

Postdoc Survey

The Postdoc Experience:

High Expectations, Grounded In Reality

In today's job market, even highly trained postdocs must overcome struggling economies, hiring freezes, and high unemployment rates. To be competitive, postdocs have to start planning for their next position on day one of their fellowship (or even sooner). Networking, staying flexible about career options, and gaining experience beyond the bench makes young scientists marketable. **By Kendall Powell**

It's perhaps no surprise that amid downturned economies and shrinking numbers of traditional, tenure-track academic positions, postdoctoral fellows have become increasingly preoccupied with opportunities for career advancement. Every other year, *Science* Careers surveys several thousand current and former postdoctoral fellows mainly from the United States, Europe, and Asia about factors influencing their postdoctoral experience. This year, the 3,200 participants placed the category "Advancement Opportunities/Career Options" at the top of the list of factors deemed important for a successful postdoc, climbing steadily up from sixth place in 2008 (See chart on page 994 for survey results and methods).

Obsessing about advancement might seem like anxiety brought on by the toughest job market seen in the last half-century. But as survey participant **Matthew Lane** points out, it's really what a postdoc is all about. "People will make it very clear that part of your job is publishing and doing research. But part of your job is getting another job," says Lane, who successfully transitioned from a postdoc to a principle investigator at Sandia National Laboratories in Albuquerque, New Mexico.

Comparing the last three surveys polling postdoc researchers—those conducted in 2008, 2010, and 2012—reveals some other trends that reflect shaky job prospects. Right behind advancement, this year's survey participants ranked "Funding/Grants" as the second most important ingredient for a successful experience. Alarming, unemployment after a postdoc rose sharply, from 4% and 2% in 2008 and 2010, to 10% in 2012—mirroring the current average unemployment rate in the European Union and slightly above that in the United States.

But the 2012 survey holds rosier news, too. Employment in so-called alternative careers doubled between 2010 and 2012 to 16%. And despite poorer prospects, the numbers of researchers who take multiple postdoctoral positions has not increased—nearly 60% of former postdocs polled held only one position and 30% held two, nearly identical to the results from the 2010 survey. Also, the length of a postdoc position has not stretched out, with a steady 60% of former postdocs surveyed still having spent between two to four years in their post. However, only 20% of former postdocs landed a tenure-track position in 2012. Here, several survey respondents who obtained academic positions share their strategies for success. Others reveal how they secured nontraditional posts—research or otherwise. And current fellows explain the preparations they've made to avoid the pitfalls of perpetual postdocing or unemployment later.

ADVANCEMENT ADVICE

Sixty-eight percent of respondents ranked the 'advancement opportunities' attribute as 'very important' in contributing to a successful postdoc experience. Another question asked participants to consider how their supervisor stacked up in that 'advancement' category, including whether the supervisors discuss future career options and allow postdocs to continue research projects in their next post. A mentor's support proves crucial to moving on to a successful career whether it's in academia, industry, a government lab, or science education.



Clockwise From Top: Lynn Adams; James Gardner; David Lodowski

"Informational interviews were an amazing way for me to learn what was out there. Just get out there and listen to your heart."

—Lynn Adams

Melissa Snyder knew she wanted to do a postdoc, but she wasn't sure how to translate that into being a career scientist. "I wanted a mentor who would teach me the process and get me involved in the department. He's been really great in getting me to further my career," she says of her postdoctoral advisor, Wen-Jun Gao of Drexel University College of Medicine in Philadelphia.

His encouragement for her to join in departmental committees and gatherings paid off when a professor at nearby Ursinus College came looking for someone to teach an undergraduate lab course. A faculty colleague who had worked with Snyder on a committee recommended her. When choosing an advisor, she suggests inquiring "is this person going to be invested in you and help you get to the next step whatever your goal is?"

Snyder is also keeping her expectations realistic. "I see how difficult the funding situation is and how my boss is constantly worrying about money to maintain the lab. When you apply to positions there are 10 to 20 other people applying who are just as good as you are."

THE EXPECTATION GAP

One of the most persistent trends over the last three postdoc surveys is the gap in the numbers of postdocs who expect to obtain tenure-track positions and the numbers who actually land those positions. Consistently, about 56% of current postdocs expect a tenure-track position. However, in reality, only 30% of former postdocs ended up as professors in 2008, 37% in 2010, and a mere 21% in 2012 (See chart on page 996).

The three surveys also reveal that postdocs on the job market prior to 2007 had higher success rates for obtaining tenure-track positions than those on the market in 2008 and later, indicating that such posts are becoming more scarce than ever before.

