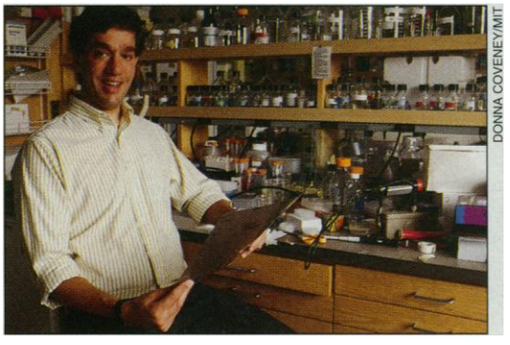
STARTING OFF RIGHT

The Modern Postdoc: Prepping For the Job Market

These temporary fellowships can set you up for a career—or land you on a postdoc treadmill.

"Being a postdoc is the best time for doing science," says Jeff Parvin, a biochemistry postdoctoral fellow at the Massachusetts Institute of Technology (MIT). "You know a lot more than you did as a graduate student; you don't have to worry about writing grants and teaching; you can do research with fewer pressures than at any other time. It's a lot of fun."

Easy for him to say. A 34-year-old M.D./Ph.D. graduate of the Mount Sinai School of Medicine in New York, Parvin is 5 years into a postdoctoral fellowship at Nobel laureate Phillip Sharp's lab at MIT. With solid publications to his credit and a project on gene expression and transcription to take with him when he moves on to his own lab, Parvin is well along what graduate students call the "golden path" to a successful career in science.



DONNA COVENEY/MIT

Golden boy. MIT postdoc Jeff Parvin has "pedigree, performance, and future grantability."

But in these hard economic times, this "best time for doing science" can be a make-or-break passage in a young scientist's life. If a newly hatched Ph.D. is lucky enough to land the temporary, 2- to 3-year research appointment known as a postdoctoral fellowship, there are relatively few tenure-track jobs waiting afterward. "It's grim. I think I snuck out [of life as a postdoc] just in time," says biochemist Gerald Joyce of the Scripps Research Institute in La Jolla, California, who finished his postdoc in 1989. Joyce's lab is small, yet he says he probably gets at least one postdoc application a week. Larger Scripps labs get many more. And Scripps receives some 200 applications for every permanent opening, according to school administrators.

Science spoke to a number of young scientists to find out what researchers aim for in a postdoc, how they have avoided getting stuck on the postdoc treadmill, and what post-postdocs are doing with their lives.

Pedigree, performance, grantability. What, in this buyers' market, is the most valued commodity? "What people are looking for is pedigree, performance, and future grantability," says Joyce. Take Bruce Tidor, age 33. He's pedigreed to the hilt, with an undergraduate degree from Harvard University, a master's from Oxford Univeristy, and a Harvard Ph.D. in biophysics. Since 1990 he's been putting together a performance record as a fellow at the Whitehead Institute for Biomedical Research in Cambridge, Massachusetts. Because Whitehead fellows have their own labs and have to obtain their own grant money, "the fellowship gives me the chance to start the academic lab thing without doing teaching," says Tidor. "I'm learning how to train people, developing completely new skills."

All that pedigree and performance would count for little if Tidor were in the wrong field. But as it happens, he's in a hot one, structural biology. And he's already found a job: He starts this summer as an assistant professor in the chemistry department at MIT.

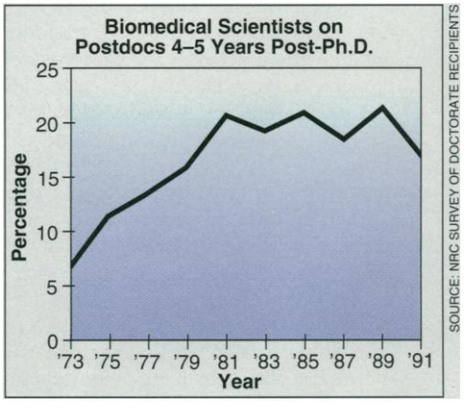
Contrast Tidor's success with the travails of Ken Yee, a 30-year-old theoretical physicist with a Ph.D. from the University of California, Los Angeles, who spent 2 years as a postdoc at Louisiana State University. Now he's decided to get out of science altogether. His field is ice cold, he says, mainly because of the cancellation of the Superconducting Super Collider. Yee applied for positions at some 50 universities and got a single offer, at the Canadian high-energy accelerator facility in Vancouver. Yee opted instead to go to law school. "I was looking ahead," he says. "Afterwards I would have had to find a job, and I felt that my chances were not very good. So I might as well get out while the getting's good."

