator escalated into a summary dismissal from her post, and physical removal by university police from her lab, Joni Seeling (left) tried to get redress from the University of Utah Health Sciences Center. Seeling, who works at the university's oncology department, held on to her job after she retained an attorney. During her fight, she became increasingly disillusioned with the university's lack of mediation or appeals machinery, and what she saw as its inadequate levels of response to postdoc concerns.

Discovering that she was not alone among the university's 400 postdocs in having problems with her principal investigator, she set up a postdoctoral association in 1997. One of the group's main goals is to try to get written contracts for postdocs, which would spell out salary rates and a schedule for rises, length of employment, and benefits and retirement contributions. "Many postdocs are in their mid-thirties, even in their

forties, and have never received retirement benefits," she says.

She would also like to see a statement of what work postdocs can take with them when they leave to start their own lab or go to their next job, and how authorship priority is assigned in papers that emerge from the lab.

Seeling anticipated that her situation would improve after one of her papers appeared in *Science*, and when she received a National Institutes of Health investigator-initiated R01 grant with a high reviewer-approval rating. But little has changed. An agreed-upon salary rise has not yet appeared, and relations with university administration and faculty have remained a little strained.

Once cautious about organizing postdocs and pressing the university to change because of possible ill effects on her career prospects, she says: "I'm now at the point of saying 'if it hurts me, so be it'." **P.W.**

John Kerr, Sloop's principal investigator at Lawrence Berkeley, observes that even today many new PhDs, apparently unaware of the demographic numbers, come in with an expectation of a tenure-track post. He partly blames faculty, who fail to inform students about today's academic track realities. It is an error that is perhaps understandable because many of today's senior faculty were employed during a time of plenty. They may not be as aware of the current reality and are probably poor sources of job-market information.

Kerr also views with disfavour the exploitation suffered by some graduate students and postdocs, particularly in life sciences. The onus is partly on the student to understand that he or she is being exploited and to do something about it. But at the same time, "you have young people in vulnerable situations and university faculty, administration, and particularly the funding agencies, must take their responsibility to them seriously".

Biotechs beckon

Biotech companies are an emerging source of higher-paying, more stable sources of postdocs than universities. With a good publication record and deep financial resources, Genentech in San Francisco is just one of many biotech companies targeted by postdocs.

Abraham de Vos, who runs a protein crystallography lab there and also directs the company's postdoc programme, says that in the early 1990s Genentech established a postdoc programme based on the academic model. It now has 62 postdocs augmenting a staff of 100 research scientists. For the most

part, the research done is indistinguishable from work that would be carried out in an academic lab, although postdocs are kept away from some of the highly proprietary projects, and publication can sometimes be delayed until after a patent application.

First-year postdocs at Genentech are paid US\$44,000, almost twice as much as some postdocs get at universities or the National Institutes of Health. With the exception of stock options, benefits are the same as for other employees: health insurance, a retirement plan, employee stock purchase and maternity leave.

In evaluating a prospective postdoc, de Vos says, "I look for successful research in the academic lab that they came from and a feeling that they have done a lot of the work themselves, that they can take intellectual ownership. You want to see the seeds of independence in their previous graduate school experience." ■

Potter Wickware is a science writer in San Francisco.

Web links

US National Research Council Report: "Trends in the Early Careers of Life Scientists" ♦ <http://www.nap.edu/readingroom/books/trends/>

Joni Seeling's Utah Postdoc Association

♦ <http://www.cc.utah.edu/~jmj2/who.html>

Am. Assn. of University Professors Report: "The Status of Non-Tenure-Track Faculty" ♦ <http://www.aaup.org/rbnonten.htm>

UC Berkeley Graduate Teaching Assistants' Strike Committee ♦ <http://www.uaw.org/publications/releases/1998/calif.html>

UC Berkeley Postdoc Association

♦ <http://postdoc.berkeley.edu/bpa/infores/index.htm>

US National Academy of Sciences report

♦ <http://www.nap.edu/catalog/9831.html>