CAREERS

TURNING POINT Antarctic researcher finds success after break from science **p.537**

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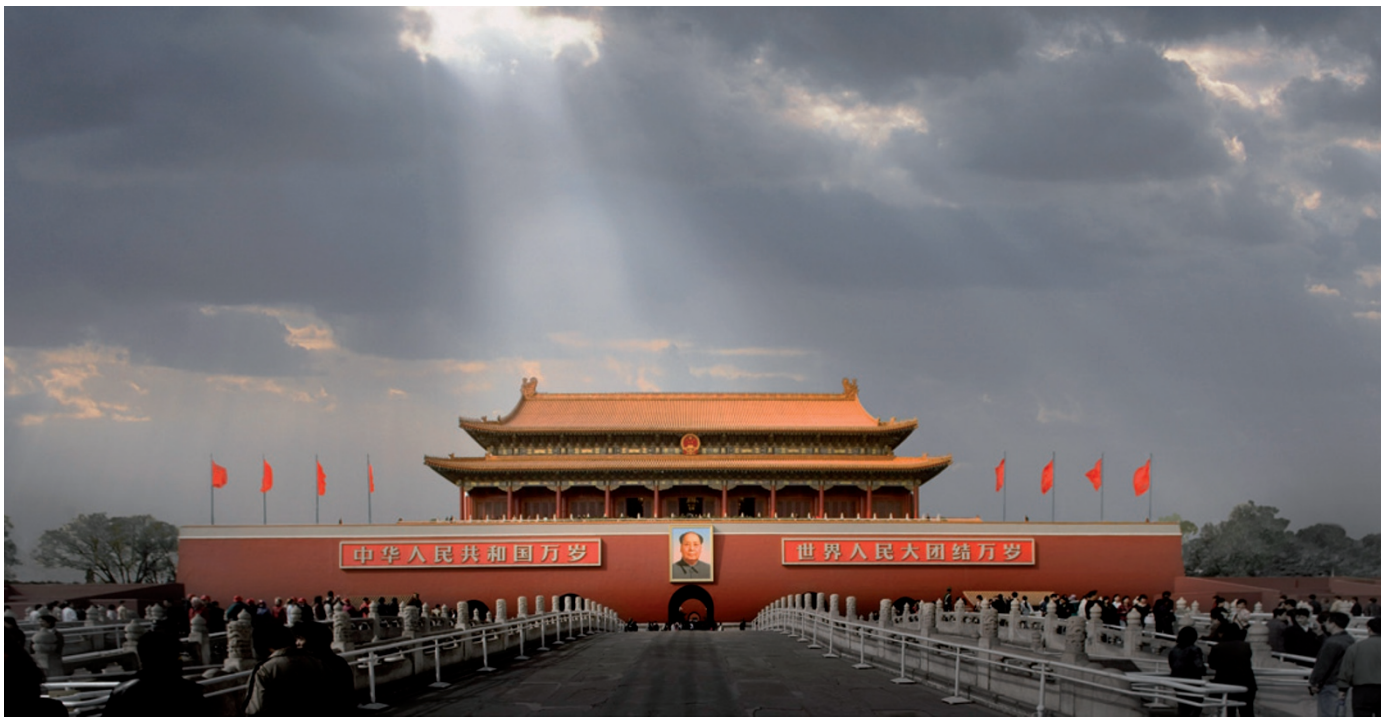


E. FREEMAN

Alongside landmarks such as the Forbidden City in Beijing, prospective postdocs will find opportunities in environmental science, palaeontology and other areas.

CHINA

The gates are open

There is a wealth of fellowships and postdoctoral openings in China for foreign researchers who aren't afraid of culture shock.

BY JANE QIU

Jacob Wickham knew just a few words of Chinese and still struggled to use chopsticks when he first set foot in Qingtongxia, a remote village in western China. In 2008, Wickham, then a PhD student studying insect biology at the State University of New York in Syracuse, had a fellowship from the East Asia and Pacific Summer Institutes (EAPSI), part of the US National Science Foundation (NSF). He was in China to study the Asian longhorn beetles plaguing tens of thousands of hectares of poplar trees that had been planted to slow desert encroachment. The experience gave Wickham the chance to network and identify research topics relevant to both China and the United States.