At the beginning of this year, **David Lodowski** took up his post as an assistant professor in proteomics and bioinformatics at Case Western Reserve University in Cleveland, Ohio after six years as a postdoc there. He has frank advice: "You cannot delude yourself. You have **continued**>

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Postdoc Survey

to consider the funnel effect that occurs. Make sure you are both willing and capable to accomplish the caliber of work as a postdoc [needed] to transition to a tenure-track position.”

Lodowski says his lengthier postdoc helped him publish several papers in medium- and high-impact journals. He also coordinated the writing of several large grant proposals within his department and collaborated with faculty who eventually hired him. Last, but certainly not least, Lodowski wrote and won a K99/R00 award, a grant that bridges the transition to a faculty position and, he says, “makes you a more attractive applicant.”

Postdocs should also carefully consider what the survey reveals about the differences between where postdocs are done and where the jobs are. In 2012, the overwhelming majority of postdoc fellowships, 80%, took place in academia. However, academic jobs, including both tenure-track and nontenure-track positions, make up only 42% of jobs obtained by former postdocs. On the other hand, 16% of respondents secured industry-based jobs and 20% were in nontraditional positions or self-employed.

KEEPING AN OPEN MIND

Those numbers mean postdocs should start and end their fellowships with an open mind about career paths. Former postdocs who found permanent positions stress staying flexible about location, getting creative about the two-body problem (couples who need to find jobs in the same geographic location), and casting a wide application net. Some even found themselves applying for what might be called ‘nontraditional’ tenure-track positions.

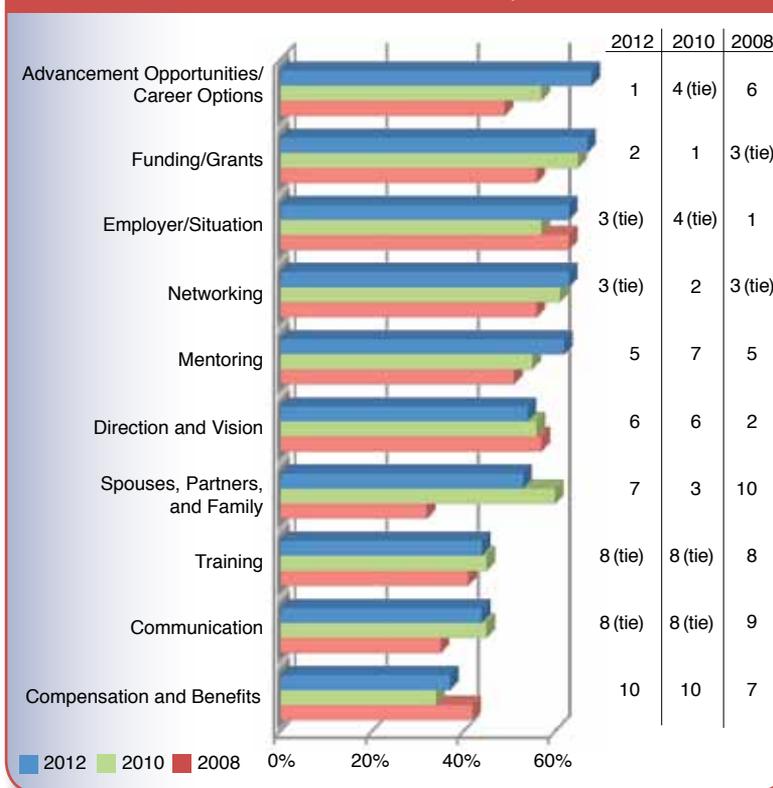
When **James Gardner** and his wife Renee defended Doctorates in environmental science in 2008, they decided to boost their two-body chances by looking anywhere in the world, both inside and outside of academia.

“I’ve always been open to other options. Whatever is rather fun and exciting is what I’m pursuing,” says Gardner. They found postdocs in Sweden at neighboring institutions. When a tenure-track job was advertised by the KTH Royal Institute of Technology in Stockholm in his field of dye-sensitized solar cells, it seemed fortuitous. But Gardner left nothing in his application to chance: he got letters of recommendation from the field experts in Sweden, he wrote his research proposal to match KTH’s stated objectives, and he sought feedback from colleagues.

“I took a really, really long time to write and tailor that application,” he says. He met with people at KTH and found out what they needed. His attention to detail paid off when he beat out two other applicants. “Find out exactly what they want and make yourself that person.”

