

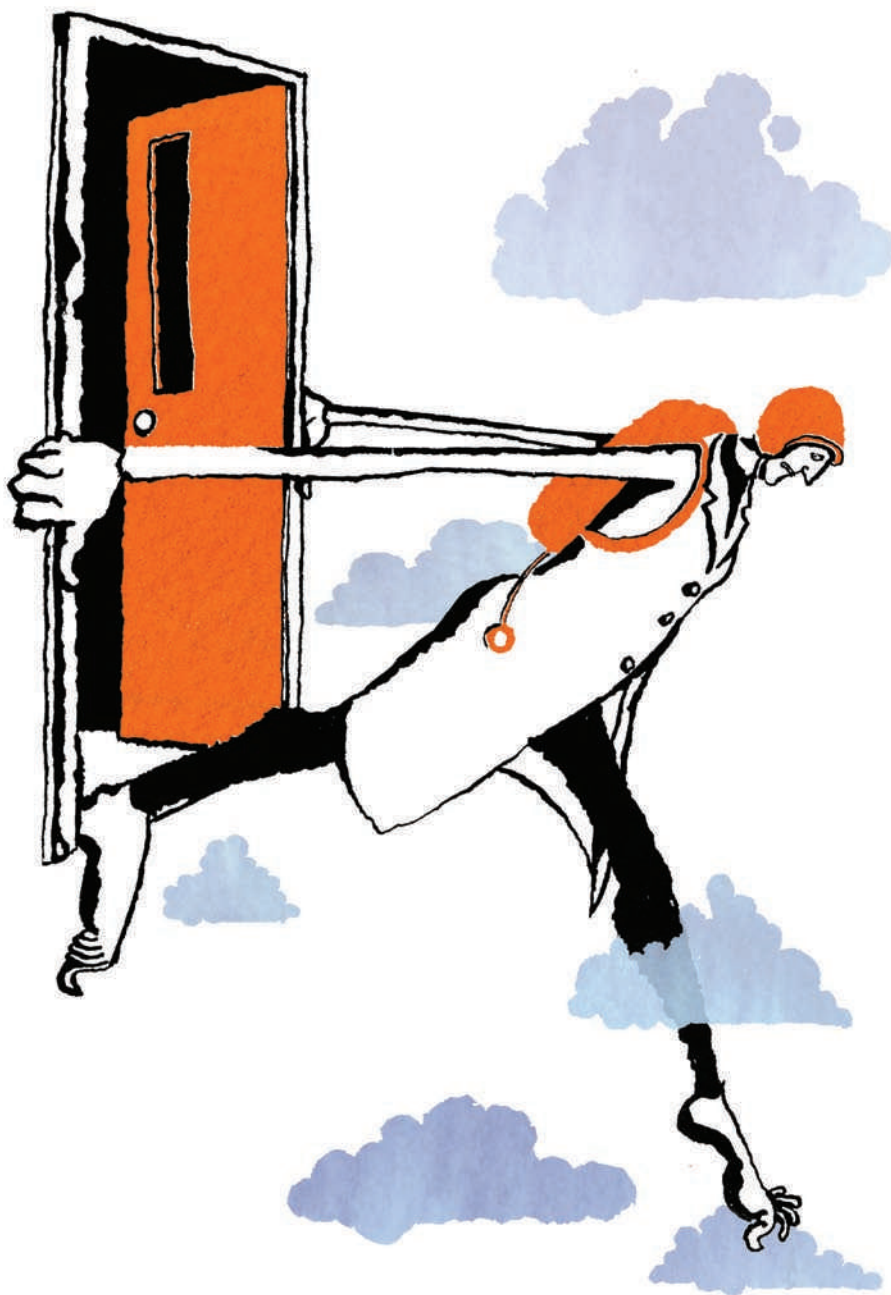
CAREERS

TURNING POINT Inventing a sequencer was a milestone in a biotechnology career **p.131**

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BELLE MELLOR



BY LAURA BONETTA

Blog author Biochembelle's post about her decision to leave a postdoc position struck a chord with many readers. She revealed an unsettling trend: a successful graduate student who had worked, published, defended her thesis and found the postdoc position of her dreams, only to discover some months later that those dreams had become a distant memory. The reality is that the 'sure-fire home-run' project isn't working out, the new department and environment aren't such good fits after all, and there are personality clashes with the principal investigator. "You are tired, angry, bitter, depressed," she wrote. "You have turned into the 'disgruntledoc' that you swore you'd never become."

