

Looking to China for Scientific Careers

China's rise in the global marketplace has been accompanied by the government's increasing focus on boosting the quality and quantity of the country's scientific research. China's government and universities are stepping up incentives to retain Chinese scientists and entice foreign academics to build their careers in China, and some professors say funding for research is more readily available in China than in the West. As a result, scientists from all over the world are starting to choose China as a place to build their academic and research careers. **By Lenora Chu**



Plum Blossom in China



Jose Pastor-Pareja

Jose Pastor-Pareja was finishing up his postdoc in genetics at Yale University when his supervising professor, a Chinese national, began talking to him about science careers in China.

"Many friends and colleagues at Yale were Chinese as well," says Pastor-Pareja, "so I heard from people I trusted that this is a great time to do science in China in terms of funding and resources."

A Spanish national, Pastor-Pareja had academic job offers from universities in Spain, England, and China, but when Tsinghua University in Beijing came calling, Pastor-Pareja knew he'd found his home. He accepted an offer to become a principal investigator in Tsinghua's School of Life Sciences, equivalent to a tenure-track assistant professor position at a Western university.

"The level of science at Tsinghua and in Beijing is amazing," says Pastor-Pareja, who earned his Ph.D. at the Universidad Autónoma de Madrid. More than 30 *Drosophila* labs exist in Beijing, making the city's fruit fly resources comparable to Boston or New York. And Tsinghua is an international leader in cellular and developmental biology as well

as structural biology and electron microscopy, explains Pastor-Pareja.

He was also drawn by the generous funding potentially available to him; indeed, after accepting Tsinghua's offer, Pastor-Pareja received an award from the government's Thousand Talents program, designed to encourage scientists and scholars working abroad to come to China. Altogether, he received funding totaling 2 million yuan (330,000 USD) on top of startup funds from Tsinghua totaling more than 6 million yuan (1 million USD), and the opportunity to start a 1,540 square foot fruit fly laboratory of his own. He describes his salary at Tsinghua as "roughly comparable to the United States—definitely better than Europe."

Despite being established in China less than a year ago, Pastor-Pareja's group is already proving productive and is nearly ready to publish a paper on the differences in extracellular matrix production in normal and tumoral tissue in the fruit fly. "At this stage, I'm benefitting from generous funding, better equipment than I had access to at Yale, and very smart and motivated students," Pastor-Pareja explains. He is also enjoying the energy of working with administrators and faculty who are as thrilled as he is to be at the university.

Certainly, he says, there are challenges to living in China: It's **continued**>

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"The level of science at Tsinghua and in Beijing is amazing."

—Jose Pastor-Pareja

Tsinghua University



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difficult to find his favorite Western foods, and it's hard to ignore the pollution in Beijing. Then there's the language barrier: "Everybody will tell you learning Chinese is a daunting task."

KNOWLEDGE SHARING

For **Ming Li**, who grew up in China's former capital city of Nanjing, the incentive to pursue his career in China amounted to a combination of both personal and professional reasons.

Li had been a star student at the University of Southern California's (USC) Viterbi School of Engineering, while researching signal processing and speech recognition. But when the time came for him to survey the job market, Li felt the pull home to China to be closer to his family. He was initially concerned that research support for young faculty members wouldn't be adequate at many traditional Chinese universities, but luckily found that wasn't the case, particularly for those that collaborate with partner institutions in the West. Such alliances help Chinese universities attract a higher caliber of student, maintain higher standards for research, and encourage faculty independence, Li says.

Li received job offers from two prestigious global partnerships in science and engineering: the Shanghai Jiao Tong University-the University of Michigan Joint Institute and Sun Yat-sen University-Carnegie Mellon University (SYSU-CMU) Joint Institute of Engineering. Shanghai Jiao Tong University and Sun Yat-sen University are ranked 3rd and 7th, respectively, among all universities in China, according to the 2013 list compiled by the Chinese University Alumni Association. Li ultimately accepted a tenure-track position at the SYSU-CMU Joint Institute of Engineering (JIE), located in Guangdong Province in southern China. Under the collaboration model, he'll be teaching and performing research for the 2013-14 academic year at Carnegie Mellon in Pittsburgh as a visiting professor, and then will head to China the following year to continue teaching and also start up his research lab.

"Teaching at SYSU-CMU-JIE is the same in style and quality as at Carnegie Mellon, and the research is also very promising," says Li. By accepting a position at a joint institute, Li gets the best of both worlds. He is able to work with CMU faculty to jointly supervise graduate students but is also eligible for Chinese government funding.

He describes his salary as "very close to" what he would be earning at an American university and competitive compared with other academic positions in China, leaving him with no financial worries, Li explains. And as an added bonus, he and his wife—both only children—will be closer to their parents back home once he completes his visiting year at CMU and relocates to China.

