



Hainan Island



Jacob Wickham holding a semiochemical lure for *Dorysthenes granulosus* (Sugarcane borer) near Danzhou, Hainan Island

Foreign-born scientists find a home in China

China, long a major exporter of scientific talent to other countries, has in recent years become increasingly appealing as a destination for foreign-born researchers. The reasons are many: Research funding in China is climbing while it has stagnated in the United States; the international environment of some institutions is friendly to researchers who aren't fluent in the local language; and special grant programs have been put in place explicitly to help recruit scientists trained abroad. Many say that the Middle Kingdom simply turned out to be the best place to explore their chosen field. **By Shawna Williams**

A recruiting boom

In recent decades, attracting researchers trained abroad has consistently formed a key part of China's push to gain international prominence in science and technology and thus power long-term economic growth. But the role those "foreign experts" play has evolved over time, says **Tao Cheng**, director of the State Key Laboratory of Experimental Hematology (SKLEH) in Tianjin and scientific director of the Institute of Hematology and Blood Diseases Hospital at the Chinese Academy of Medical Sciences and Peking Union Medical College.

"The main reason [for recruiting internationally] in the past was to engage with other, more developed countries. Basically we would just learn the technology and gain knowledge, but now it's different," Cheng says. "The emphasis is more on collaborating on major projects. At a higher level, the government emphasizes that China should even lead—should initiate—some projects toward international goals." Cheng says that at many of the institutes and universities he visits, he's also noticed a shift from "international" recruits who are almost exclusively Chinese returnees trained abroad, to those who are actually foreign-born.

Cheng himself is a returnee who joined the faculty of Harvard Medical School, then went to the University of Pittsburgh before joining SKLEH in 2007. As he sees it, his institute has been successful in recruiting high-level international talent because it has key elements in place:

peers who can discuss science at the same level as potential recruits, internationally competitive salaries, unique research resources, and an academic environment that fosters free exchange of ideas.

Follow the money

According to the Organization for Economic Cooperation and Development, in 2014, China spent more than US\$344 billion on R&D—second only to the United States, which spent over US\$432 billion. Perhaps more importantly, research funding in China has risen precipitously in recent decades, a trend that seems set to continue despite the country's current economic slowdown. In March of this year, Premier Keqiang Li told a meeting of the National People's Congress that science funding will be a priority of the central government over the course of the next five-year plan, with a 9.1% boost in 2016 alone.

One result is that even early-career researchers trained abroad seem relaxed about their funding prospects. "I've never worried about where the actual money comes from," says **Jingmai O'Connor**, a professor who has worked at the Institute of Vertebrate Paleontology and Paleoanthropology in Beijing since earning her Ph.D. from the University of Southern California in 2009. "There's only one grant that I specifically remember being denied; there's always a lot of grant money and a high chance you're going to get it if you put a little effort into your proposal."

Nevertheless, despite China's growing reputation as a funding powerhouse, "one thing we have to make clear to job candidates is that the roads here are not paved with gold," cautions **David O'Connor**, dean of research at Xi'an Jiaotong-Liverpool University in Suzhou. "But if you submit a good, solid proposal, it will likely get funded." He says one barrier non-Chinese scientists can face is that members of their grant committees may view them as transient and be reluctant to fund their work. To overcome that hurdle, he recommends that they network extensively with others in the field and make it clear they're committed to building a career in China.

Other fruits of the funding boom—namely the proliferation of world-class shared resources—are also a significant draw for international researchers. "The people who decided to come [to SKLEH] didn't regard the pay as a big reason for **cont.>**

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“If you want to look at chemicals that could be good candidates for antibiotics, the Chinese National Compound Library has big libraries, well organized and available.”

—Brigitte Gicquel



coming. The most important reason is our unique resources,” says Cheng. He explains, “We have core facilities that are pretty much similar or even better than [those] in the United States—all because the government has invested substantially in the past few years.” Most importantly, he says, his laboratory is connected to a hospital, so its researchers have access to patient samples and can conduct translational research relatively easily.

Similarly, tuberculosis researcher **Brigitte Gicquel**, who heads a lab at the Institut Pasteur in Paris, spends three months of every year at its counterpart in Shanghai, partly to gain access to a store of about 1.5 million potential drugs she can test on the disease. “If you want to look at chemicals that could be good candidates for antibiotics, the Chinese National Compound Library has big libraries, well organized and available,” she says. Because tuberculosis is still a major public health concern in China, she adds, there is a “willingness to try to solve the problem.”

