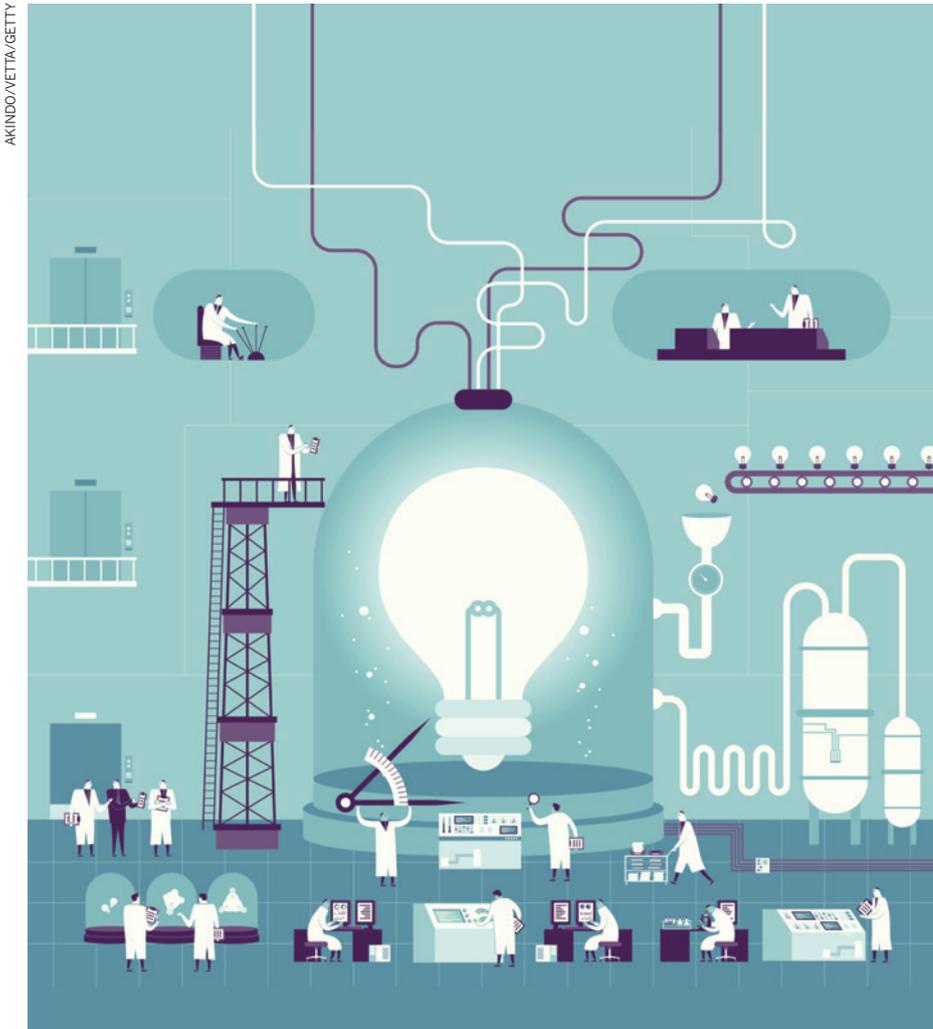


CAREERS

TURNING POINT Colombian postdoc leverages fellowship to fight parasites **p.131**

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AT THE BENCH

The right mix

Staffing a lab is fraught with complexity, so new team leaders can learn a lot from the experience of others.

BY CHRIS WOOLSTON

Evolutionary biologist Erin Kelleher has just started her first lab: she has a technician and would like to bring in a couple of PhD students soon. Chemical and biological engineer Robert Langer oversees an empire of nearly 100 postdocs, graduate students and

technicians. The two are at markedly different career stages — one could hold a lab meeting at a restaurant booth, the other would need an auditorium — but they have something in common. They want each staff member to be just right for their lab — a good worker, a good colleague and, most of all, a good fit.

