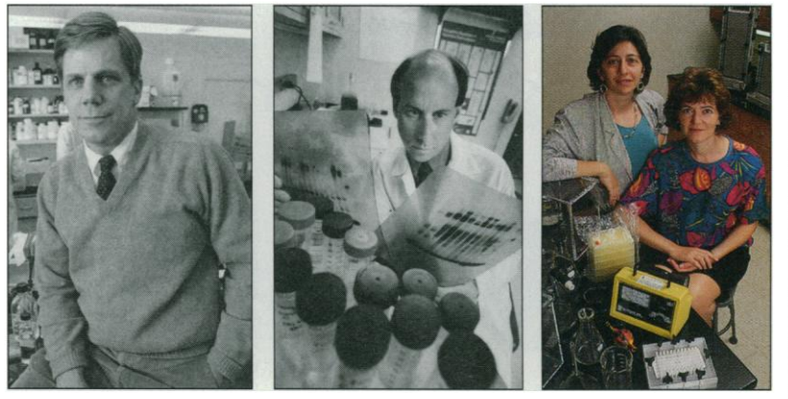
SCIENCE

Careers '93: A Survival Guide



Success in a shrinking world. Science that's on the move tends to be international, interdisciplinary, or applied.

Careers in Science '93 is something of a good news/bad news story—except that, to reflect the real world honestly, we begin with bad news: job shortages. Then we get to the good part: The growth of new fields and new techniques means new and different job opportunities.

Since our first careers section in 1991, the job situation for the Ph.D. researcher has steadily worsened. Hiring is slower. Research money in academia is tighter than ever. In R&D-based industries, most research staffs are at best holding their own, and reduced R&D budgets are being devoted almost entirely to applied research.

Right now unemployment among natural scientists in the United States stands at 2.3%, up from just over 1% in 1989, according to the Bureau of Labor Statistics. Mathematicians and computer scientists are a little worse off, at 2.6%. Engineers, hit by defense layoffs and sluggishness in the chemical industry, now have hit their highest unemployment level in more than a decade, 3.8%.

This stands in sharp and unhappy contrast to the famous Ph.D. "shortfall" predicted several years ago by the National Science Foundation (NSF), which in 1989 noted a dramatic drop-off in the production of home-grown Ph.D.s through the end of the century. Some people, such as Nobel Prize–winning physicist Leon Lederman of the Illinois Institute of Technology, still say we need to be training more Ph.D.s. He and others point out that the basic demographic facts that led to NSF's projections haven't changed: Ph.D. production has been flat; college enrollments (along with the need for new faculty) are starting back up and will continue to rise for the indefinite future; and many superannuated faculty will be retiring before 2000.

But unexpected developments have thrown simple extrapolations into a cocked hat. There's been the dissolution of the former Soviet empire—which has not only led to contraction of the defense industry but has sent droves of highly trained technical people our way. Even more serious in its effects has been the recession, which has dragged down the economies of the entire industrialized world. Furthermore, there are the legions of foreign students who believe the United States is not only the best place in the world to get a graduate education in science, but the best place to use that education to make a living (see p. 1769).

Even demography may be misleading: The wave of retirements in academia may not be as big as expected, says Betty Vetter of the Commission on Professionals in Science and Technology, since mandatory retirement ages at universities and colleges will become illegal as of 1 January. And whether or not faculty members start

dropping like flies, tenure-track positions may become as scarce as hen's teeth because universities and colleges are turning increasingly to part-time, adjunct, and other non-tenure-track positions to meet teaching and research demands. Finally, other priorities are intervening: According to the Equal Employment Opportunity Commission, university faculty only grew 1.2% from 1990 to 1992, but universities' hiring of accountants, coaches, counselors, lawyers, systems analysts, and other such professionals grew by 4.5%.

FEEDBACK

In this issue, as always, space constraints forced us to omit coverage of many scientific arenas—this year the physical sciences—in order to explore new realms, notably the social sciences, which we are covering in to fulfill our compact with readers who dutifully write us about our lacunae. Although there is no "Feedback" form in this issue, we promise to respond to readers' concerns, and encourage suggestions and comments. Please address them to Constance Holden, Careers, Fax: 202-408-8015.