China has also seen a proliferation of fellowship programs aimed at recruiting scientists trained abroad, whether returning Chinese or foreign-born. The Chinese Academy of Science’s Hundred Talents Program, launched in 1994, has provided startup packages to over 2,000 researchers, and was joined in 2009 by the Thousand Talents Program and others. Startup packages through the Hundred Talents Program now range from 800,000 RMB (about US\$120,000) for early-career researchers (with the possibility of applying for more after two years) to 7 million RMB (over US\$1 million) for full professors with evidence of “deep and outstanding” academic achievements. Other government agencies, such as the Ministry of Science and Technology, have since launched their own recruiting programs, as have some provincial and local governments. The programs are designed to provide researchers with startup packages or continuing funding equivalent to what they could expect in Western countries.

Old bones and fresh perspectives

While resources are a necessary precondition for most researchers considering a move to China, the reasons many cite for working there have little to do with money. For O’Connor, who studies Mesozoic birds, the primary appeal was China’s rich fossil record in this area. **Sarah Rothenberg**, now an assistant professor at the University of South Carolina, credits a summer graduate fellowship and postdoctoral experience in China with focusing her attention on the health effects of mercury in rice; her field research in China continues today. For **Jacob Wickham**, China offered the opportunity to study the Asian longhorned beetle, an invasive pest in the United States, in its native environment.

Another unexpected perk for Wickham was completing the China national postdoctoral program. Though he initially applied

for the program mainly to get a work visa and clear other bureaucratic hurdles while he completed a National Science Foundation (NSF)-sponsored fellowship in China, he calls the Chinese postdoc “a really great experience.” In contrast to the U.S. system, he explains, postdocs in China are expected to complete a well-defined project within two to three years and to write and defend a thesis. “I had people from Peking University, Tsinghua University, and the Institute of Chemistry of the Chinese Academy of Sciences (CAS) on my dissertation committee, and it greatly enhanced my project,” he says.

In Gicquel’s view, one advantage of working in China is a new emphasis on innovation and getting products to market, which is driven by recent policy changes that, for instance, increase revenue-sharing with inventors. “The percentage going to inventors is enormous compared to any other country,” she says, and as a result, “people are more concerned about development and discovery.”

Astronomer **Richard de Grijs** was a faculty member at the University of Sheffield in the United Kingdom when he began to consider a move. Ironically, he remembers telling his wife on his first trip to China in 2002, “There’s no way I’d ever live in this country because it’s so messy and so different.” But on subsequent trips to collaborate with colleagues, he watched as the country became more developed, and he grew to appreciate the students in particular. “Students here are keen to make progress—they take that initiative,” he says.

Back home, de Grijs was confronted by “almost nonexistent” research funding, just as China was increasing its investment in astronomy and planning ambitious projects, such as the Large Sky Area Multi-Object Fiber Spectroscopic Telescope. In 2009, when his wife was offered a faculty position at Tsinghua University in Beijing, de Grijs went back on his 2002 promise and accepted a position at the recently opened Kavli Institute for Astronomy and Astrophysics at Peking University. He’s since had the opportunity to participate in the preparation for a major international project, the Thirty Meter Telescope, and served as founding director of the East Asian Regional Office of Astronomy for Development. These are “just a few examples of things I would never have been able to do if I had stayed in my previous job in the United Kingdom,” he says.

Similarly, when David O’Connor, then of the University of Sheffield, heard about an opening at the then five-year-old Xi’an Jiaotong-Liverpool University, he initially said he wasn’t interested. “But then I got [to] thinking about it and decided it was sort of an interesting challenge—to establish a new department in a new university,” he says. “These days in the UK, it’s about downsizing.” Five years later, O’Connor not only continues to lead the biology department but has taken on the role of dean of research for the university. One advantage to starting from scratch, he says, is “the ability to set things up the way you want them.”

For Eric Peng of the Kavli Institute, the excitement of helping build something new goes beyond his own institution. “Something very attractive [about China] was to feel like I could make a difference and contribute to the development of this country’s scientific community,” he says. “Here when you have expertise that’s complementary to what domestic researchers have, or a different angle on a problem, you feel like you have leverage to do more than you would in the United States.”