Of all of the tasks facing lab leaders, staffing

is one of the most important — and the most challenging. Most researchers encounter plenty of cautionary examples as they work their way up through the academic ranks: unfocused graduate students, overwhelmed postdoctoral researchers and surly or sloppy technicians.

Picking the right people is a skill that can take an entire career to perfect. Langer, from the Massachusetts Institute of Technology in Cambridge, has been recruiting staff for more than 30 years, but says he still doesn't think his "interview questions are as good as they could be".

Few principal investigators (PIs) receive instruction in how to staff a lab, and that can open the door for plenty of early-career missteps, says Duncan Odom, a human genetics researcher at the University of Cambridge, UK. "We've done a poor job of training postdocs to become group leaders," he says. "In fact, we haven't really done that job at all. Most postdocs are in large labs that have been running for a long time. They don't have any understanding about what it's like to set up a lab."

RIGHT ON COURSE

Odom suggests that new PIs take management courses to help them with the transition from researcher to leader. A common mistake, he says, is to quickly add as many workers as a budget will allow. It might be possible to pay their salaries, but a new lab is unlikely to generate enough data, projects and papers to keep everyone happy, engaged and productive.

That leads to turf wars over projects, arguments about authorship and, in some cases, stalled careers. "I've seen labs implode from getting too big too fast," he says. "I deliberately grew my lab slowly. Feeding too many hungry mouths with limited resources is a recipe for trouble." He currently has nine members — two postdocs, two graduate students and five staff scientists, recruiting roughly one each year that his lab has been running. Langer agrees that the pace is important: his lab has roughly tripled in size over the past two decades, but he says he has never suffered from growing pains and has no shortage of projects to go around.

Without careful management, even established labs can become too large for their own good, Odom says. "Most labs with 20 or more people become incubators for Darwinian-type battles, whether they want to or not."

And getting the right people is not an easy job, stresses Frank Chan, who ►

► studies genetics and evolution at the Friedrich Miescher Laboratory, a research institute of the Max Planck Society in Tübingen, Germany. He generally has six or seven lab members at a time — and a lot of other people who would like to be there. With so much interest, he can afford to be discerning. “Of 100 applications, five to ten will be really good,” he says. “It’s a tough market for both sides. It’s hard to find a match.”

Chan attracts applicants from all over the world, which means that in-person interviews are rarely an option. Still, he always talks to potential lab members either on the phone or, even better, over Skype. He wants people who have a solid, career-based reason for applying, not someone who is simply looking for a place to land. “The motivation has to make sense,” he says. He does not expect total mastery of evolutionary theory, but he does require a sense of purpose. “They have to be clear about what they want to gain by working with me,” he says. “There has to be some sort of trajectory.”

The interview is obviously a crucial part of the hiring process (see ‘Tips for success’), but not all PIs feel like they are ready for the task. “Among new group leaders, the interview is always a conversation topic,” Chan says. “People want to know: what are the magic questions to ask?” Chan says that he simply sticks with the basics. He asks candidates about their thesis, and he asks them to clarify how much of it was done on their initiative and how much was given to them. “I’m looking for people who can learn things very quickly,” he says.

He also looks for basic congeniality — the ability to collaborate without too much friction, to engage without too much discomfort — a quality that is hard to detect on a CV. “People



Robert Langer has built up his lab gradually.

RECRUITMENT

Tips for success

As part of a laboratory leadership course that started in 2002, the Howard Hughes Medical Institute (HHMI) in Chevy Chase, Maryland, periodically surveys its fellows and alumni to find out the key things they wished they had known before starting their first lab. “The number-one thing that comes up is choosing the right people from the get-go,” says Maryrose Franko, a science-programme manager at the HHMI’s Janelia Research Campus in Ashburn, Virginia. “Who do you get, and how do you get them? It’s important, because that person can set the tone for your entire lab.”

Spurred by the surveys, the HHMI published a book called *Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty*. The book, available for free online (go.nature.com/xel46p), includes a chapter called ‘Staffing Your Laboratory’, which covers a wide range of topics from recruitment strategies to sample questions for telephone interviews.

