



China's largest
biobank at Zhangjiang
High-Tech Park, Shanghai.

BRACED FOR THE BIOTECH BOOM

*Why careers in China's biopharmaceutical industries
have never looked more promising.*

BY SHANNON ELLIS

Timing can make a big difference in a career. Is it worthwhile to stay longer in a comfortable job or is it the right moment to strike out for a new challenge? Similarly, timing can make all the difference when deciding to enter a developing market like China.

Just a decade ago, when China-born scientists with overseas experience began returning to the country, lured by their homeland's fast growth and growing financial means, they found a drug industry dominated by generics.

Undeterred, they got busy building the infrastructure for an industry capable of drug discovery and development, buoyed by substantial government support and a thriving economy.

Today, biotech specialists arriving in China find an industry at a turning point, with many key elements in place for innovation: a university system churning out doctorates and strong basic research, substantial financial backing from both the private and public sectors, regulations that are becoming globally harmonized

and a vibrant group of entrepreneurial leaders with ambitions for China and abroad.

They also find a country facing significant unmet medical needs — particularly in cancer, neurology and diabetes — and a rapidly ageing population. Although China is the world's second largest pharmaceutical market after the United States, some of the most effective modern medicines are not on sale. For example, of the 42 cancer drugs approved globally in the past five years, only four are ▶

▶ available in China. But this is set to change. Recent regulatory changes will bring imported drugs to China more quickly, and local biotech firms are racing to develop domestic — and, they hope, global — blockbuster drugs. For academics and entrepreneurs, it is an ideal time to build on the biotech investments of the past, says Lan Huang, chief executive of New York-based BeyondSpring Pharmaceuticals, which is running drug trials in China.

A HUNGER FOR SCIENCE

It only took two visits to Shanghai's Zhangjiang Hi-Tech Park to convince Greg Scott to set up a life-science consulting business there, amid a hotbed of drug research and development (R&D) companies. He founded ChinaBio in 2007, and encourages others to consider a move to China. "Do it! It is a great experience," he says. "If I was helping someone plan their career, China has to be a part of it as the number one drug market outside the United States."

It is not just entrepreneurs and multinational drug company employees; many academic and staff scientists also find working in China a stimulating career move. Ray Stevens, a chemist renowned for determining the crystal structures of the body's receptors, which are important for identifying drug targets, can recall the exact moment he decided to trade sunny California for Shanghai, uprooting his school-age children and wife. Like many academics, he had visited China several times, but it was not until 2009, after delivering a talk on membrane proteins to colleagues in the neighbouring city of Suzhou, that he decided to make the move.

"One of the big attractions was the energy and excitement the students had for science. It won me over," Stevens says. After he had finished his talk, "a group of students came up to the podium to ask questions. They kept asking questions as I made my way to the bathroom and even followed me in. I was amazed; they were so hungry. It was the moment I decided to spend my sabbatical in China".

In 2011, Stevens moved to China as a visiting professor. Just a year later, the president of ShanghaiTech University, Mianheng Jiang, came calling, offering the chance to set up his own institute. He now runs the iHuman

Institute at ShanghaiTech, is a member of China's Thousand Talents Plan and was in 2017 awarded a Magnolia Prize, an accolade given to foreigners who have contributed significantly to Shanghai's development. He has also co-founded a biotech company, RuiYi, in Shanghai.

BUILDING BIOTECH

The passion for science that Stevens discovered did not spring up accidentally. It has been fostered by government support for biotechnology that has intensified over the past decade, creating a force attracting scientists and the entrepreneurially inclined to China. Of the 2 million returnees to China over the past 6 years, it is estimated 250,000 work in the life sciences. And, although many scientists making the move were born and raised in China and have a decade or more experience working in the West, non-Chinese speakers such as Stevens and Scott are coming and thriving here, too.

"SINCE 2008, 7,000 RETURNEES HAVE BEEN RECRUITED."

