

CAREERS

OCCUPIED The ‘carp lady’ at Malheur National Wildlife Refuge debriefs **p.533**

JOB SKILLS How to answer the classic interview questions go.nature.com/h4nabz

NATUREJOBS For the latest career listings and advice www.naturejobs.com

MATT WYCZALKOWSKI



Members of the Balsa (Biotechnology and Life Sciences Advising) consulting group in St Louis, Missouri. The group mostly consists of PhD students.

NON-PROFIT WORK

Take my advice

Part-time work at a consulting firm can provide management skills and connections for graduate students and postdocs who hope to move beyond academia — or not.

BY CHRIS WOOLSTON

Not many graduate students who spend 50–60 hours in the laboratory each week are eager to take on an outside job — especially one that pays nothing. But Michael Lang, a PhD student in cell and developmental biology at the University of Michigan in Ann Arbor, has added two part-time, unpaid positions to his workload. He’s the president of miLEAD Consulting, an independent, non-profit company based in Ann Arbor that connects the university’s graduate students and postdoctoral researchers with local biotechnology and health-care companies that need help with product development, market analysis or branding. And he

works directly for miLEAD to provide his own insights and analyses to companies.

Lang thinks that the long hours are worth it. The consulting work helps him to build leadership and management skills that would come in handy if he were to reach his ideal goal of running an academic lab. And if that doesn’t work out, he’ll have a fall-back position: “I’ve always wanted to be a scientist, but a US\$130,000 job at a top consulting firm sounds pretty good too.”

Lang’s group is one of several consulting organizations that have sprung up on US campuses in the past few years. They supply teams of postdocs and graduate students who can take a scientific approach to common questions faced by local biotechnology and pharmaceutical

start-ups — what is the demand for a new product, what is the competition, what can be done to make a product better and what is the best way to profit from a good idea? Consultants do not always know how companies use their input or whether their advice makes a difference, but the value of the experience is undeniable. “We want to give people another bullet point on their CV,” Lang says. “It can get them over the hurdle of getting a job.”

A few of these consulting groups, including miLEAD, are independent, non-profit companies with no official ties to their home institute. But most are affiliated with their host institutions, including Harvard University in Cambridge, Massachusetts, Stanford University in California and the University ▶

► of Pennsylvania in Philadelphia. Such campus-based organizations haven't caught on outside the United States, but at least one global company, 180 Degrees Consulting, recruits postdocs and graduate students for consulting projects and gives scientific trainees in the United Kingdom and elsewhere a chance to add to their skill set.

Whatever group they work for, trainees in consulting get valuable experience in analysis, decision making and team-based problem solving that can give them a boost in the job market. It is also a break from the normal routine. "Fast-paced teamwork can be a lot of fun," says Huadi Zhang, a medical-science PhD student and co-president of Harvard Graduate Consulting Club. "I didn't have that kind of experience in the laboratory." But on-the-side consulting is also a serious commitment and time drain — and there are several hoops to be jumped through if students want to start a group from scratch (see 'How to start a consultancy'). The field is not for everyone, but an increasing number of trainees have found that it is possible to consult their way into a career.

CV BOOSTER

For Lang, consulting has turned into a second life outside the lab. He estimates that he spends 10–15 hours a week fulfilling his duties as president of miLEAD: overseeing the search for clients, recruiting consultants and, importantly, training them in the basics of business. Working on a project — which might involve meeting with a company's board, talking to doctors or digging through research articles — generally takes him another 10–15 hours each week. These are huge time commitments for a graduate student with experiments to run and papers to write. But it's worth it, he says, for the boost it gives to his CV and research. "The additional work has helped me streamline my science," he says. "There's not a lot of downtime in the lab."

Lang's recent projects include an eight-week gig for a Michigan pharmaceutical company that is developing a therapeutic drug for newborns. (Because of non-disclosure agreements, he cannot name the company.) He and his team studied the market for the drug, scoped out the competition and gauged its potential applications in neonatal medicine. Previously, he was on a team that spent four weeks assessing an app-based learning tool for college students that was developed at the University of Michigan.

Lang says that miLEAD brought in \$6,000 in revenue in 2015 and is aiming for \$12,000 in 2016. The board uses all of the revenue for group-related activities, including flying in speakers for panel discussions and funding team-building gatherings. If the coffers get sufficiently full, Lang hopes to start a grant

"We treat this like a business. If money is involved, better work gets done."