His work in the field and his brush with Chinese culture made such an impression on Wickham that he decided to pursue postdoctoral research in the country. Two years after his EAPSI fellowship, he returned to China on a three-year postdoctoral grant from the NSF's International Research Fellowship Program, studying insect species — in particular the Japanese pine sawyer beetle — that are pests in China and could become invasive if accidentally introduced to the United States. He now works at the Institute of Chemistry in Beijing, part of the Chinese Academy of Sciences (CAS).

OPPORTUNITIES ABOUND

Wickham is one of a growing number of scientists seeking to jump-start their careers in China, attracted by the country's new research infrastructure, expanding scientific community and thirst for talent. There were 127 applicants for the CAS Fellowship for Young International Scientists in 2011 — an increase of 41% since 2009. About 67% of applications are successful.

China has unique ecological problems that make it attractive to environmental scientists, plenty of fossils to draw palaeontologists, and high investment in clean technology, which encourages climate-change research. Postdoctoral research in the country, especially in these areas, could help young scientists to forge collaborations, make contacts and get training in specialized techniques. Foreign researchers will have to cope with language challenges and culture shock, but the experience can be enriching both personally and professionally.

For several years, the Chinese government ▶

Jacob Wickham enjoyed his PhD research in China so much that he returned for his postdoc.

V. FU

▶ has been attempting to end the country's brain drain, luring home-grown scientists back from overseas and encouraging young talent to stay put. More recently, it has also sought to draw foreign researchers to its shores. The best funding mechanism is usually a fellowship (see table), because salaries at Chinese institutes are often lower than those in Western countries, and Chinese granting mechanisms can't easily be applied to foreign scientists.

CAS and the National Natural Science Foundation of China (NSFC) both offer Fellowships for Young International Scientists to freshly graduated PhD holders and more experienced postdoctoral researchers of all nationalities. Applicants must contact a principal investigator in a Chinese lab, explain their project and request that the investigator submit an application on their behalf. CAS also runs a joint fellowship scheme with the Third World Academy of Science (TWAS), to support postdocs from other developing countries.

Foreign agencies run programmes, too. Each year, EAPSI provides more than 30 US PhD students with first-hand research experience in mainland China (it also sends researchers to Japan, South Korea, Taiwan, Singapore, Australia and New Zealand). Students spend a week learning about Chinese language and culture in Beijing, before a two-month stint doing research at institutes of their choice. They can also visit other universities and institutes across the country. Options for researchers from outside the United States include the Science and Technology Fellowship Programme in China (STF China), run by the European Union (EU), or initiatives from national funding councils.

Many foreign postdocs say that working in China is far from easy. In daily life, the language barrier is the biggest challenge. "Simple tasks, such as opening a bank account and going out to do some shopping, are not that simple any more," says Andy Tsun, a British immunologist who has been working at the CAS Shanghai Pasteur Institute for two years.

The EU's STF China fellows receive six months of language and culture training in Beijing at the start of their placements, with short trips to other parts of China. "It's a great innovation for this kind of programme," says Sébastian Chanfreau, a French chemical engineer who spent two years at Nankai University in Tianjin. Chinese placements are "certainly a daunting experience for people who don't speak Chinese and know little about the culture and the way of doing things there", he says.

However, language is not necessarily a problem in the lab or field. Many Chinese researchers speak English well, so foreigners can usually communicate with their colleagues. Meetings of teams that include international researchers are often conducted in English. Of course, more complex communications could be tricky — foreign postdocs acting as supervisors should make sure that instructions are fully understood, to prevent time or work being lost.

RED TAPE

What really baffles most foreign researchers in China is how science is done and administrated. "It definitely takes some time to understand how another culture conducts science in aspects ranging from grant administration to working in the lab and field, and organizing conferences," says Daniel Joswiak, a US glaciologist who has been working at the CAS Institute of Tibetan Plateau Research in Beijing since 2008. "You have to be very proactive."

Postdocs often need to take the initiative when collaborating or learning about a colleague's work. And researchers may need to be forceful to get permits and approvals to work in politically sensitive areas such as Tibet and Xinjiang. To study pest problems, Wickham had to navigate first the State Forestry Administration and then the provincial forestry bureau. Regulations can be vague and difficult to decipher, and the officials in charge may not be in a rush to process the request. It is essential to monitor each step of the process. "The hierarchical structure can be challenging," says Wickham.