The lessons apply to researchers in all disciplines of science, says Franko, one of the book’s project developers. Here is some advice from the publication.

Attracting applicants Some of the best staff members are found through word of mouth, so let colleagues know that you are looking for good people. Include a message on your

website that you would welcome inquiries from prospective students and postdocs. You can also place an advertisement in a journal or on the website of your scientific society.

Make sure that applicants understand your vision for the lab — how it will function, what you would expect from them, and why you are excited about the science. If you see yourself as a mentor, make that one of your selling points.

The interview Keep the interview structured to ensure that you are asking basically the same questions of every candidate. Try to ask a variety of questions — some direct, some open-ended — to gauge their temperament, ambition and overall approach to science. Some sample questions include:

- What are your most significant accomplishments?
- What do you want to be doing in five years?
- How do you stay current in this field?
- Describe a project in which you had to work as part of a team. How did that turn out?
- What’s the biggest challenge in your current position? How are you managing it?
- Can you name a scientist you like and respect? What do you like about that person? **C.W.**

in a lab spend 80% of their time working with each other, not with the PI,” he says.

Before a PI arranges his or her first interview, it is important to check with the human-resources department at their institution on interview policies and regulations, says Francisco Andrade, a physiologist at the University of Kentucky College of Medicine in Lexington who participated in an online seminar offered earlier this year by the American Association for the Advancement of Science on how to build up a lab. “Every university has its own way of doing things,” he says.

It is not just a matter of getting the right forms. Universities may have strict rules about what a PI can or cannot ask a potential employee. And in some countries, some questions — about age, marital status or family plans, for example — are illegal.

AIM FOR DIVERSITY

A study published in April suggests that such personal queries might be pointless, anyway (F. M. Felisberti and R. Sear *PLoS ONE* 9, e93890; 2014). It examined the factors that predict the productivity of UK postdocs

— and found that those with children published just as often as those without. It also found that whereas postdocs from the United Kingdom were somewhat more productive at the start of their positions, researchers from other countries quickly closed the gap. “Diversity in general is a good thing in the lab,” says study co-author Rebecca Sear, a behavioural ecologist at the London School of Hygiene and Tropical Medicine. “Some people have a tendency to hire people who are like themselves. I see that tendency in myself.” She says that she sometimes has to remind herself to take a chance on workers who might have a slightly different approach from her own (see www.nature.com/diversity).

Chan is proud of the global scope of his team. His current roster includes a postdoc from Croatia, a postdoc from Australia, a PhD student from Russia, a PhD student and a research assistant from the United States, and an undergraduate research assistant and an animal caretaker from Germany. Although Chan’s lab is based in Germany, they all communicate in English; he does not particularly care whether prospective lab members can

speaking German, but they do have to be reasonably fluent in English.

But assessing applicants' credentials can be dicey if their accomplishments took place at far-off institutions with different grading systems. "Our department is getting a lot of applications from different countries," says Kelleher, who works at the University of Houston in Texas. "Some are like a black box. You read it and you have no idea if they're a good candidate or not." In such cases, contact with candidates as well as referees takes on paramount importance.

MICHAEL GRIGG

CHECK EVERYTHING

Chan says that, in his experience, many applications fail to stand up to scrutiny. "A lot of CVs claim to have every skill on Earth," he says. So more than ever, it pays to be diligent and contact supervisors as well as look at the actual publication history. "In a competitive market, a lot of people will colour beyond the lines," he says. "But if you claim to have done something that you didn't really do, that's a deal breaker."

"A lot of CVs claim to have every skill on Earth. People will colour beyond the lines."

Andrade says that every detail on an application is worth double-checking. "We see incorrect information at all levels," he says. "At best, it just shows a lack of care. At worst, it's something else." And even letters of recommendation can mislead, adds Odom, who says that he puts little stock in them and calls the referees instead. "You have to speak to a human being. Even if they were truthful in their letter of reference, they may have been guarded."