James Wicker also was drawn to the unique research environment China offered. As a physics Ph.D. student at the University of Tennessee with a Master’s in statistics, “the labs I had contact with didn’t really embrace my cross- **cont.>**

PHOTO: BRIGITTE GIQUEL

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David O'Connor

disciplinary research background,” he says. Then, in 2004, Wicker participated in a two-month, NSF-sponsored program now called the East Asia and Pacific Summer Institutes for U.S. Graduate Students, which placed him at Beijing’s National Astronomical Observatories, part of CAS. He found that those he worked with shared his appreciation for cross-disciplinary research, and a few years later he returned to the observatory as a postdoctoral fellow. “I like working in a diverse group—for example, there were people working in spectral analysis and exoplanets, as well as X-ray astronomy and high-energy astronomy,” he says. While Wicker continues his interdisciplinary research part-time, he’s since changed his focus again to work as an editor for *Research in Astronomy and Astrophysics*, an English-language journal based at the observatory.

Not so lost in translation

Some foreign-born researchers in China work in institutes founded as international partnerships, such as Gicquel’s CAS Institut Pasteur of Shanghai, and the CAS–Max Planck Gesellschaft Partner Institute for Computational Biology, also located in Shanghai. Such an environment helps reduce the language barrier for English-speaking scientists, says de Grijs. While he describes his language level as “survival Chinese,” he says that hasn’t been a problem in his work life because the Kavli Institute’s official language is English, and the students he encounters are proficient in the language.

What of researchers outside these international institutions? Wicker, who began a postdoctoral fellowship in 2007 at the

CAS National Astronomical Observatories, says that having studied Chinese for about five years before making the move has been “a big advantage.” He adds, “I’ve known some people who didn’t have a strong background in the language, and they really had a hard time.” Without his Chinese language skills, Wicker says, he probably wouldn’t have landed his current job as an editor.

Thijs Kouwenhoven, now an astrophysicist at Xi’an Jiaotong-Liverpool University, says the language has proved “one of the biggest challenges” of his time in China. While his Chinese has improved over his seven years there, he says it’s been easy to miss important small print in large documents, and simple errands tend to take longer than they should. “It adds up to a large inefficiency in my life,” he says.

But according to Jingmai O’Connor, a lack of strong Chinese skills can have its advantages. When writing grants, “I write the proposal, and then I have my students translate it. They get experience with grant preparation and I avoid a lot of the paperwork!” she jokes. She also isn’t required to attend meetings that are held in Chinese.

A greener future?

One form of bureaucracy no foreigner in China can escape is immigration-related paperwork; applying for one’s residence permit is a regular ritual for full-time researchers that must be performed every one to five years, depending on the length of one’s contract. And while some say that a residence permit affords them all the rights and privileges they need, lacking citizenship or permanent resident status can make some tasks difficult or impossible, such as registering a vehicle or sending a child to public school in a sought-after area like Beijing or Shanghai.

As part of its push to recruit more talent from overseas, the central government in 2004 announced that it would begin issuing permanent residence cards—the “Chinese green card”—to select individuals who had made large investments or significant professional contributions to China. Only about 5,000 green cards were issued through 2013, according to the state-run newspaper *China Daily*. But since 2014, the criteria for eligibility have been gradually expanded—allowing, for example, a faculty member who has worked for CAS or a university for at least four years to apply. Still, the application process itself remains somewhat murky. Wickham, for one, says he doesn’t know anyone who has successfully navigated it, but plans to apply early next year. “I hope that I might be the first green card in the Chinese Academy of Sciences!” he says.

Noting that “competition in the international human resource arena is becoming increasingly ferocious,” China’s State Administration of Foreign Experts Affairs recently announced another change: Beginning November 1, the process for “foreign expert” work permits held by professionals such as researchers and teachers is to be merged with that for other workers and streamlined. The aim, according to the administration’s announcement, is to make the process more efficient, cutting the time required in half.

Regardless of how that process turns out, however, Wickham plans to stay put. “China is opening up more and more every year and continues to be a better and better place for doing science,” he says. “I’m really happy with my decision to stay here and pursue my career.”

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