Foreign scientists may find it difficult to plan field projects ahead of time. In many countries, researchers are used to knowing months in advance exactly when they are going into the field, where and for how long. But often in China, "everything is done at the last minute in terms of planning field sites and working with the local government", says Wickham.

"It definitely takes some time to understand how another culture conducts science."

In the lab, however, forward planning is essential: reagents often need to be shipped from overseas, which might take more than a month. This can be frustrating for Western scientists who are used to next-day deliveries. "You have to plan ahead," says Tsun. "If you have a change in project direction, it will take a while to get things going."

There are also restrictive rules for importing and exporting cell lines and transgenic animals, which can also slow things down and complicate international collaborations. "You need to be able to share reagents in science. It's also a way of validating results," says molecular biologist Jannie Danielsen, who has been working at the CAS Beijing Institute of Genomics since early 2011, on a fellowship from the Danish Council for Independent Research.

The Chinese work ethic often makes an impression on foreign researchers. "It's humbling to see people working so hard," says Tsun. He says that half the Pasteur Institute is sometimes still in the lab after 7 or 8 p.m. — something that Tsun rarely saw during his PhD research at the University of Oxford, UK.

But hard work doesn't always translate into

FELLOWSHIPS FOR FOREIGNERS

Agencies in China and abroad offer funding for young scientists hoping to explore the country.

Programme	Target	Duration	Website	Notes
CAS Fellowships for Young International Scientists	Postdocs	1 year	go.nature.com/ectbcu	Renewable; open to all foreign postdocs
NSFC Fellowships for Young International Scientists	Postdocs	6 months to 1 year	go.nature.com/suqyxx	Renewable; open to all foreign postdocs
TWAS–CAS Fellowship Program	Postdocs	6 months to 1 year	go.nature.com/u7kuau	For postdocs from developing countries
EU Science and Technology Fellowship in China	Postdocs	2 years	go.nature.com/julvmc	For EU citizens
NSF International Research Fellowship Program	Postdocs	3 years	go.nature.com/ms7yb8	For US citizens or permanent residents
NSF EAPSI	Graduate students	2 months	go.nature.com/gff32a	For US citizens or permanent residents
Next Step Connections	All levels	1 to 6 months	go.nature.com/qrncrb	Commercial programme offering professional internships in Asia to students and young professionals of all nationalities

creativity. Many of the students "haven't been trained so much in using their knowledge to generate new ideas and find new solutions", says Danielsen. "They work extremely hard and very long hours, but I am not sure whether they are able to step back a bit and reflect on the results." Wickham says that the science is often highly managed by professors, and researchers are not encouraged to take risks or learn from their mistakes.

A DIFFERENT WORLD

Foreigners may find that some practices are anathema to their usual customs. Most academic institutions in China offer financial rewards for getting papers published in journals with high impact factors — often thousands of dollars for the first and corresponding authors (see *Nature* **441,** 792; 2006). Such policies threaten to make competition unhealthy and discourage people from working together and exchanging ideas, says Sarah Rothenberg, an environmental scientist who has just joined the University of South Carolina in Columbia after three years at the CAS Institute of Geochemistry in Guiyang. "Science has become a totally different game there," she says.

Despite the differences, all the researchers contacted for this article say that their Chinese colleagues went out of their way to make them feel welcome and help them to sort out logistical issues such as housing. The country's ample research funding also helps. "There are problems with money everywhere but China," says Chanfreau. "I was often told, 'Money is not a problem, just get what you need'."

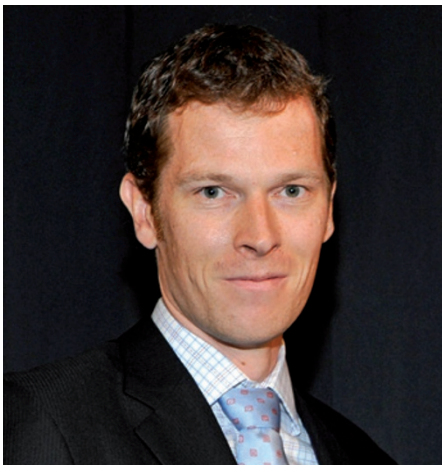
Some foreign postdocs have taken the opportunity to experience Chinese culture outside their research. Chanfreau, for instance, helped to initiate an EU–China science-communication project in Beijing, akin to the international Café Scientifique, in which researchers and the public meet to debate topical issues such as green chemistry, breast cancer and genetic engineering. "The sense of being able to contribute to the public understanding of science in China is extremely rewarding," says Chanfreau.

