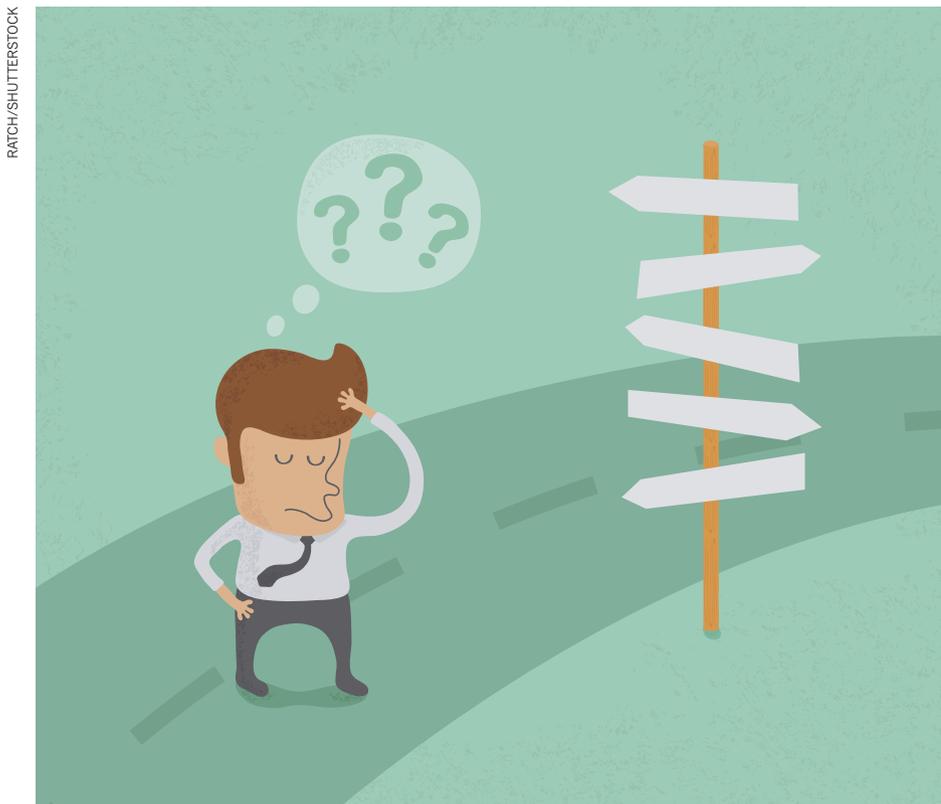


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CHINA

At a crossroads

China is luring back expatriates with generous incentives, causing many to weigh the pros and cons of returning.

BY QUIRIN SCHIERMEIER

A year ago, Jun Yao was facing a difficult dilemma. Having completed a PhD and two postdoctoral stints in the United States, the Chinese-born neuroscientist was well placed to pursue an academic career in his adopted country. But recruiters in China had also taken note of his achievements and were offering him substantial incentives to continue his research back home. Should he stay or go?

When Yao had left China in 2002, the United States had obvious advantages as a place for launching his career. He did a PhD at Pennsylvania State University (Penn State) in College

Park, followed by postdocs at the University of Wisconsin-Madison and at the Salk Institute for Biological Studies in La Jolla, California. But he knew that the environment for science research, and especially funding, had notably improved in his homeland over the past ten years. So much so, in fact, that Tsinghua University in Beijing — one of the nation's top-tier institutions — was now able to offer him a position as principal investigator in neuroscience and a generous starting package. Based on what Yao had seen of offers in the United States, the deal was exceptional.

Yao mulled over the best way forward, and in the end he opted to return. (Soon after, a US university expressed strong interest. But Yao

declined, having made his decision.) During interviews for the job, he had been impressed by the high calibre and hard-working nature of the students. "I had not made up my mind before I went to Beijing for the interviews," he says. "But when I saw the new labs and modern facilities they have built, and when I spoke with students and scientists at Tsinghua, I decided that this is the place for me to do science in the future."

China is counting on Western-trained researchers such as Yao to help the nation boost its scientific status to a level similar to that of the United States, Europe and Japan. And it is forking out the money to do so: in 2012, the nation spent 1.98% of its gross domestic product on research. That is slightly higher than Europe's allocation for research and, with the amount growing by approximately 20% a year, China's proportional spending on research edges ever closer to the 2.79% of the United States and the 3.34% of Japan.