Biochembelle, who asked to be referred to by the pseudonym she uses on her blog, has moved from one postdoc position in the United States to another, at a research and teaching hospital. She says she heard from many researchers in similar situations who, like her, chose to switch labs for various reasons. "For me, there were enough issues going on that I did not feel like I could do my best work in the environment I was in," says Biochembelle. "I don't think it is ever just one thing that pushes you to the point where it is time to walk away."

Regardless of the motivation, switching labs is not easy and postdocs should think carefully about it. Sometimes, problems can be resolved by a frank discussion with the principal investigator, perhaps by enlisting the help of a trusted mentor or adviser. But if walking away seems to be the best course of action, there are some steps that can help to ensure a smooth transition with few, if any, negative repercussions.

When informing their principal investigator of the move, postdocs should focus on career goals and opportunities rather than on personality issues. They should also give plenty of notice and find a way to either complete projects or leave them in such a state that they can be continued by someone else. And, of course, they should choose their next labs wisely. These measures can help postdocs to nourish their careers and stave off stagnation as they make their next moves.

MULTIPLE POSITIONS

Many life scientists complete more than one postdoc before finding a permanent position. According to the US National Science Foundation, in 2006 about 43% of all doctorates in the biological, agricultural and environmental ►

CAREER DECISIONS

Taking the plunge

Switching to a new postdoc may be risky and challenging, but it does not have to be career-threatening.

► life sciences had held one postdoc position, 16% two postdoc positions, and 3.6% three or more. And the reasons are varied. “A lot of people do more than one postdoc not because the first postdoc did not work out but because they did not find a regular career position or because they wanted to get additional training,” says Thomas Gething, director of the office of postdoctoral affairs at the University of Washington Graduate School in Seattle. However, spending too much time as a postdoc can have negative consequences, especially in countries that have forced retirement at a certain age. In Germany, for example, the retirement age is 67, so time is precious. “If you work backwards, you need to be a full professor by your mid-40s,” says Jonathon Howard, director of the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden, Germany. “We tend to hire group leaders in their early 30s so if you are spending more than 5 years total as a postdoc I would think you would run into problems.”

This time constraint means that postdocs cannot afford to linger in unproductive positions. “Having to switch postdoc labs may not be an ideal situation, but sticking it out can be even worse,” says Rania Sanford, assistant dean for postdoctoral affairs at Stanford University in California. Staying in an unworkable postdoc to demonstrate commitment could be more detrimental than moving on, she says.

Howard agrees. After completing a PhD in Australia, he spent less than a year in his first postdoc in Britain before switching to a lab where he felt he could be more productive. “I knew after about six months that I should move on,” he says. The negative consequences were minimal, he says, because it was such a short stint. “I think it would be worse to stay five years in a postdoc and not get anything out of it.”



“You want to make sure you don’t go from one bad situation to another.”

Rania Sanford

TOUGH CHOICES

But although switching labs can have career benefits, it is not always easy or practical to do. This is especially true for postdocs with visa concerns. Moving to a new university requires a lot of paperwork and there is no guarantee that a new visa will be granted in time. In extreme cases, leaving a lab might mean leaving the country. It can also run counter to a deeply ingrained cultural milieu. In China, “we have a deep belief that you have to face a problem head on and not give up,” explains Stanford University postdoc Xiaomeng Milton Yu. “If I were to say to my Chinese friends that I don’t get along with my supervisor and want to leave the lab, they may see that as giving up.” Although Yu is



Nick Brooks and Jonathon Howard suggest tackling issues with supervisors to avoid career problems.

happy in his current position, he says he knows of a few Chinese postdocs who have left their labs because they were unhappy with them. But, he says, “I think in general foreign postdocs are more likely to stick it out.”