CASE STUDY

How to start a consultancy

Early-career researchers at institutions that do not have a consulting organization can start one themselves. The first step is evaluating and comparing existing groups to find a model that fits. Michael Lang, president of miLEAD Consulting in Ann Arbor, Michigan, recommends setting up a non-profit corporation that charges at least a nominal fee for its services.

Simran Madan, PhD student at Baylor College of Medicine and senior vice-president of the Consulting Club at the Texas Medical Center in Houston, says that it's important to survey the local scene to determine whether there are enough trainees around who have the time and interest for consulting work, and enough local businesses that could use help. She also recommends finding a confidante who has been through the process. "Since

setting up a non-profit is a monumental challenge, we recommend consulting with someone who has the expertise," she says.

Madan suggests working with university administration to get their support; even though the non-profit group won't technically be a part of the campus, the approval and cooperation of an institution can be crucial for long-term success. It's also important to set up a team with sharply defined roles and a chain of command.

Paperwork is involved, not surprisingly. In the United States, it takes a lengthy and complicated application to the US Internal Revenue Service to obtain non-profit status. Among other things, the application must show that the organization will not make money for the founder. But once obtained, the status allows the group to accept donations and avoid paying income tax. **C.W.**

programme to help local businesses to get off the ground. miLEAD's fees for client companies are a tiny fraction of what a big-time consulting company would charge, but they underscore the professionalism of the process. "We treat this like a business," he says. "If money is involved, better work gets done."

Conversely, Zhang says that the Harvard Graduate Consulting Club has no plans to start charging clients. "It's a way for us to give back to the community," he notes. Although it is likely that local start-ups get some value from their consulting, improving a company's bottom line is not the main point of the exercise. "It's a learning experience for us," says Zhang.

A GROWING FIELD

Consulting organizations are starting to pop up on other campuses, giving more postdocs and graduate students a chance to try out the field. Simran Madan, a PhD student in translational biology at Baylor College of Medicine in Houston, Texas, is helping to kick-start consulting services as senior vice-president of the Consulting Club at the Texas Medical Center in Houston. This independent, non-profit group is drawing talent from several local institutions, including Baylor and the University of Texas Health Science Center and MD Anderson Cancer Center in Houston. The group aims to begin offering consulting services by the end of the year. For now, Madan and club president Redwan Huq, a Baylor PhD student in molecular physiology and biophysics, are learning how to recruit potential consultants, provide training, structure consulting teams and attract clients.

The plan is to charge local companies about \$500 for 6 weeks of work analysing a product

and coming up with a marketing or development plan, a price that should be attractive to cash-strapped start-ups. "Professional consultants are expensive, and you almost never see a start-up hiring a firm," Madan says. "But they can get the same sort of analysis from a trainee."

One source of inspiration for Madan and Huq is the BALSAs (Biotechnology and Life Sciences Advising) group, a successful consulting organization at Washington University in St Louis, Missouri. BALSAs, which started in 2011, has 100 active members who participate in around 40 projects a year. About 60% of the members are science PhD students, 30% are science postdocs and a few are business or law students. Each job lasts six weeks, and each team includes three consultants, a project manager and an adviser. Most of the work involves product development and market analysis for local start-ups and entrepreneurs in the biotechnology, agriculture and health-care industries. The group also has clients in South Dakota; San Francisco, California; and Philadelphia, Pennsylvania, says Shivam Shah, who is the BALSAs president and a PhD student in biomedical engineering at Washington University.

A frequent BALSAs client is Washington University's Office of Technology Management, which has often hired the team to help evaluate patent applications from faculty members. Shah says that the group tries to avoid having students evaluate their direct supervisors, but that is not always possible. Students aim to judge patent applications strictly on their scientific merit and real-world potential, he says.

Since joining the group in 2013, Shah has worked on more than 20 projects as either a consultant or a project manager. Working on multiple projects has given him a chance to

fine-tune his management style and learn more about the scientific marketplace, he says. He hopes to land a consulting job soon after getting his degree, perhaps with a health-care venture-capital firm looking for advice about wise places to invest.

But a consulting career is hardly the only destination for Balsa members. Many have ended up working in industry as research scientists, patent specialists or consultants for companies such as the multinational agrochemical company Monsanto, based in St Louis, Missouri, and the New York-based computing giant IBM. And of the roughly 200 alumni of the programme, he estimates that about one-third have continued in academic careers. The skills learned in the consulting game — management, leadership and teamwork — would prove valuable to anyone running their own lab, Shah says.

