COALITION BUILDER How a biophysicist brought hope to the Middle East **p.275**

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COLUMN

Crowd-sourced career wisdom

Bela Z. Schmidt interviewed 50 lab leaders to understand why he failed to become one.

Getting a tenure-track academic research post is like winning a raffle — it happens for some, but the chance of success for any one individual is low, because the number of ticket holders far exceeds the number of prizes. It is fair to tell you here and now that I did not make it to the tenure track.

But I was curious about why I didn't, and I learnt from interviewing more than 50 principal investigators (PIs) that my mindset might well have presented obstacles. I'm not claiming to know the formula for how to get tenured (if I had that, I would have used it for myself). Instead, I would like to offer the advice I've gathered.

At the beginning of my career, I did not think that I'd encounter any obstacles securing tenure. I had a great mentor for my PhD programme in structural biochemistry, which I completed in 1995, and another excellent one for my first postdoctoral position. They gave me achievable goals, taught me the joy of discovery and lifted me up when I lost hope.

Most of all, they looked out for me — they cared about my career, introduced me to other leaders in the field and helped me to get ahead. But I became complacent: I started to believe that if I did a good job by my supervisor and solved the research questions placed in front of me, my career would take care of itself.

I was wrong, of course. I went from one postdoc position to the next, four in all, working on research questions that interested me and that were relevant to human disease. I worked hard — I had a great time doing experiments and producing data, and I felt relevant and useful to society. But time goes by quickly. I became "too expensive" to stay in academia as a postdoc. A PI can hire a person half my age for less money if I don't come with my own fellowship, and I had been a postdoc for so long (23 years, all told) that I was no longer eligible for many fellowships.

I did try to get on the tenure track. At the age of 41, after working in several postdoc positions over the course of 12 years, I started applying for tenure-track and other permanent posts. At this point, I had 19 peer-reviewed ▶

publications, including 5 as first author; 2 book chapters; and 10 published meeting abstracts. Perhaps it was not a hugely impressive record, but I was hoping it would be enough.

In the next 3 years, I sent out more than 100 applications to academic institutions, the private sector and government agencies (predominantly in the United States, where I was living at the time).

I applied for 57 academic tenure-track positions at first-tier research universities, second-tier teaching colleges and two-year 'community' colleges (which do not confer four-year degrees). Four institutions offered me a phone or in-person interview. I think I could have taken a position in Hungary, but I was not ready to move to another continent, and the university wanted me to start immediately.

Between 2007 and 2009, I also applied for 22 positions in the biotechnology–pharmaceutical sector and 25 positions at government organizations, including various institutes and agencies connected with the US National Institutes of Health, the US Department of Defense and the US National Laboratories. I received no offers, not even an interview.

Then I moved back to Europe to start a new family, and I took another postdoc position. Finally, I lost interest in becoming a PI. I had a brief but pleasant engagement at a biotechnology company (brief, because it was in the wrong country for me), and then became an innovation manager at a university. This position turned out to be a poor fit for me, so I left after two and a half years. These days, I am spending my time interviewing more PIs, taking data-science courses and writing job applications. I hope to publish the results of my interviews as a book on mentoring.

HARD WORK

Over the years, I have attended many seminars and workshops on career development. At such events, the takeaway is usually that you need to work hard and network to get ahead. I was doing both. After a while, I gave up on my dream of becoming a PI, but I didn't understand why others had succeeded at something I did not. I felt I was as smart as they were and worked as hard as they did. I could not ascribe my failure to get on the tenure track to just bad luck. I was a researcher, after all, and I wanted to understand my failings.

Around this time, I learnt a few things about cognitive psychology — for one, that emulating my successful colleagues' ways of thinking might be a helpful step towards achieving the overall goals that they had managed to reach. So, I decided to interview tenured or tenure-track PIs who were leading their own laboratories to find out more about their thought processes.

