

CAREERS

INDUSTRY Moving from an academic lab to a company role **p.281**

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VOLUNTEERING

Pro bono science

Offering your skills as a volunteer can be rewarding but needs careful thought.

BY AMBER DANCE

When physician Alison Smith retired in 2012, she wasn't ready to hang up her stethoscope. So the primary-care doctor in Sussex, UK, decided to volunteer for the charity Freedom from Torture in London. She examines asylum seekers who need medical evidence of their abuse to strengthen their applications to stay in the country.

In part, the work helps to assuage what she describes as “survivor guilt” — the feeling that whereas she's had a great life, others haven't been so lucky. It also makes her feel that she's counterbalancing the acts of physicians who participate in torture. Plus, Smith admits, she has a selfish reason. “It's an interesting challenge,” she says. “I don't want to let my professional skills go.”

Smith is one of many scientists, engineers

and health workers worldwide who apply their professional abilities and skills — and their often-scant spare time — to volunteer missions. Not only does it give them satisfaction to deploy their skills for good, it can also offer career benefits such as opportunities for networking or, occasionally, for publishing. Researchers who feel a pull towards philanthropy can contribute to projects that involve rights to health or to safe living environments, for example. And they need not wait until retirement or travel abroad to get involved: there are ways to make a positive difference in the lives of many with a local commitment of a few hours. But it is important for would-be volunteers to select their projects carefully — and to grasp what is required of them in scientific expertise, time commitment and costs they might have to shoulder.

How to find an organization to volunteer

with? Some researchers land projects through their universities, and many turn to their discipline's professional associations. The On-call Scientists programme, run by the American Association for the Advancement of Science (AAAS) in Washington DC, matches scientists with human-rights organizations. It has enrolled nearly 1,000 scientists from 58 countries; tasks might include helping organizations to analyse and understand technical reports, designing surveys or developing useful technologies. “I'm seeing more and more of these kinds of ‘without borders’ types of initiatives started by scientific organizations,” says Theresa Harris, manager of the programme.

One is the Thriving Earth Exchange (TEX), launched in 2013 by the American Geophysical Union in Washington DC. It matches Earth scientists with communities that need ▶

► advice, such as cities that are planning for the effects of climate change. Natasha Udu-gama, director of community partnerships for TEX, notes that scientists often begin their careers eager to help humankind. Then they get sidetracked by the pressure to publish, write grants, achieve tenure and reach other career milestones. Humanitarian projects, even small ones, can help to fulfil that lost-along-the-way desire to make the world better.

It's the feeling that inspired Linus Bengtsson, an epidemiologist at the Karolinska Institute in Stockholm, to found a non-profit humanitarian organization. "Everybody who deals with global health, they want to accomplish something in the end, and many feel that research is not enough," he says. In 2008 he co-founded Flowminder, which uses data about people's locations — from surveys, satellites and mobile phones — to map where people are in low- and middle-income countries. These data can help charities and governments to direct aid or to track transmission of disease. About half of the people who work with the organization are volunteer scientists who may incorporate the studies into their own research; the rest are staff.

IN DEMAND

Some types of expertise are much in demand, including statisticians to crunch numbers, environmental scientists to evaluate reports on hazards, and physicians to provide medical assessments or care. But scientists and engineers can also contribute to projects outside their specific fields. "There are so many transferable skills," Harris says. "Anybody who knows how to clean up a database is valuable."

Perhaps one of the most attractive elements of volunteer work for researchers is that they can make a huge difference in others' lives more rapidly than with most research projects. A member of On-call Scientists, for example, helped the small town of Temacapulín in Mexico as it faced the danger of flooding as a result of the building of a dam. Harris put the town's lawyers in touch with a water-resources engineer who analysed the proposed dam, attended public hearings and helped to develop a plan to scale down the dam and safeguard the town. Statistics Without Borders, an outreach committee of the American Statistical Association in Alexandria, Virginia, provided volunteers to help Nepal to reorganize its census data in the wake of the April 2015 earthquake. The new spreadsheet allowed fieldworkers to know who was living in the communities they visited. And DataKind, headquartered in New York City, a global network of volunteers skilled in working with data, assisted US-based Crisis Text Line, a helpline for teens. They created an algorithm to identify the most urgent texts and prioritize responses.

For researchers who have time to travel, or can combine philanthropy with work trips, off-site volunteering is an option. Mary Gray, a statistician and lawyer at the American University in Washington DC, spent two weeks in



Volunteers helped to track survivors of a 2015 earthquake in Nepal.