Postdoc problems often arise because of differing expectations between the principal investigator and the postdoc related to project focus, productivity, research style and the postdoc’s career-development goals. A postdoc might lament the research time that they need to sacrifice to supervise others in the lab; the project might not fit the postdoc’s interests or career goals, or it might require skills that the postdoc lacks.

In many cases, such misunderstandings can be resolved simply by opening the lines of communication between principal investigator and postdoc. “Many times they are worried about the same thing,” says Jo Handelsman, a professor of molecular, cellular and developmental biology at Yale University in New Haven, Connecticut. Both might, for example, worry that the postdoc has not yet published any work. “The worst thing is leaving things to fester,” says Handelsman.

When direct communication isn’t possible, a postdoc might consider reaching out to other colleagues — perhaps a department chair, another principal investigator or staff in the postdoc or ombudsman office. At Imperial College London, all chemistry postdocs are offered an academic mentor, separate from their principal investigator, whom they get to know and can go to for “confidential advice of any sort,” says postdoc Nick Brooks, head of Imperial’s Chemistry Postdoc Development Team. “This system can help to mitigate potential problems between postdocs and principal investigators.”

But talking has its limits when stark personality clashes arise. “This is a much trickier problem to fix than a conflict in goals,” says Dorothy Shippen, a biochemist at Texas A&M University in College Station. In such cases, says Shippen, postdocs should think strategically about the decision to leave. First, she says, they should consider whether they can stay long enough to get something accomplished, such as a publication



HOWARD: MPI-CBG

or a good letter of recommendation. But if they are losing respect for their principal investigators, losing their love of science, or expecting to accomplish little by staying, they might need to look for new positions, she says.

A lack of funding can be an even more formidable obstacle to a successful postdoc experience than disagreements with the principal investigator. In some places, postdocs can be reliant on the principal investigator for grant money. According to the National Science Foundation, in the autumn of 2006, 56% of science and engineering postdocs at US universities were funded through federal research grants, up from 52% in 1993. Grant applications being denied can mean that a principal investigator cannot afford to keep all of his or her postdocs. And if a lab has an uncertain financial future, and the principal investigator is waiting for the results of various grant applications, a postdoc might find it prudent to seek a position that promises more grants. “That is happening a lot right now,” says Lynn Zechiedrich, a principal investigator and microbiologist at Baylor College of Medicine in Houston, Texas. But although a lack of funding can present an opportunity to let go of unproductive staff, principal investigators are often prepared to go the extra mile for those who are worth it. Zechiedrich, for instance, was ready to forgo her own pay rise to pay a postdoc’s salary while waiting for a grant to come through; another postdoc took a one-month furlough until the funding was available. “These were smart, hard-working postdocs, and now their results have helped us get more grants funded, so sometimes you have to get creative to maintain a postdoc position,” says Zechiedrich.

EXIT PLAN

Whatever the reason, the decision to switch labs should not be a purely emotional reaction, says Sibby Anderson-Thompkins, director of the office of postdoctoral affairs at the University of North Carolina at Chapel Hill. “Make a list of pros and cons based on your expectations and career goals and on the overall

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environment and relationships,” she says. “Then ask yourself if moving to another lab will give you more opportunities and more viable projects that result in papers or publications.”

As they weigh up their options, postdocs should consider talking discreetly to other principal investigators about joining their labs. It’s also a good idea to learn as much as possible about the principal investigator and lab environment from current and past lab members. “You want to make sure you don’t go from one bad situation to another,” says Sanford. She advises that postdocs find out exactly what would be expected of them. They should discuss the skills and training they have, and what they need to develop in the next year. “It is also important to understand what the lab direction is, what the principal investigator wants to do, and what the grants situation is,” she says, “so that there are no surprises.”

When approaching new labs, a postdoc should avoid disparaging the principal investigator of the lab he or she is leaving. “You can say there were challenges, but focus on the lessons learned and skills gained,” says Anderson-Thompkins. “It is okay to say that you wanted to pursue other opportunities, but you don’t have to say how bad the lab or the principal investigator was.”