Many of the 50 PIs I interviewed mentioned being lucky — being in the right place at the right time, knowing the right people. Of course, "be lucky" is not a very useful piece of advice. But some of their advice might help you to recognize and take advantage of your luck. I chose the tips that stuck in my mind because I knew I had not followed them. I hope that they might be useful for you, regardless of the sector you work in. Use them like a catalogue of chess moves: none will guarantee that you win the game, but they might help you to avoid some pitfalls along the way.

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Accept your data. According to one PI, success depends more on the people doing a project than on the topic of study; some people make their project work no matter what the topic is. Others block their own way to success because they require too much evidence.

I, for one, have always been excessively critical of my own data. Although I am a meticulous experimenter, whenever my results seemed to confirm my hypothesis, I was afraid to accept them because I knew I was biased (it's funny, I know). I was spending too much time looking for alternative explanations instead of accepting that I was on the right track and moving on to the next step. We have all heard about the reproducibility crisis — and I am not advocating the reckless publication of unverified data, or recommending being so careful that you end up publishing nothing — but there is a balance between being reckless and shooting yourself in the foot.

Own your project. Another PI told me that the best researchers take ownership of their projects. Or, as he put it, the best researchers do not ask for permission to do something; they just tell their PI what they have done. Another PI echoed this thought when she told me that postdocs should work on important questions, instead of sticking to the questions put in front of them.

I have been guilty of violating this advice, too — I stumbled once on a huge effect of a group of enzymes on the favourite protein of our lab. I even managed to persuade myself that the effect was not an artefact. My supervisor acknowledged that the size of the effect was remarkable, but pursuing a new direction did not fit in with the lab's plans — and I let it go. I worked on continuing projects and dropped this exciting new avenue. Had I insisted, I think he would have come around — few PIs will say no to a promising publication.

View yourself in your desired role. When I asked another interviewee how long he had been a PI, he said, "I have always been a PI — in somebody else's lab." Others have voiced similar sentiments; they always treated their supervisors as future colleagues, not as their superiors, establishing a relationship of two equal scientists working towards common goals.

Ward off despair. When your results seem to contradict your PI's hypothesis, you might fall into despair (I did), but this is not good for productivity. It might help to know what one PI told me — "students should know that PIs are wrong 90% of the time". You must generate your own motivation in science and work out how to pick yourself up, because nobody else will do it for you. Working on questions that are important to you and taking ownership of your project will help you to keep your motivation level high.

Maximize your time. Several PIs emphasized the importance of keeping your eye on timelines. "In science," as one of them put it, "you have to be productive in a short time." I know I have messed this up, too. When I started my last project, the two years of my brand-new fellowship seemed to stretch out ahead of me like the ocean. But they went by much more quickly than I thought they would.

You should always keep your eye on the calendar and make sure that you will have publishable results when your fellowship is due to end. Funding is tight worldwide for both

research grants and postdoctoral fellowships, and it is far from certain that a lab will keep postdocs on board to give them time to complete and publish their projects. (I still have the data from that last project and hope to publish them eventually.)

Outline your goals. In line with this, other PIs told me that they always had a plan for the next step in their career. When they started their PhDs, they were already thinking about where they would do their postdocs. When they started their postdocs, they already knew where they would apply for assistant professorships. Of course, their plans changed over the years — but they always had a plan to work towards.

Trust your intuition. Most of the PIs I interviewed told me that they had made quick decisions with their 'gut'. I had been doing quite the opposite. I always felt that being a scientist meant making well-informed decisions and, if you couldn't come to a decision, collecting more information. But most PIs acknowledged that they made decisions — from everyday minor choices to more major decisions involving the direction of a study — knowing that they would find out only later if they had made the right choices. Instead of working on one or two well-thought-out projects, some PIs start ten half-baked ones. Even the most carefully planned projects can fail, and the chances are that you will learn more from an experiment that you conducted in one day than you would from three days of only thinking about it.