But China's political environment sometimes gives pause to expatriates who are accustomed to living and working in a democratic society — the nation's human-rights and freedom-of-speech issues worry some. Also of concern are the quality of science at some of China's lesser-known institutes and universities; the level of expectation that returnees often face as a foreign-trained expert; and the fact that funding streams still often depend on connections to 'old-boy networks'. "For Chinese scientists who have been abroad for years, it is difficult to be reintegrated into the system," says Cong Cao, a sociologist and expert on Chinese science who is based at the University of Nottingham, UK.

TALENT CONTEST

To bring in the talent, China is embracing science and coming up with concrete plans to lure back promising expats. Its 'Thousand Talents' plan — to which Yao successfully applied with assistance from the university — aims to entice foreign-trained professionals to dedicate their skills to building the government's vision for a twenty-first-century China, which, according to statements from vice-president Li Yuanhao, includes both wealth creation and technological exchange with other nations. As part of a special section of the Thousand Talents plan, scientists, scholars and engineers under 40 years old who have at least three years of postdoctoral experience at a reputable non-Chinese university can apply for a position at a Chinese university or industry laboratory. Successful applicants get grant money ▶

► and relocation funds worth several million renminbi (depending on the research project); research projects typically run for three years. Candidates apply to the university or institute of their choice, and successful applicants then negotiate a salary and terms of employment with their host institute. Attracted by the prospect of lucrative funding and new career opportunities, about 3,000 scientists have heeded the call since the scheme was established in 2008.

By all indications, there will be plenty of applicants for years to come. China's scientific diaspora numbers well over 400,000 scientists and other scholars. In the United States, for example, there is scarcely a research department that does not have Chinese-born PhD students and postdocs within its ranks. Many Chinese researchers leave their home country in the hope of finding permanent jobs — in or outside academia — and many do. But as funding opportunities in the United States and elsewhere decline, they are increasingly considering career opportunities back home.

"I've been in the United States for 20 years now and never has it been more difficult to secure grant money, especially for early-career scientists," says Yao's former PhD supervisor Gong Chen, a neurobiologist at Penn State in University Park. "I do tell my students that it's a good time to do science in China — but I also tell them about the downsides."

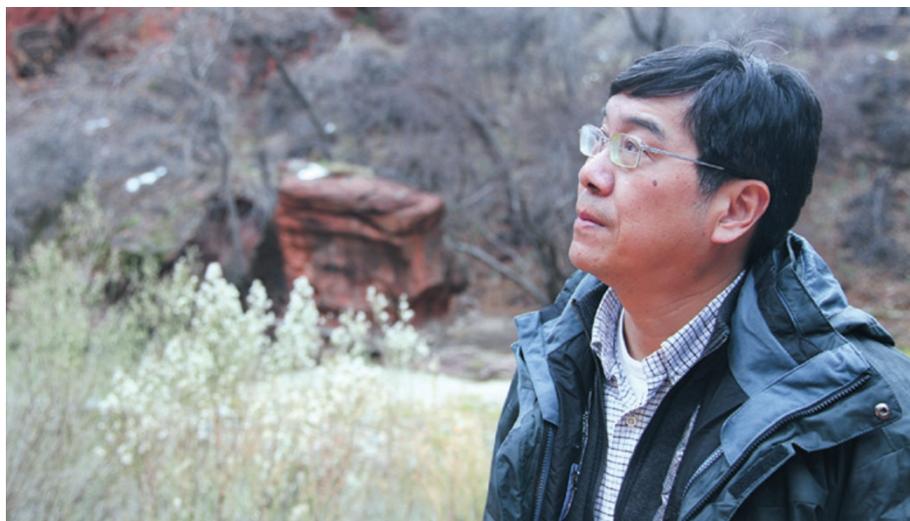
PROCEED WITH CAUTION

Those downsides are not inconsiderable, and require careful study of any potential new workplace. "Go to China," recommends Yao, "and look around before you apply for a position or sign a contract."

For instance, department heads and research administrators often have unrealistic expectations about what repatriates can accomplish in a short time, says Chen. "There is immense pressure on returnees to instantly produce scientific results and publish in prestigious journals," he says. "One is right to expect hard work and determination from young scientists. But they need more time and support than they are often being granted."

Newcomers will typically need to start their research from scratch in more-or-less empty laboratories and with little knowledge of local circumstances. "Be social — good relationships with colleagues and superiors are essential, after all," says Chen. "But do also prepare for difficulties and delays that you will inevitably face in a new environment, no matter how hard you are willing to work."