The push for innovation comes from the highest levels of government, with the biotech industry receiving special attention in not just one but three of the government's latest five-year plans: the strategic blueprints that determine the country's economic goals for the forthcoming half-decade. The latest plan, China's thirteenth, stipulates that the biotechnology sector should exceed 4% of gross domestic product by 2020 and that there should be 10 to 20 life-science parks for biomedicine with an output surpassing 10 billion yuan (US\$1.5 billion). China has more than 100 life-science parks dotted across the country; run by local governments, these hubs lure companies with tax breaks and subsidies. It is estimated that more than \$100 billion has already been invested in the life-sciences sector by state,

provincial or local governments in an effort to hit the five-year-plan targets.

The Thousand Talents Plan (see page S8) has been especially successful at recruiting life-science talent. "Since 2008, 7,000 returnees have been recruited across all disciplines," says Dan Zhang, former secretary-general of the Thousand Talents programme and chief executive of Fountain Medical Development in Beijing, which helps companies to carry out clinical trials. "The life sciences committee for biotech is one of the largest groups in the programme. We've recruited more than 1,400 people, from both science and industry — including company founders, chief scientific officers or leading academics."

Returnees, especially those recruited via the Thousand Talents Plan, have had a "huge impact" on the industry, says Zhang. He says that returnees are the force behind the majority of drug approvals in China, that they fill peer review committees and life-science faculties, and that many are made university deans of schools of pharmacy and medicine. Sheng Ding, for example, has split his time between a biomedical-research facility in California and Tsinghua University in Beijing as dean of the school of pharmaceutical sciences since 2015. The generous grants and prestige of a place on the Thousand Talents Plan or similar programmes can increase an applicant's attractiveness to employers and enable them to command higher salaries.

DEEP POCKETS

Since the global financial crisis, financing for biotech in China has been on the rise, whereas the sector has taken a hit in the West. Chinese investors who are looking to diversify their portfolios away from property and manufacturing are encouraged by the growth prospects of the life sciences, given China's unmet medical needs and ageing population. Chinese venture capital and private equity funds raised \$45 billion for investment in the life sciences in the two and half years prior to June 2017, according to ChinaBio. So far, only \$12 billion has been invested in the industry, with financiers on the hunt for good companies to invest in. Most of the cash is going towards financing innovative biotech firms that

THREE YEARS

A snapshot of China's biotech industry



FROM BIG PHARMA CAREERS TO RISKY START-UP OPPORTUNITIES MEET CHINA'S BIOTECH STARS



FRANK JIANG, Asia Pacific R&D head and global vice-president at Sanofi until 2015
Joined CStone Pharmaceuticals in 2016.



LI CHEN, R&D head at Roche China until 2010
Founded Hua Medicine in 2011.



JINGSONG WANG, head of R&D at Sanofi China until 2015
Founded Harbour Biomedicine in 2016.



JIM WU, director at Roche in China until 2013
Founded Ark Biosciences in 2014.



SAMANTHA DU, a scientist at Pfizer until 2001
Founded Hutchison Medipharma in 2002 and Zai Labs in 2014.



STEVE YANG, head of R&D Asia for Pfizer, then Asia and Emerging Markets R&D head at AstraZeneca until 2014
Joined WuXi AppTec as executive vice president in 2014.



LINGSHI TAN, head of Pfizer China R&D and vice president of global development operations
Founded dMed in 2016.



Q&A: BIOTECH ENTREPRENEUR

Lan Huang founded BeyondSpring in 2010 and now splits her time between China and the United States.

BY SARAH O'MEARA

Why did you leave China?

I began my biology degree at Fudan University in Shanghai and transferred to the United States in my third year, in 1991. At that time, the government paid tuition fees and assigned you a job for five years after graduating. It was unlikely I would work in academia, and it was too long to be away from my research field, so I left.

Why did you move into biotechnology?

China joined the World Trade Organization in 2001, and I saw that as an opportunity. I borrowed money to start my own consulting firms in the United States and China. In 2010, I founded BeyondSpring, which is developing a drug to treat lung cancer and the effects of chemotherapy. We have offices in Dalian in northern China and New York. China has lots of high-quality data, which is a huge boost to our research.

How has China changed since you left?

It's incredible. Every time I visit, something has changed. When I left, there were no elevators, no central heating. Certain foods were rationed. Now, living standards have improved hugely. In many respects, it feels no different to America.

What's the difference between doing business in China and the United States?