He says that grades, testing scores and endorsements from past supervisors are all important, but above all, he is looking for people with a plan, especially potential postdocs. "Grad students are there to stabilize their lives and figure out what they want," he says. "If they want to be an investment banker, cool. But if postdocs don't know what they're going to do, you shouldn't hire them. Some of them may not be planning to go into the field, but they have to have a clarity of heart."

Of course, PIs must have plans of their own. Kelleher, for her part, wants to keep her lab small — hire a couple of PhD students soon, and maybe a postdoc down the road. As a postdoc, she was in a lab with just a few other people, and enjoyed that intimacy. "That will probably be my preference as a PI," she says. Her vision for her future will really start to take shape when the next person joins the lab — whoever it is. ■

Chris Woolston is a freelance writer in Billings, Montana.

TURNING POINT

Juan David Ramírez

Juan David Ramírez, a postdoc in molecular parasitology at the US National Institutes of Health (NIH) in Bethesda, Maryland, was named a Pew Latin American Fellow in June. After the two-year fellowship, Ramírez plans to return to his native Colombia to help fight his country's endemic parasites.



What sparked your interest in parasites?

I come from a country with many endemic tropical diseases. Many people in my family had malaria. One had Chagas' disease. I became really interested in infectious diseases, particularly those caused by parasites. Luckily my teachers in high school encouraged my love of microbiology, and I decided to study it as an undergraduate at the University of the Andes in Bogotá.

What made you pursue a graduate degree?

During my bachelor's, I developed a molecular test for diagnosis of Chagas' disease. When I finished that, I did a master's examining the link between genetic diversity and clinical outcomes. Only two drugs are available to treat Chagas' disease. My adviser, collaborators and I found that most of the parasites (*Trypanosoma cruzi*) were resistant to one of the two, and developed a test to determine which drug should be used in each patient. Our results helped to create a guide for treatment of the disease in Colombia. I want to do similar work on other parasites.

Describe your graduate experience.

My adviser was supportive and let me do anything I wanted. I was an author on 18 studies on the molecular epidemiology of parasitic diseases in journals such as *PLoS Neglected Tropical Diseases* and *Acta Tropica*. We were in a good situation — we had close contact with patients and clinical metrics of the disease. I also had the opportunity to spend a year at the London School of Hygiene and Tropical Medicine. I brought parasite samples from humans, reservoirs and insect vectors in Colombia and explored the genetic diversity and reproductive mechanism of *Trypanosoma*.

Eighteen publications seems like a lot

It was. I won the national science award as a result. I owe a lot to my supportive adviser, but I was quite focused on publications, serving as primary author on 12 studies while also providing samples or analysing data for collaborations. As long as I had interesting results, I pushed my adviser to read and correct the manuscript I wrote so that we could submit for publication.

How did you secure a postdoc at the NIH?

While I was doing my PhD, the Latin American Congress of Parasitology convened in Bogotá. There, I met my current adviser, Michael Grigg. He had seen my work on *Trypanosoma* markers and liked it, and was doing similar work in *Toxoplasma*. I asked about the possibility of coming to the NIH to do a postdoc, and e-mailed him when I finished my PhD. In April last year, I started a postdoc on *Leishmania* and *Giardia*.

Describe your postdoc.

It is awesome. In Bogotá, where I did my masters and PhD, we had restrictions on resources, equipment and technology. Here, the sky is the limit. I do not have to worry about not having access to a sequencer.

What does the Pew award mean to you?

I am the second Colombian in history to get the award and that is important to me. Research in South America is focused largely in Brazil, Chile and Argentina. Other countries have talented researchers but do not get many opportunities. The award is also important because it provides funds if I want to return to Colombia to start my own lab after two years here.

Will you return to Colombia?

Yes. I was productive in Colombia as a graduate student and got research funded by the European Commission. I think I can still do that. I want to help Colombian science to be better appreciated and to do good work that will help to persuade the government to invest more in science. There are many other parasites I want to explore. I want to do work that has an impact on the health of my country. ■

INTERVIEW BY VIRGINIA GEWIN