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Finish. There is lot of truth to the maxim "finished is better than perfect". If you do not publish something that you have worked on, you have wasted your time and your supervisor's time and money (guilty there, too). It is as if you had never done the work, as far as everybody else is concerned. If you can't prove your hypothesis because there is not enough time to do all the required experiments, it is better to prove and publish only part of it, rather than trying to go for the complete story and ending up with an unfinished, unsubmitted manuscript (I have a couple of those).

These few pieces of advice stuck with me — I hope they will be useful to you. ■

Bela Z. Schmidt *is a former innovation manager at KU Leuven in Belgium, and is aiming for a fellowship to complete his book or for opportunities in data science or biotechnology.*

TURNING POINT
Coalition builder

Zehra Sayers, former president of Sabanci University in Istanbul, Turkey, where she is a structural biologist, spent 15 years chairing a scientific advisory committee on the Synchrotron-Light for Experimental Science and Applications in the Middle East (SESAME). The laboratory, the region's first of its kind, opened in Allan, Jordan, in May 2017. Last month, Sayers and four colleagues received the American Association for the Advancement of Science's award for science diplomacy for their work on the project.

SABANCI UNIV.

What studies are under way at SESAME?
Some scientists from the Cyprus Institute in Nicosia have been analysing human remains such as teeth and bones. Other scientists are measuring the quality of soil and air in the region, looking at toxic heavy metals such as lead and arsenic.

How did you learn about SESAME?
I remember reading in 1999 about efforts to build a light source in the area. I knew that the DESY synchrotron facility in Hamburg, Germany, was having power problems, and here, there are always power failures. I also heard they were going to dismantle and rebuild a secondhand machine. I thought, "Nobody will use it." But I was one of the few people in Turkey who knew the meaning of the word synchrotron and had worked at one.

What made you get involved?
Herman Winick, a high-energy physicist at Stanford University in California, and Ercan Alp, a Turkish American synchrotron researcher at Argonne National Laboratory in Illinois, were sending me e-mails and pleaded with my German collaborator, "Tell her to talk to us just once!" Both had co-chaired the first SESAME scientific advisory committee. They happened to come to Hamburg while I was there, and I agreed to meet them. They answered all my doubts.

Why did the region need its own light source?
A synchrotron is a special environment, where people from different disciplines come together. You might have an experimental station for molecular biology, with archaeologists working next to you. You start talking to them, and that opens up a new line of communication among scientists. This is important in the Middle East. We noticed in our SESAME user meetings, which have been held since 2000, that people from different countries, cultural backgrounds, beliefs and political views were talking to each other.

Why did SESAME have to be newly built?
If we hadn't had the highest scientific goals, people would not have respected this laboratory or the work that comes out of it.

Did you ever fear the project would collapse?
There were big roadblocks to getting the construction money for the beamlines and experimental stations. Eliezer Rabinovici at the Hebrew University in Jerusalem, and some Israeli colleagues, had the idea of a one-time voluntary contribution from the project's member countries, apart from their yearly payments. This meant that at least five countries would pay US$1 million each for five years. Jordan, Turkey, Israel, Iran and Egypt all agreed. But then we had the Arab Spring in 2011, and the agreement didn't get signed in Egypt. Then Iran couldn't pay, because of sanctions. But the other three countries stuck to the deal.

Are people using SESAME as you imagined?
We started having user meetings early on, and word spreads. A pharmacology professor in Jordan heard about SESAME, and even though she didn't know anything about synchrotrons, she sought out training and is now directing her students towards it. We've trained more than 100 people from the region and sent them to synchrotrons around the world, where they've done great science. Now a new generation is taking over at SESAME.

Have you advice for early-career scientists in Turkey?
Keep calm, keep trying and keep your work standards high. If you have a goal in mind, you don't always get there on a straight path. Ask yourself, would you run a marathon if no one was watching? ■

INTERVIEW BY KENDALL POWELL

This interview has been edited for length and clarity.