Lane, who is also part of a two-body equation, offers similar advice: “Going on the job market starts the minute you start your postdoc. From the beginning, you should be behaving as though you already have the job you want.” For him, that meant writing funding proposals even when it wasn’t necessary and telling his mentor where he wanted to take

Postdocs Rate Factors That Contribute to a Successful Postdoc Experience



SURVEY METHODOLOGY

The survey was launched on February 14, 2012 with an e-mail invitation to approximately 38,000 postdocs and recent Ph.D.s worldwide. Of the 3,208 qualified surveys which were collected, 73% came from individuals in North America, 17% from individuals in Europe, and 10% from Asia/Pacific or the rest of the world. Significantly more current postdocs than former postdocs participated (79% vs. 21%). Most (80%) postdoc positions were held in academic institutions. Life sciences and medical sciences were the most common disciplines for postdoc studies, being cited by 72% of the respondents. Most current postdocs (93%) were 40 years of age or younger. Most former postdocs (84%) were 31 to 50 years of age.

projects next.

After completing a postdoc at University of Oxford in plant sciences, **Arantza Rico**, returned to northeastern Spain. Limiting herself geographically meant Rico had to job search outside of the box. She took a lecturer, tenure-track position in the School of Education at the University of the Basque

Country, also known as UPV/EHU. Her department sought an applicant with research experience to teach primary school teachers how to teach science. “This was a big change for me,” she admits. “When the opportunity came up, I didn’t know anything about research in education. But I can ask good questions.”

IT’S WHO YOU KNOW

Something equally crucial as keeping an open mind is keeping up a broad list of contacts. Personal connections parlayed into positions appear to be the norm in today’s market. Networking—through attending scientific meetings or meeting influential researchers—ranked third in contributing to a successful postdoc experience, with 63% of those surveyed designating it as ‘very important.’ In addition, when asked what they liked best about their postdoc experience, 37% respondents cited “interacting with other people.” This represents an increased focus on interactions when compared with prior surveys.

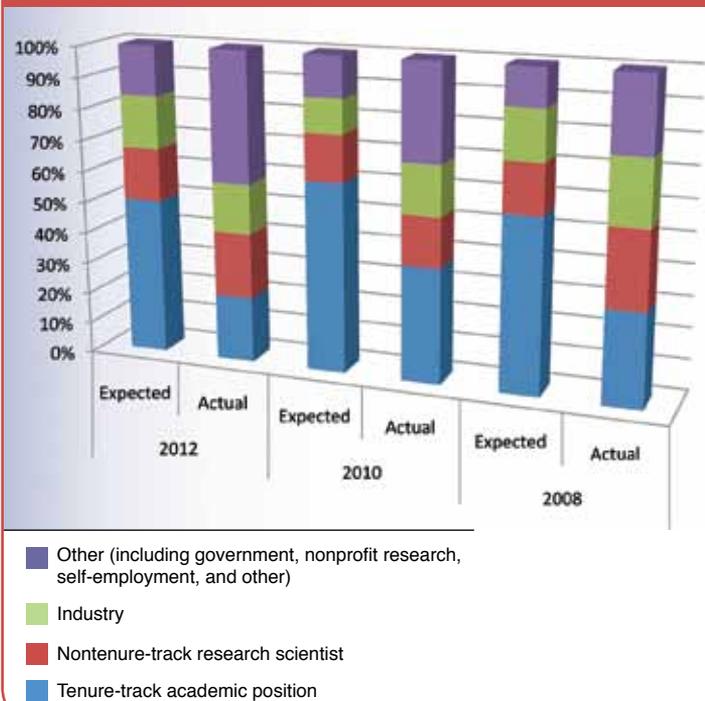
These trends reflect the uptick in the use of online professional networking in recent years. But it’s still old-fashioned face-to-face interactions that have most helped postdocs garner valuable experiences and interviews. When **Susannah Gordon-Messer** wanted to switch from research to K–12 science education, her doctoral co-supervisors at Brandeis University were supportive, but could not connect her to that world.

“I sought help from anybody who would listen to me. I networked, and I had one giant piece of help,” she says. Nobel Laureate Elizabeth Blackburn introduced Gordon-Messer (Blackburn’s cat-sitter) to a well-known name in science education, Emeritus Biochemist Bruce Alberts at the University of California, San Francisco and current editor-in-chief of *Science Magazine*. He eventually connected her to the Strategic Education Research Partnership in Boston, where she did a nontraditional postdoctoral fellowship.