There is a paucity of organizations such as miLEAD and Balsa outside the United States, but early-career scientists in the United Kingdom, Europe and elsewhere can still get real-life consulting training. One option is a position with 180 Degrees Consulting, a global organization with branches in Cambridge, UK; King's College London; Munich, Germany; the University of Tokyo; the University of Sydney; and the University of California, Los Angeles, among many other sites. The company enlists students and postdocs to provide pro bono consulting to non-profit and humanitarian organizations around the world. Although the work generally is not focused on scientific issues, science PhD students and postdocs can bring valuable skills to the organization, says Daniel Jiang, a PhD student in computer science who in 2015 founded the 180 Degrees Consulting branch at King's College London. "I know more about data sets than a political-science major does," he says.

Jiang's group is working with a children's charity and sports charity in London, and a school in the Philippines. The company attracts people who want to make a positive difference in the world, Jiang says, but there are benefits for the consultants themselves. "It's a great opportunity for students to find out about a different career before they graduate," he says.

Lang of miLEAD is still technically a student, but he's racking up professional-grade experience and isn't slowing down: he'll jump into two new projects as an adviser this summer. He can't discuss details, but the big picture is clear: he'll be working long hours, thinking about tough problems and moving closer to a postgraduate career.

Are the long days worth it? That's a cost-benefit analysis that he has figured out on his own, no consultant required. ■

Chris Woolston is a freelance writer in Billings, Montana.

TURNING POINT

Carpe freedom



Armed militants who were protesting against how public land is managed took over Oregon's Malheur National Wildlife Refuge on 2 January. They stayed for 41 days and caused roughly US\$6 million in damages. US Fish and Wildlife Service biologist Linda Sue Beck describes the occupation and its aftermath.

Did you anticipate the takeover?

No. We knew that the militia was in town for a peaceful march to protest against the prison sentence of a father and son convicted for arson on federal lands, but we didn't expect anything like what happened. The occupiers did a lot of damage, to our offices and the land, as well as to tribal archaeological artefacts.

What management issues do you work on?

The refuge was established in 1908 to support millions of resident and migratory birds. In the 1920s, someone brought common carp (*Cyprinus carpio*) into the basin, and they've become a problem. Before they were introduced, 9 species of submerged aquatic vegetation covered 90% of the lake. That, and the associated macroinvertebrates, drew birds. Today, the common carp are in direct competition with the birds for that food. They also muddy the water so that there is no light for the plants to grow. We're trying our best to get the carp under control.

Is federal-land management contentious?

There have been contentious issues, but my experience has been mostly positive. Together with tribal members, ranchers, non-governmental organizations and other government agencies, we spent 5 years over 40 meetings to write a 15-year plan for the refuge. People were vocal about things they didn't like, but in the end, the number-one priority was carp control. We agreed that we want it to be healthy again so that it can serve as a grocery store for the birds.

Your name appeared in news reports, as if the militants were targeting you. Why?

Essentially, they were sitting at my desk. At one point, a news article suggested that I was one of the reasons the occupation was happening. I've never had a rancher call me out — I have no idea where that came from. And to be honest, it freaked me out when my parents were contacted by a journalist. Then another person wrote an article entitled, 'I stand with Linda Sue Beck.' I think I was just the target for news that day.

That piece gained traction on social media.

What was it like?

It was nice to have support. I also have a good relationship with the locals, in part because I've involved them in science experiments where, for example, the public catches fish so that I can collect data. Some local ranchers turn carp into an organic fertilizer to use on their fields. The militants picked the wrong refuge to take over. I think they thought it would be easier to sway the locals, but our partnerships are strong. People are sending cheques from all over the world. Hopefully, we can use those funds to get the refuge back up to what it was.

What was the first day back at work like?

We had to evacuate the area after the takeover, and I was sent to our office in Vancouver, Washington, until the occupation was over. Coming back for the first time, I had to go through two FBI roadblocks and be escorted to my heavily guarded office. We're still piecing together the full impact of the damage.

How did the takeover affect your work?

We missed an opportunity to remove thousands of carp from the lake. In December, the lake was at a record low of about 800 hectares, so we had planned to block carp while they were aggregated at the mouth of the river, so that we could pull them out of the system. The lake has since grown to roughly 8,000 hectares, and the fish have dispersed because it is so deep.

How did it affect your outlook?

I realized how important it is to be honest and to keep lines of communication open. My approach to science is that I believe in what I'm doing to conserve land and animals for future generations. There might be political stuff at play, but I do what is best for the birds. ■

INTERVIEW BY VIRGINIA GEWIN

This interview has been edited for length and clarity.