Technically, they are increasingly similar. You can expect the same software, hardware, research methods and standards. The major difference is expectation. China is a developing country, and everyone is very commercially driven and practically minded. They want to get to the end fast. In the United States, it's more science driven. They enjoy the journey. ■

This interview has been edited for length and clarity.

are, in turn, hiring at a rapid pace (see 'Three years').

Money is flowing into academic life-science research as well. "It is relatively easy to get a good grant for science," says Xiaodong Wang, director of the National Institute of Biological Sciences in Beijing and co-founder of the immuno-oncology biotech BeiGene in Beijing. "Because the scale compared to the United States is still relatively small, in terms of relative money, and national young talents can get start-up funds from the central government, it makes things easier." But Wang points out that research grants are usually submitted in Chinese, which can be a barrier for overseas scientists, who have to rely on translators. Wang himself returned to China from the United States in 2003.

Stevens says he has not found accessing funding in China easier than in the United States, but is heartened by the emphasis on high-risk research versus the low-risk research that he says largely gets funded by the US National

Institutes of Health. He credits Chinese grant-makers with investing for the long term, taking pressure off the need to generate data quickly to secure another round of funding. In China, academics are also increasingly able to profit from their research — universities are permitting inventors to share the proceeds from patents and set-up their own companies. This is part of a wider initiative to get more discoveries from the bench to the bedside.

BIOTECH BONANZA

Competition for life-science talent in China has shifted. Despite their heavy investment in R&D centres in China in the past decade, multinational biopharma firms are finding themselves battling Chinese biotechnology start-ups to attract talent. Two top pharma recruiters in Shanghai — Jonathan Zhu, head of life sciences in China for Heidrick & Struggles (also a returnee), and Simon Lance, managing director for China at Hays — predict that job growth will increasingly ▶

2017

2016, July

A Chinese biotech start-up breaks the country's record for first-round financing, raising \$150 million.

2017, June

China's drug administration body agrees to align Chinese drug regulations with the rest of the world.

Chinese CAR-T cell trial impresses on the global stage, showing excellent results for relapsed or refractory multiple myeloma.

ChinaBio reports that Chinese venture capital and private equity funds raised \$45 billion over a period of 30 months for life-sciences investment.

► come from Chinese biotech companies, not the foreign biopharma firms. “It’s a sea change,” says Zhang.

The president and chief executive of Suzhou-based Innovent Biologics, Michael Yu, says that his company is expanding quickly. “We are constantly looking for employees and hiring people. We have grown more than 20% year-on-year.” Innovent is hunting for employees who have worked in countries such as the United States, where the drug industries are more mature and people have had greater experience of overseeing the development of innovative drugs (see ‘What recruiters want’). “Ten per cent of our team are from overseas,” says Yu. “Returnees have first-hand experience with how drugs are developed and regulated in the United States.” This type of foreign experience will become increasingly important. In July, China became a member of the International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH), signalling its intentions to mould its regulatory system in the shape of the ICH’s founding members: the United States, the European Union and Japan.

Start-up biotechs, especially those flush with cash from venture-capital financing, are looking to scoop up talent and are willing to pay top dollar. “In the last two to three years, we have seen a change. More R&D heads are considering offers to work for Chinese biotechs, venture capital and clinical research organizations,” says Zhang. “I believe this will continue in the next few years as more investment flows into domestic start-ups and they can make a combined offering: money and equity.” China-based biotechs such as BeiGene, Hutchison MediPharma, Zai Labs and WuXi Biologics have all enjoyed successful public listings, so other biotechs hope that equity offers will entice returnee talent away from corporate jobs and academic positions.

For many returnees, working for a start-up is not about the money; it is about increased responsibility and influence. Entrepreneurial biotechs demand more from their team than corporate environments, and returnees feel they can make an important contribution to building China’s biotech industry. “In a large organization, one’s role is minimal in terms of making an impact and being accountable for something that happens,” says Xuefeng Yu, co-founder and chief executive of CanSino Biologics in Tianjin. “But in China, you can really contribute or lead in an effort that will be impactful for the industry and also society.”

For Yu, deciding to leave an executive position with the pharmaceutical firm Sanofi in Toronto, Canada, to become an entrepreneur in China seemed like a reasonable risk to take. “I have plenty of experience and considered the chance to be successful to be pretty high,” he says. Today, CanSino can point to its China Food and Drug Administration-approved Ebola vaccine, developed in partnership with

the Chinese military, as a measure of its success.