Marisha Godek’s connections to her doctoral advisor [continued](#)>

Postdoc Survey

Expectation Gap



Featured Participants

AAAS Science and Technology Policy Fellowship
fellowships.aaas.org

Case Western Reserve University
www.case.edu

Drexel University College of Medicine
www.drexelmed.edu

Environmental Protection Agency
www.epa.gov

KTH Royal Institute of Technology
www.kth.se/en

National Postdoctoral Association
www.nationalpostdoc.org

Sandia National Laboratories
www.sandia.gov

Strategic Education Research Partnership
www.serp.institute.org

The Education Arcade
www.educationarcade.org

University of the Basque Country
www.ehu.es

and other colleagues in the field of bioengineering were key to her finding an industry position at a global medical device company. She attended small, elite gatherings such as Gordon Research Conferences to gain face time and build a rapport with influential scientists. Many of them consulted for the companies where Godek wanted to work.

“I made people aware that I was looking for an industrial job. When something came up, here’s the person handing them my CV,” says Godek, now a principle scientist focused on surgical devices. “To me, that’s the ideal way into a company.”

Maintaining connections to scientists in a postdoc’s desired field is key—especially when it comes to managing the unthinkable bump in the road, unemployment. “Do not stop networking, even if it seems very discouraging. Let all of your contacts know that you are looking for a job and ask them to keep an eye out,” advises **Cathee Johnson Phillips**, executive director of the National Postdoctoral Association in Washington, DC.

MANAGING THE WORST CASE SCENARIO

Johnson Phillips says unemployment is a new issue. Indeed, the number of former postdocs categorizing themselves as unemployed jumped from 2% in 2010 to 10% in 2012. While not all of those postdocs are truly unemployed—some are working in non-science jobs—the number of highly trained scientists out of work remains significant.

Former postdoc, **Klaus Becker** blames a lack of networking support from his former advisor—namely not being permitted to attend scientific conferences—for his unemployment in science. His postdoc characterizing human embryonic stem cells resulted in seven papers and a contract position at the Center for Cancer Systems Biology at Tufts University School of Medicine in 2009. When a dispute over data led to a layoff, Becker found himself drawing unemployment checks.

“You have to have a network of people who know you and know what you do. I neglected to look out for myself [as a postdoc] and now I’m paying the price,” says Becker. Ironically, while supporting himself as a church musical director and classical pianist, he’s learned the value of networking: “I must add five new contacts a week now, swapping gigs. The same is important in the sciences, you cannot work alone.” Becker is retraining, taking some courses in advanced mathematics, in hopes of setting up a data analysis consulting business.

Postdocs facing unemployment can take many tacks: volunteer with a nonprofit, serve as an adjunct professor, or freelance as a writer or consultant. They should also consider attending conferences via webcasts, doing non-science work to gain management experience, or picking up new degrees such as an MBA or teaching certificate. Johnson Phillips advises pursuing activities that will build a postdoc’s resume in the desired area, be that teaching, industry, research, or an alternative career.

MAINSTREAMING ‘ALTERNATIVE’ CAREERS

If the jump in unemployed postdocs is dismaying, there’s hope in the numbers finding positions in ‘alternative’ careers. Nontraditional positions have doubled in each of the last two surveys, from 4% in 2008 to 8% in 2010 and to 16% in 2012. It’s doubtful the doubling will continue, but this sector could easily account for 20% of post-postdoctoral jobs soon.

“Get ready to define your own job and your own job description,” says Gordon-Messer, now an education content manager at MIT’s Education Arcade project. She networked with people who had successfully left the bench behind at a conference. She also applied to every job posting she saw, discovering ‘dream’ jobs she never knew existed. “I had to learn how to be a spin doctor. I sold myself as a project manager, a mentor, a developer. You really have to keep an open mind,” about positions, locales, and pay, she says.

Lynn Adams knew she had to seek alternatives when she found a perfect-fit principle investigator position in her field—and couldn’t bring herself to apply. Instead, when she learned about the AAAS Science and Technology Policy Fellowships, she realized her background in cancer research could be put to use in another direction. She’s currently a fellow at the U.S. Environmental Protection Agency in Washington, DC, helping assess hazards posed by carcinogenic chemicals.

She wishes she’d had earlier exposure to “these other things you can do with this degree.” Like many, she relied on networking and her own digging to find other options. “Informational interviews were an amazing way for me to learn what was out there. Just get out there and listen to your heart.”

Gardner likens the postdoctoral career path to the unexpected twists and turns research can take. “Research is all about going into a situation and not necessarily having a good feeling about the outcome. You have to be open to all the options and be willing to dramatically change direction.” And while serendipity always has a part to play, he advises current postdocs to make careful preparations for that instant “when you turn the corner and realize you are in the right moment.”

Kendall Powell is a freelance science writer based in Lafayette, Colorado.

DOI: 10.1126/science.opms.r1200121