One of the main concerns is where the position is based. Only a few Chinese institutions — among them Tsinghua University and Shanghai's Fudan and Jiao Tong universities — offer conditions that are comparable to those at top Western institutes. Researchers there can count on state-of-the-art lab equipment, top-quality collaborations with foreign institutions, adherence to the precepts of research integrity,



Expatriates might find it difficult to reintegrate into the Chinese system, says sociologist Cong Cao.

the absence of old-boy-network practices and a high calibre of students, faculty and visitors. But at less-esteemed universities in smaller cities, the level of science is often second-rate, says David Zweig, chair of social sciences at the Hong Kong University of Science and Technology. He suggests avoiding universities that allow professors to keep on their own PhD students routinely as they become postdocs and professors. "You only want to go to places that send students out to the world."

Returnees should also seek out a mentor who is familiar with local circumstances and can help them to acclimatize and to deal with problems if they arise. "As an outsider, you'd otherwise be pretty much lost," Zweig says. "You might not even be able to get any research money."

He and others say that at many institutes, getting funded or promoted often depends on forming personal relationships with local research administrators or party officials. Reports of plagiarism, theft of ideas and other fraudulent behaviour are common. All of this can add up to a situation in which Chinese scientists are more productive when they are abroad than when they are in China, says Rao Yi, a biologist formerly with Northwestern University's medical school in Chicago, Illinois, who became dean of the School of Life Sciences at Peking University in Beijing in 2007. "If they care about their research and integrity, those who might return should go for institutions that have reformed or are determined to reform," he says.

Generous benefits to returnees often cause *hong yan bing* — 'red-eye disease', as envy is often called in China — among other Chinese academics. The Thousand Talents plan makes no specific provision as to the terms of employment of returnees, such as salary or period of employment; those terms differ depending on the host institution. But high-profile awardees can get instant tenure and a salary that is considerably higher than the 200,000 renminbi (US\$32,650) per year of an average Chinese

professor. Such efforts, says Yi, sometimes cause Chinese professors to view senior returnees as competitors for funds and fame. Cao agrees: "There are often tensions between people with and without foreign education," he says. "Frankly, some do not want expats to return to China permanently."

China expert Denis Simon, vice-provost of the Office of International Strategic Initiatives at Arizona State University in Phoenix, says that the problem is especially difficult when the recruit is not Chinese-born. Another government incentive — the 'Recruitment Program of Foreign Experts' — encourages scientists with a PhD from an overseas university to work in China for at least nine months a year over a minimum of three consecutive years, and it offers rewards that are similar to those of the Thousand Talents scheme. "It's one thing to attract Chinese-born postgraduates from overseas," he says. "Bringing senior scientists to China is a different story. It's hard to swallow for China's old guard that Mr Smith gets so much when their Mr Wang gets so much less."

For his part, Yao knows that challenges lie ahead, but he has found much to encourage him. He has been assigned a 180-square-metre laboratory on the Tsinghua campus on the outskirts of Beijing — more research space than he ever had in the United States. It will take a good few months to buy the equipment and hire the technicians and postdocs he needs. To remain busy and productive, he maintains an active research alliance with the group he left behind in California.

PREPARING TO RETURN

Chinese researchers would be wise to establish a scientific reputation for themselves before they consider going back to their homeland, says Cao. "Don't move too early in your career," he says. "Make sure you have done at least a few years of productive postdoctoral research and produced some nice papers, else you'll have the air of one who is not competitive in the West."

The Thousand Talents plan also includes a popular short-term option for scientists who are reluctant to sever ties with the West altogether. The awardees who select this route keep their overseas academic jobs and obligations while working up to three months per year — usually during the summer break — at a Chinese host institute.

Those moving back should consider the scientific opportunities and family-friendly provisions of, for example, the Thousand Talents plan, which often includes premium medical service, free insurance and eligibility to purchase property at discount rates. But they should also be aware that a successful application is no guarantee of a permanent job in science. The tenure track to a permanent academic position — so familiar in the United States — is widely absent in China. In the past, says Chen, pretty much anyone who obtained a PhD could look forward to a job for life. But leading universities in Beijing and Shanghai have begun to evaluate junior faculty members' performance after five years and to make promotions to permanent positions on the basis of those evaluations.