Picking your focus. Can a prospective postdoc predict what field will be hot in a few years when it's time to hunt for a job? Not according to Whitehead postdoc and *drosophila* researcher Liz Gavis. "Figuring out what's going to be important is very difficult," she says. "Science changes very quickly. Things become hot overnight." Therefore, she advises, "pick a problem that you think is really interesting and try to get into the best lab that's doing what you want to do. Always shoot for the best."

It's also advisable to find a manageable project that you can take with you to a permanent job. "If you can get credit for doing your own project and then take it with you, you will look a lot better in the job search," says Whitehead postdoc Peggy Goodell, who does research with stem cells. Jeff Parvin, for instance, plans to hold on to his gene expression and transcription work —with the blessing of his supervisor, Phillip Sharp. "Many postdoc advisers don't like people to develop a hot project and take it with them," Parvin says, "but Phil doesn't care. Someone asked him if there'd be a problem, and he said, 'not unless the work is interesting.'"

Sharp is relaxed enough to joke about such things. Other lab chiefs are not. Although they may not go so far as to forbid a postdoc to take a project, there are other ways of applying pressure, says recent Princeton University physics postdoc David Coker. One might be to sabotage a subsequent grant request. "Your former supervisors may be reviewing your grants. You definitely do not want to take something with you against their wishes, because they can get back at you," Coker says.

Get published. Publications are the "validation of performance," as Scripps's Joyce calls them. They show you're bankable. Tidor has 27



Still looking to settle. Despite tales of multiple postdocs, the most recent (1991) statistics for biology Ph.D.s indicate the situation is no worse than it was a decade ago, according to the National Research Council.

published papers to his credit; Parvin's include two first-author papers in *Cell*. "There's no trick to being published, and no short cuts," says Tidor. "The things that have worked for me are projects I believed in. You make them work because you care deeply, not because you think you might get a publication out of it." And, of course, it doesn't hurt to be hardworking, talented, and surrounded by accomplished people.

MIT genetics postdoc Dmitry Blinder is not so blessed. First of all, he's giving up his project—purifying proteins involved in nitrogen regulation in yeast—because "it's too difficult." And he has few publications. "I have not been able to get results that are good enough to publish. They are too crude." So although he's been looking for a year, there's no job in sight.

Helpful supervisors. Without effective support from above, it's hard to move on. That's been a big handicap for Damian Christian, a 30-year-old former University of Maryland astronomy postdoc who's now working in a computer warehouse. His supervisor tried to help him get a job, he says, but she lacked standing in the field and knew few people to whom she could recommend him. Blinder, too, has had problems with his boss. "He has not been willing to place a call," he says.

In contrast, physicist Coker has enjoyed his supervisor's support all the way. After getting his Ph.D. in 1993 from the State University of New York (SUNY)–Stony Brook, he faced a difficult postdoc hunt. "Unfortunately, I had changed fields in the last year and a half of my grad career. So I only had one paper in my new field."

Then Coker saw an advertisement for a postdoc with physicist Salvatore Torquato at Princeton—"one of the premier guys in the field of statistical mechanics of random media, and one of the few people in the world who was doing what I was expert at." Coker's supervisor wrote Torquato a glowing letter, detailing Coker's achievements and abilities in the lab. It worked. "Torquato said that his letter was one of the reasons he hired me," Coker says.

Coker's stint at Princeton was supposed to last until 1995, but, suddenly pedigreed, he found himself marketable. He heard of a faculty position at the SUNY Institute of Technology in Utica, applied, and got it. "From helping pick my successor at Princeton, I know that recommendations can be crucial," Coker says. "They're actually more important than the resumé."