Going directly from a corporate job to being your own boss in a new country is a big leap to make, but Yu was already deeply familiar with the Chinese vaccine market before he arrived, and was ready to do more. “I wanted to return to China to make products that would serve the country’s health. It felt like the right time,” he says.

A BIG ENTRANCE

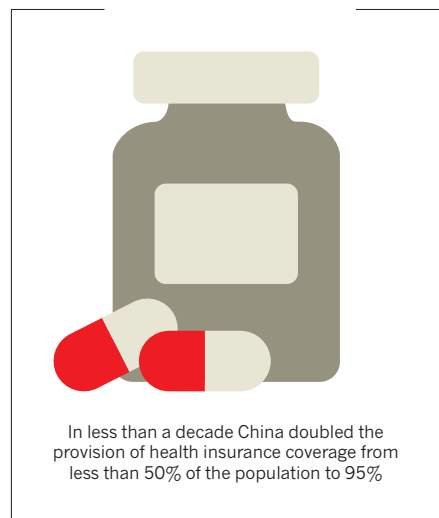
For foreign scientists unsure whether China is for them, one well-trodden route is to first arrive in an expatriate role with a multinational pharmaceutical company, or to work with a recruitment firm offering positions overseas. Then, after a few years, many make the leap to a biotech start-up. The time in between provides an education on China. Returnees and foreigners may shine in technical roles, but there is a learning curve when it comes to understanding how to work with local staff and regulators, and run clinical trials. “I am always getting an education in managing talent in China,” says Scott.

This path from multinational drug company to biotech is clearly seen in the bios of many of the more ambitious start-up founders (see ‘Meet China’s biotech stars’). Returnees with a few years under their belt in China and an ability to effectively navigate the system are far more valuable to employers than new arrivals.

CASE STUDY

What recruiters want

China lacks seasoned experts with at least 10 years’ industry experience, say insiders. Companies are especially keen on experience in translational medicine, early-stage clinical trials and antibody manufacturing. Start-up biotech firms need experienced managers at every level, from clinical trials to drug-manufacturing processes, to help build their companies. Recruiters emphasize that those interested need to do their homework. “Come over, speak to companies and recruiters. Get involved in life science events and associations to get an indication about what China is and isn’t,” advises Simon Lance, managing director at the recruitment firm Hays. “You’d be surprised how blasé some candidates are when applying for positions here.” **S.E.**



In less than a decade China doubled the provision of health insurance coverage from less than 50% of the population to 95%

“The advice I give when people first come back to China is: do not think you know China well just because you can speak Chinese,” says Zhang. “People tend to underestimate the speed of change here and local capabilities. In the beginning, I tended to overemphasize my technical advantages and did not understand how to be fully effective in this environment.” Or as Mark Engel, chief executive of Shanghai-based biotech firm Phagelux, puts it, he is looking to hire people with “skills plus a willingness to work within the culture”.

UNIVERSITY NETWORKS

Academics looking to make a move to China can get their feet wet by attending conferences — and they may be able to exploit their existing networks of China-born students and lab mates. Stevens came to China at the invitation of his students, who sought help to set up their lab, and was offered a role as a visiting professor at the Shanghai Institute of Materia Medica during a sabbatical from Scripps Research Institute in La Jolla, California. He later went on to found the iHuman Institute.

China’s prestigious universities, such as Fudan, Tsinghua and ShanghaiTech, have had success in attracting international talent and want to open the doors further. Ming-Wei Wang, dean of Fudan University’s school of pharmacy in Shanghai, wants the percentage of overseas faculty members to grow from 3% to 15% and to offer classes taught in English. Stevens has a similar goal for the iHuman Institute and has a target that 25% of his team is made up of overseas scientists. This push for global talent is driven by an understanding that strong science has no borders. But Stevens admits it is not always easy to get others to follow in his footsteps. “Getting non-Chinese foreigners to come to China has been a struggle. People are unaware of the opportunity and it takes an adventurous person to take the risk.” ■

Shannon Ellis is a science and business writer specializing in China and biotechnology.