The Chinese government — always struggling to reconcile communist ideals with the transition to a market economy — is aware of the grumbling within its



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Gong Chen

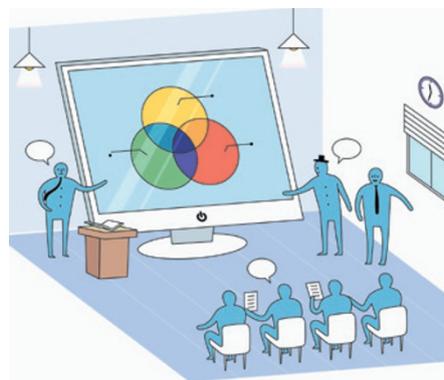
academic institutions. But the Communist Party has made it clear that bringing back the best is crucial to the nation's economic development. During his 2007–12 term as head of the Communist Party's organization department, Li Yuanchao stressed that bringing back expatriates was a "strategic investment". Critics say, however, that if China really wants to bring back the best, it must overhaul its science culture and its academic institutions to embrace democratic pluralism and improve transparency. The idea is that more returnees from the West would not just help the development of Chinese science, but that of society as well. "The inflow of young science talent from abroad," says Chen, "will help shape our nation." ■

Quirin Schiermeier is Nature's Germany correspondent.

COLUMN

A powerful narrative

Scientists should find engaging ways to present information to their target audience, says **Yoshimi Rii**.



Last summer, I took part in an unfortunate episode on the first day of a teacher workshop. Along with three other scientists, I gave talks to schoolteachers on the use of real-time scientific data in the classroom. Because we didn't want to talk down to our audience, we kept to the standard scientific format for our presentations, with minor adjustments to specific jargon. As the day went on, however, it became apparent that we had missed the mark.

"Why do scientists' presentations all look the same?" said a teacher to me during the break. "It's like you guys all get the same template." Her words struck me like a 10-tonne anvil. She was right. Where was the creativity?

Most of us at one time will have attended a talk about what should have been an engaging topic, only to find ourselves being lulled to sleep. Most likely, the speaker was using PowerPoint or Keynote. There are better approaches.

MAKING THE DISCONNECTION

The user-friendly nature of software such as PowerPoint allows anyone to make a presentation without much thought. Type in a few talking points, throw in some pictures and voilà! Here's my cookie-cutter talk. Never mind that there's too much information on some slides — they're bulleted, so they must be easy to understand! The plot makes five or six points, but hey, it's colourful and impressive, so that's OK, right? And let's not worry about those bumpy transitions, never mind the lack of a coherent narrative.

Reliance on bullet points and complicated graphs has caused many to become lax at applying important performance skills. Disconnected from the public, scientists often forget to explain what to them is everyday lingo. Last September,

at a press conference at the University of Hawaii in Manoa for the Intergovernmental Panel on Climate Change Working Group I Report, scientists showed modelled rises in sea level from now until 2100. I watched the eyes of the reporters roll backwards in their sockets.

Because slides are easy to recycle from one presentation to another, researchers often give a talk on autopilot using slides that they've shown hundreds of times before. If the presenter is disengaged, how can they expect the audience to listen?

BREAKING BAD

On the second day of the teacher workshop, we decided to scrap our prepared talks and start afresh. I placed a quote from *Moby Dick* in the title box and was rewarded with a smile from an English teacher in the audience. I then tossed a microbe-shaped stuffed toy to a teacher in the front row to open up a discussion about bacteria and phytoplankton. We asked them how they wanted to illustrate these concepts to their students. For the remainder of the workshop, the talks became less structured, more interactive and better appreciated. I vowed never to rely on cookie-cutter presentations again.

Last October, I found myself at a foundation symposium with an audience of retired doctors, professors and other distinguished society members who had made donations in support of research at the university. I sat next to one donor, a 90-year-old veteran who was part of the highly decorated 442nd Regimental Combat Team in the Second World War. As part of the symposium, senior scientists and I were invited to give talks on exciting research being conducted at our university. I was nervous.

But I found myself breathing a sigh of relief. In the first talk, a scientist studying the history of calendars opened up a star-studded umbrella. Another scientist presented a beautiful slide show of mushroom pictures and riveted the audience with accounts of his hunts in unusual places. At the end of the symposium, the veteran next to me grabbed my hands and said, "I feel great knowing that my money has made all of this possible. Thank you." We relayed our message that day, and without the aid of a single graph. ■

Yoshimi Rii is a graduate student in phytoplankton ecology at the University of Hawaii in Manoa.