Shifting priorities

In industry, it's called downsizing; in academia, it's strategic realignment. Whatever the term, it means universities and colleges realize nowadays they have to run a tighter ship if they want to keep afloat. And many scientists say there have to be qualitative changes as well, since the traditional disciplinary structure of academia isn't meeting real-world needs very well. Some universities are trying to move beyond ad hoc gestures like budget cuts and toward strategic planning for the future. Brandeis, for instance, has launched a 5-year program to cut faculty by 12% and trim spending by $12 million a year. But at the same time, the school is staking out a position in the avant garde with plans to establish a new multidisciplinary Center for Complex Systems. And that brings us to greener pastures.

The happier news

Despite the economic constraints of the current era, there never has been a more exciting time to be a researcher. As industrialized nations make the transition to a highly competitive global economy, research resources may be less abundant, but computers, telecommunications, and an incredible variety of instrumentation are opening new vistas for research and collaboration—including cooperation among disciplines that used to be far removed from one another. And although applied research is getting the best funding these days, many applied areas promise to be every bit as challenging as basic research.

In this issue, for example, we examine a pair of the most promising arenas in the biomedical world. First, we turn to an elite among elites: clinician-researchers (p. 1784), who, particularly in molecular medicine (p. 1786), are more in demand than ever. Then comes a look at opportunities in biotech (p. 1788), where the future is still looking good for smaller firms and where there are jobs in unexpected disciplines—organic chemistry, for instance (p. 1791).

Then there are mega-trends, such as the growth of research on global change. Not only does this work call for unprecedented cooperation among natural scientists and engineers, but increasingly the field is employing disciplines in the social and behavioral sciences that natural scientists have long ignored (p. 1796). Climate and environmental change are not the only areas crying out for good research—immigration, population growth, societal impacts of resource shortages, urbanization, technology, and all the problems facing poor and would-be developing countries demand the best minds from disparate fields. "The social sciences are literally *the* source of our understanding of how humans are contributing to global change and being affected by it," says Barbara Boyle Torrey, incoming director of the Commission on Behavioral and Social Sciences and Education at the National Research Council.

New fields are being hewn from these developments, as they are from the dramatic new perspective being cast on the social sciences with the development of new knowledge about the biological bases for behavior. In anthropology this is spurring the growth of a new subdiscipline, human evolutionary ecology (p. 1798). In psychology, it's led to the creation of the field of cognitive neuroscience (p. 1805). The reach of this particularly fast-growing area can be shown by the fact that new money is available even in this era of fiscal retrenchment, and there are new initiatives such as the Neural Processes in Cognition program run jointly by the University of Pittsburgh and Carnegie-Mellon University.

Getting positioned

The message to new Ph.D.s is clear: Whatever field you choose, look for ways to position yourself to address the Big (that is, global and multidisciplinary as well as well-funded) Questions. That often means getting training in a supplementary or all-purpose trade such as computer programming or statistics, and it always means being flexible. As for finding jobs, both in the United States and abroad, budding scientists are going to have to go beyond the usual approaches and really dig for openings—going to the smallest booths at the convention, or writing to authors of research papers in your field. That, at any rate, is how Douglas Tweet, an American, got a job in Japan (p. 1774). As the national borders fall before science, the smart young researcher, wherever he or she may be, will increasingly watch for little-used opportunities abroad (p. 1776).

And one last word of advice—a weighty word coming as it does from a Nobelist: Trying unorthodox approaches is likely to be more productive, says double helix co-discoverer James Watson, than sitting back and waiting for responses from the 500 resumes you sent out. In his usual candid manner, Watson (p. 1812) uses his experience to document the virtues of perseverance, the willingness to take risks and to break conventions. With today's CV inflation, the positions you applied for are also likely to have drawn hundreds of applicants. It may be that characteristics other than your scientific brain are more important than ever in determining whether you sink or swim.

–Constance Holden