Fiji in 2011 when local hospital officials wanted to assess whether their medical care was effective. Gray gave doctors and lawyers a crash course in statistics, which helped them to make those judgements. "In a week or in two you can accomplish quite a lot," she says. "You leave a resource behind."

Those who can't travel can often find opportunities close to home. Climate scientist Andrew Rice at Portland State University in Oregon helped the nearby city of Eugene with its carbon-emissions-cutting plan in a TEX project. He examined the approach and the maths, provided by a city official and a consulting firm, on how much of the city's carbon emissions would have to be cut. He attended a city-council

meeting, where he spoke about how the team came up with its figures, and how the numbers related to global climate-change projections. The city approved an emissions-cutting target based on the project in July. Rice liked knowing that his scientific skills had immediate impact. And Udu-gama of TEX says that cities appreciate input from an unpaid third-party expert.

Volunteering can also expand one's skill set. Volunteers get a taste of project management and learn to work with clients from different cultural backgrounds. Teamwork is especially crucial in pro bono projects. "You must be willing to listen," says Udu-gama. "We stress that above all else."

CAREER BOOST

Volunteer work can also help a career. Junior scientists and students may gain experience that they can add to their CVs, and researchers may be able to publish the work they did or integrate it into their current projects. Ashley Collier, a graduate student in environmental engineering at the University of Colorado Boulder, plans to include her volunteer work in her thesis on low-cost air-quality monitoring. Through TEX, she got involved with a community group in Denver, Colorado, that was concerned about contamination from perchloroethylene, a chemical used in dry cleaning. Collier and collaborators tested homes for perchloroethylene as well as radon gas. They found no worrying levels of perchloroethylene, but discovered excessive radon in 12 out of 15 homes. Now, Collier and the community group Taking Neighborhood Health to Heart are planning ways to educate residents about radon and how they can fix their homes to protect themselves.

VOLUNTEER PREPARATION

Questions to ask

When seeking or preparing for volunteer work, it is important to communicate with the charity about both its expectations and yours, and set the plan down clearly, possibly even in a contract. "Treat your pro bono engagement as you would a paid engagement," advises Miriam Young, head of communications and culture for the data-driven non-profit DataKind in New York City.

Here are some questions to ask the non-profit, and yourself, before signing on the dotted line.

- Is this a credible human-rights organization? What are its goals?
- How much time will I be spending on this project? How urgent is it, and how long will it take?
- What are my deliverables?
- What's the budget? What expenses will I have to pay?

- Are there confidential data to protect, and who will have access?
- Do I need to do anything to make sure findings are admissible in court?
- Will there be any conflict of interest with my current or past employment?
- Do I need any insurance, such as liability or travel coverage?
- How will the non-profit use these results?
- Who owns the samples and data? Can I publish the results?
- Will I have to testify in court? Or talk to the media?
- How will the organization take care of my well-being?

For more guidelines, see *Human Rights Projects: Guidelines for Scientists and Human Rights Organizations* (American Association for the Advancement of Science, 2012), available at go.nature.com/2d7dtxg. **A.D.**

TRADE TALK

Lab whiz



As a postdoc and graduate student, Stefanie Marquez-Vilندرer acquired a suite of lab skills. Now she works at AxoGen, a medical-technology firm in Alachua, Florida.

How did you approach your job interview?

I looked at the job description and what skills they were looking for, and came up with a response to how I would fit. Even if I hadn't written regulatory documents, I could say I had written grants. It's better to say that than to say that you don't have any clue.

Why did your company choose you?

They wanted someone who could provide support for all sorts of experiments, and to help with writing protocols and with university collaborations. Even though I didn't have all the techniques, I had shown I could learn many new methods in my postdoc. And I did have management experience coordinating 10–15 people, mainly undergraduates. I work closely with students and interns here at AxoGen, helping them to plan what experiments they need to run and what reagents they need to buy.

Do you wish you'd done anything differently during your training?

For graduate school I found a lab that was interesting to me, rather than a lab that published a lot or had a lot of funding; those were questions I probably should have asked about when I was choosing. An important question to ask about potential mentors is how often they participate in conferences. As a postdoc, I didn't attend a single conference outside the University of Florida. This hurt my chances of getting a job quickly, because I didn't make any industry contacts.

How can trainees best prepare for their job search?

I don't regret doing a postdoc, but I wish that I had had different opportunities presented to me. We have quite a few interns here; they are getting experience that will make them more competitive if they decide to go into industry. I didn't have that available. It was that lack of industry experience that was holding me back — it was hard for me to get my foot in the door.