The postdocs who find success will be those who are open to a new environment and eager to explore different approaches to science. "A sense of humour and the willingness to be flexible are crucial," says Corwin Sullivan, a palaeontologist who went to China to pursue a postdoc at the CAS Institute of Vertebrate Paleontology and Paleoanthropology in Beijing in 2005 and is now an associate professor there. "The expats who find China most difficult are those who have a rigid sense of how things should work and refuse to adapt." ■

Jane Qiu *is a freelance writer based in Beijing.*

TURNING POINT
Rob McKay

Rob McKay, a glacial sedimentologist at the Victoria University of Wellington in New Zealand, won the 2011 Prime Minister's MacDiarmid Emerging Scientist prize in December for research on Antarctica's climate and environmental history.



Why did you leave science after completing a master's degree in geology?
I did my master's with Peter Barrett at Victoria University. I went on my first trip to Antarctica with him, and I really enjoyed being in the field. But after I finished in 2000, I had hefty student loans and decided to make some money and see the world. I ended up in the United Kingdom, using the critical-thinking skills honed during my graduate research to edit research reports at an investment company.

What lured you back to do a PhD?
I had kept in touch with Peter, intending to write my master's results into a paper. But in 2005, he invited me to do PhD research with the Antarctic Geological Drilling project (ANDRILL), a multinational collaboration to investigate past climate change. I had concerns about doing a PhD at the same university that I earned my earlier degrees from. But the geology department had expanded to run the Antarctic Research Centre and had a greater focus on international collaboration. I decided that pursuing a PhD there would be a good career move.

Describe your role in the ANDRILL research.
I was meant to focus on sedimentary petrology, working out the origin of sediments in 1-metre cores from the Antarctic ice shelf. But ANDRILL found evidence of past cycles of ice-sheet expansion and retraction coming out of this one-of-a-kind 1.3-kilometre drill hole. We found 60 cycles of an alternating pattern. Documenting and interpreting these cycles became one of the more important parts of the project, and I worked on that. Our team's findings confirmed that the ice sheet was highly variable, which had been the subject of speculation.

What did you learn from that experience?
You have to grasp the opportunities presented to you, even if they are high-risk, high-reward. Still, I realized that I should have a back-up plan. Luckily, the 1.3-kilometre drill hole was that plan, and it proved to be quite fruitful.

How have international collaborations helped your career?
I've spent 2–3 months at a time on expeditions with people from the United States, Europe and Japan. These trips are bonding experiences, which I think facilitates continued collaborations — invitations to labs all over the world. Big interdisciplinary projects bring together hugely diverse groups of people. My work on ANDRILL led to a paper in the *Geological Society of America Bulletin* (R. McKay *et al. Geol. Soc. Am. Bull.* **21,** 1537–1561; 2009), which received a lot of attention from the palaeoclimate community because it was one of the most detailed records yet published of Antarctic climate history and fluctuations in the ice sheet. That led to an invitation to take part in the Integrated Ocean Drilling Program, an international marine-research initiative. I'm taking my palaeoclimate work from the ice sheet to the ocean, trying to determine how ocean chemistry dynamics affect climate.

How will the Emerging Science prize affect your career?
It certainly will help with my imminent job search. It's prestigious and helps to bring attention to climate research. I hope to use some of the NZ$200,000 (US$160,000) prize money to get another PhD student involved in my next project, which is likely to involve sea-level histories around New Zealand, and to fund collaborative research with an overseas lab.

To what do you attribute your success?
There is an element of luck. I was fortunate to work on this amazing drill hole that had features that had never been seen before. I'm also really interested in the research, and have learned to overcome intimidation to put my ideas out there. ■

INTERVIEW BY VIRGINIA GEWIN