If, after careful consideration, a postdoc decides to leave his or her lab, the postdoc should inform the current principal investigator of the decision promptly, and make sure the conversation focuses on professional rather than personal issues. Discussions should

also focus on finishing existing projects or handing them over to other members of the lab. “Give them plenty of lead time and wrap up what is going on,” says Anderson-Thompkins. “That will help you leave on the best possible terms.” It could also mean that the postdoc is still able to garner a supportive letter of recommendation from the principal investigator in the future. And even if a glowing recommendation is out of the question, chances are that the ‘old’ principal investigator will be a collaborator or grant reviewer or a close friend to someone on a hiring committee. “You want to walk out the door with a good reputation,” says Anderson-Thompkins. “Don’t do anything that will hurt your career.” ■

Laura Bonetta is a freelance writer based in Garrett Park, Maryland.

TURNING POINT

Jonathan Rothberg

Last December, Jonathan Rothberg, founder and chief executive of Ion Torrent, a biotechnology company based in Guilford, Connecticut, released the Personal Genome Machine. The US\$50,000 desktop DNA sequencer will, he says, greatly improve access to genome sequencing.

What decision was pivotal in your early career?

I was interested in chemistry and engineering in high school, and did a chemical engineering undergraduate degree at Carnegie Mellon University in Pittsburgh, Pennsylvania. But my interests in biology and cognitive psychology were growing, and I had to decide which to follow for a PhD. I knew I wanted a set of tools that would make me marketable. The explosion in biology from genome sequencing set me up to combine my interests in computers, biology and engineering, and have an impact in a rapidly emerging field. So I got a PhD in biology from Yale University in New Haven, Connecticut.

What is your advice to young scientists?

Master a number of fields. There will always be someone better than you at physics, maths or chemistry, but if you focus on mastering a few things you love, nobody will be better at that intersection.

Who had the biggest influence on your career?

Steve Jobs [co-founder of Apple]. I loved the way he was changing the world in 1984. I saw him give a presentation in which he said the most profound thing I had heard — that the reason he had become influential was that he ‘just did it’. I know it sounds like a Nike commercial, but it hit home that most people simply think about things, and don’t do them.

Are you a scientist, inventor or entrepreneur?

I would say scientist and inventor. I am not an academic so I don’t publish very often, but my publications have been on the covers of *Nature* and *Science*. I’m an entrepreneur only because assembling smart people and funding is essential to bringing inventions to market. But scientific needs inspire my inventions. For example, my newborn son had a health scare in 1999. The doctors had no way to tell whether he had an inherited disease, and I realized that an invention able to sequence an individual genome quickly would be useful. That idea sparked my second company, 454 Life Sciences. But my inventions also give me access to interesting, ground-breaking science. I cold-called Svante Pääbo, a geneticist at the Max Planck Institute for Evolutionary Anthropology in



Leipzig, Germany, and told him that I had a machine to help sequence the Neanderthal genome — which led to a collaboration.

Is the Personal Genome Machine a turning point just for your career or for science in general?

I hope it is pivotal for science in general. We made a semiconductor device that sees chemistry in real time. A chip measures electrical charges during DNA replication, which lets it decode the sequence. It’s a connection between chemistry and the digital world. This means that the sequencing machine will one day be as ubiquitous and cheap as the mobile phone.

What skills do you think will be most in demand in the coming decade?

Quantitative skills — the ability to do calculations and estimations. Biology is great, but you need analytical skills. It no longer helps simply to describe something. We need more people at the intersections of fields. For example, bioinformaticians don’t have to have a PhD in molecular biology, but they need enough of an understanding to develop an intuition about how systems work.

How should would-be inventors go about bringing a technology to market?

They should do the hardest experiment, the one that poses the biggest obstacle to success, first — otherwise they could find themselves ten years later having made little progress. Many people lose themselves by not asking tough enough questions about their own inventions. If you can’t clear the biggest hurdle, you are wasting everyone’s time. ■

INTERVIEW BY VIRGINIA GEWIN



“The worst thing is leaving things to fester.”

Jo Handelsman