INTERVIEW BY MONYA BAKER

This interview has been edited for length and clarity. See go.nature.com/2dbh9u8 for more.

Scientists working with Flowminder can adjust their research to better fit people's needs, Bengtsson says. Flowminder researchers collaborated with a Nepali mobile-phone operator to map how people moved around after the 2015 earthquake, producing data that were useful to relief organizations. In turn, the work led to a publication for the researchers (R. Wilson *et al.* *PLoS Curr. Disasters* <http://doi.org/brbp>; 2016).

Stéphanie Horion, a postdoc at the University of Copenhagen who studies global environmental change and Earth observation, found that a TEX project pointed her to a resource that she is now applying in her research. TEX asked her to help the Horn of Africa Regional Environmental Centre and Network, a group in Addis Ababa, Ethiopia, that promotes sustainable development and environmental issues. It wanted to understand how a region surrounding Lake Ziway was using water. It already had someone to build a model of the water usage and requirements, but needed additional satellite maps. Horion contacted her network of scientists to find the right maps. In the process she accessed new vegetation maps, which she is now using in her own analyses of ecosystem change.

Networking while volunteering can also be a significant career perk. Samarth Bhargava, a software engineer at Inferlytics in Bangalore, India, schmoozes with other data-heads at DataKind events. "You get to interact with these amazing people and pick their brains," he says. And in his DataKind project to help a non-governmental organization process web-based complaints and predict future problems (such as a spate of messages about overflowing drains that might herald floods when monsoons hit) he's learnt about urban planning and government operations.

CAREFUL PREPARATION

There can be pitfalls, especially if the non-profits or the scientists who work with them don't communicate enough at the start (see 'Questions to ask'). Organizations may not understand the limitations of what scientists can provide if they are not spelled out. Harris recalls one non-profit that asked for an On-call Scientists volunteer to design a survey, which the scientist completed. But when the non-profit asked how the survey would be distributed, the scientist was not able to do this, and both sides were left disappointed.

Harris also warns that non-profits often have to reorganize their priorities in a hurry, pushing projects onto the back burner as a result of political changes in the host nation or emergencies such as a tsunami. Scientists should understand this and should also keep in mind that their proposed solution may not be used.

Volunteers may have to foot some expenses themselves. When Gray went to Fiji, she paid her own airfare. Smith estimates that she spends about £2,000 (US\$2,600) per year on her medical-doctor registration, liability insurance and travel to and from London to work with Freedom from Torture. And volunteers need to be realistic about how much time they can offer.

Some say it would be easier to volunteer for longer periods once one is retired or established in a career, but others say there's no reason not to start early. The summer months or between semesters, when academic responsibilities diminish, are good times. "People should at least be thinking about these things as a graduate student — what are the societal implications of your research?" says Rice.

The experience required varies by organization. For example, On-call Scientists seeks volunteers with at least a master's degree plus two years of experience in their field. Statistics Without Borders lets anyone sign up, no matter their level of education or experience. Foreign-language skills help to boost a volunteer's appeal, Harris notes. And some profes-

"You get to interact with these amazing people and pick their brains."

sors may be able to get their students involved in projects, thus enabling younger scientists to get experience in volunteering.

Being accepted isn't the only hurdle to successful volunteering. Researchers should make sure that the organization or project will have the desired impact on people in need, says Bengtsson. At AAAS, Harris vets non-profits by checking their past accomplishments and speaking with referees, such as peers at other charitable organizations. Scientists can check a prospective partner by reviewing the organization's reports, and by checking websites such as Charity Navigator or GuideStar, which provide information on and evaluations of charities and non-profits.

After that, the choice is straightforward. "Do something that you think is interesting," Bengtsson advises. "Follow your heart." ■

Amber Dance is a freelance writer in Los Angeles, California.

CLARIFICATION

The general advisory nature of the Careers article 'How to survive as a whistle-blower' (*Nature* **532**, 405; 2016) meant that it purposely did not discuss the case used as an example in detail. For clarity, it should be noted that as a result of the university's initial internal inquiry into the case, the co-authors were recommended to submit a list of errors to the journal in question. The editor-in-chief of the journal ultimately elected to retract the paper. In addition, a subsequent external inquiry concluded that although there had been misconduct by one researcher, there was no misconduct by the travelling supervisor referred to in the article, and there was no intentional wrongdoing. It also found that some of the allegations were not substantiated.