Selling yourself. All the pedigree, performance, and grantability in the world may be for naught if you can't communicate your abilities. When Coker became aware of the Princeton opportunity, he didn't hesitate. "I called and invited myself down there," he says. He refined his self-marketing skills as a postdoc. "When I wrote out applications and overviews of what I've done and want to do, I could emphasize my strengths better." The bottom line, Coker says, was his own determination: "I obtained my present job through pure perseverance and hustling."

Even Parvin now realizes he could have been more assertive. He has been waiting over a year to learn the result of his interview at Harvard, the only place he applied. "You have to put fuel on the fire," he says. "You have to let people know that you're negotiating with other schools. I believe I could've sped up the process tremendously if I had another offer in hand."

If you get discouraged, remember Peter Wu. A 40-year-old physicist, Wu spent 5 years postdocing and 3 years out of the research loop while teaching abroad, and had sent out some 400 unsuccessful job applications. Now he's landed a faculty position at Southern Oregon State College in Ashland. "I stuck it out long enough," he says. "I tell people, if you're good, and you stick it out, sometimes things work out. And remember, you can always do something else. Anything is better than being a postdoc all the time."

–Peter Radetsky

Peter Radetsky teaches in the science communications program at the University of California, Santa Cruz.

Doing a Postdoc the Industry Way

While the academic postdoc market is tight, there is another option: a postdoc in industry. Giant companies such as DuPont and Ford, established biotech firms like Genentech in San Francisco and CalGene in Davis, California, and start-ups like NeXagen in Boulder, Colorado, all offer postdoctoral positions. This is not a large part of the postdoc world—according to the National Research Council, the proportion of all postdocs that are done in industry has held steady at about 4% between 1985 and 1991 (the latest year for which figures are available)—but it is something to consider, especially because government science agencies are now lending a helping hand. In chemistry, for example, the National Science Foundation (NSF) has added industry postdocs to its $1.7-million-per-year sponsorship of postdoc programs in academia and government. And in mathematics, NSF is offering a new program allowing postdocs to combine industry and academic lab experience.

Doing a postdoc in industry can be tricky, however. Because the fruit of research is often proprietary, publications, the postdoc's best friends, may be hard to come by. Karl Jalkanen knows. Now a University of Illinois chemistry postdoc, he did his first postdoc stint at a San Diego biotechnology firm. But because he couldn't publish anything, Jalkanen feels the experience added little to his marketability. "It was a way for the company to get migrant labor," he says. Those who've been there advise prospective postdocs to look before they leap. "Be very clear that you will have a project that you can work on, and you will be allowed to publish it," advises Torsten Wiegand, a postdoc at NeXagen. "Get it in writing," adds Virginia Ursin, a former postdoc and now senior scientist at CalGene.

Industry postdocs also have to be prepared to subordinate their scientific goals to company priorities. "That's the trade-off," says Ursin. "You can bring to the job whatever amount of creativity you can muster, but it's always within a fairly well predetermined area." There are exceptions to that rule, however. Firms like DuPont and Genentech, which have thriving postdoc programs (DuPont employs 40 postdocs, Genentech 60) encourage basic research and independent projects as well as research aimed at generating a product. "Here at DuPont, you have a great deal of flexibility," says postdoc Patrick Warren, a University of Nebraska biochemistry Ph.D. working in photosynthesis research. He also notes that the atmosphere at DuPont is more collaborative than in academia, because there is more money available, which reduces competition for resources.

And industry postdoc positions can lead to jobs in academia as well as industry. "The anti-industry bias among academics has disappeared," declares Princeton University molecular biologist Lynn Enquist, himself a former DuPont scientist. He points out that commercial experience offers extra pluses, because—in addition to research—it involves experience in "the ability to manage a budget, the ability to be with people." And then there's the ability to write patent applications. "A lot of academic people have written patents now, and they realize that they're hard to write," says Enquist. Adds Ursin: "Considering how universities are going, a resumé of patent applications should be as well received as publications."

–P.R.