Professor **Junfeng Wang** also appreciates being near his family, but cites China's prominence in nuclear magnetic resonance research as the



Fudan University

primary reason for his return. Indeed, China has hosted the last three major nuclear magnetic resonance-related conferences. He completed his postdoctoral training at Harvard University in 2009 and accepted a position as director of the magnetic resonance program at the Chinese Academy of Sciences' High Magnetic Field Laboratory (CHMFL)—one of only five high magnetic field labs in the world. Accessing funding in China is easier than in the West due to the increasing support from central and local governments, Wang says; indeed Wang's lab itself was sprung from a 2008 government initiative.

MAKING AN IMPACT

David Waxman was researching population theory at the University of Sussex when an academic colleague—who had split time be-

tween China and the United Kingdom for years—urged him to consider doing research in China. Waxman visited his colleague in Shanghai several times and found the city to be an exciting place to live and work. He also made a surprising discovery: He was drawn to the rare opportunity to impact students' education in a way that wasn't possible in the United Kingdom.

Chinese culture doesn't necessarily encourage students to question teachers, Waxman says. "I want students to question me, argue with me, and formulate ideas with me."

His colleague in China promptly assisted with Waxman's application for a Thousand Talents central government grant to fund Waxman's time and research in China. Waxman was awarded a five-year contract as a professor of biology at Fudan University in Shanghai, one of China's top universities. He has few teaching duties compared with the commitments required for a standard faculty position back in the United Kingdom, he says, which often involves administrative- and teaching-related duties that can be at least 50% of a faculty member's time.

"I have an enormous amount of freedom and resources to do my research," explains Waxman. "I have a very generous startup package which means that at the present time I am not pressed to get grants in China, though I expect to apply in the future. It's a very big thing for scientists not to have to apply for grants all the time; **continued**>

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—Ming Li



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Featured Participants

Center for China and Globalization
en.ccg.org.cn/_d1479.htm

Fudan University
www.fudan.edu.cn/english-new

High Magnetic Field Laboratory, Chinese Academy of Sciences
english.hf.cas.cn/r/Research-Divisions/HFML

Joint Institute of Engineering, Sun Yat-sen University-Carnegie Mellon University
jie.sysu.edu.cn

Key Laboratory of Green Process and Engineering, Chinese Academy of Sciences
research.nvidia.com/content/IPE-CAS-ccoe-summary

Shanghai Jiao Tong University-the University of Michigan Joint Institute
umji.sjtu.edu.cn

Tsinghua University
www.tsinghua.edu.cn/publish/th/index.html



David Waxman

meanwhile, grants in Britain and America are increasingly hard to get.”

He works with several Ph.D. students and has enjoyed the opportunity to train them “in the way that I know,” says Waxman. “By the end of their schooling, I’d like them to be independent researchers.” Waxman is realistic about the impact he might make, but hopes he can “drop a stone into a pond and cause a ripple effect by training the next generation of leaders.”

The potential to make a huge impact in a country that is undergoing rapid change draws many other researchers to China. Chemical Engineer **Chuanfang Yang**, for example, says he saw an opportunity to make a big difference with the country’s pressing concerns over clean air and water. “Sustainable growth is much needed in China, but it’s mostly taken for granted in Western countries,” said Yang, who left an R&D job at an environmental company in the United States to become a professor at the Chinese Academy of Sciences’ Key Laboratory of Green Process and Engineering. Not so in China, where outdoor air pollution contributed to nearly 1.2 million premature deaths in 2010, according to reports analyzed by the Health Effects Institute, a U.S.-based nonprofit that studies the health impact of air pollution.

INCENTIVES TO COME

Over the past decade, the Chinese government has been steadily introducing incentive programs to lure scientists from other countries as well as keep homegrown talent in China.

The most high-profile program within the last few years is the central government’s Thousand Talents program, which aims to draw experts in science, technology, and entrepreneurship to the country (and is the program supporting the research of both Tsinghua’s Pastor-Pareja and Fudan’s Waxman). The application process is long and multilayered, but the benefits are generous for those who succeed: a salary plus benefits, a lump-sum of 1 million yuan (about 160,000 USD), and research subsidies ranging from 3 to 5 million yuan (490,000 USD to nearly 820,000 USD) over a three-year period.

The Chinese Academy of Sciences (CAS) also sponsors an incentive

program called the 100 Talent Plan, which grants 2 million yuan (325,000 USD) or more to promising young academic leaders. The initiative has successfully drawn more than 1,000 foreign and expatriate Chinese scientists to work at one of the 100 or so institutes at CAS.

The Ministry of Education (MOE) sponsors the Yangtze River Scholar Scheme program, which aims to bring 200 visiting science professors and chairs to Chinese universities annually. Awardees work in China for three- to five-year terms, and are eligible for bonuses up to 200,000 yuan annually (32,000 USD) or 30,000 yuan monthly (5,000 USD), depending on the level of award granted.

The MOE also has a joint initiative with the Li Ka Shing Foundation called the Chang Jiang Scholars program, which awards research grants and a three-year position at a Chinese university to professors of all disciplines, including science, economics, and social science, from both China and abroad. And the National Natural Science Foundation of China administers a fund to lure overseas scholars to China to conduct basic scientific research.

Provincial and municipal governments in China are also launching programs to attract and retain scientific talent; for example, the governments of Shanghai and Beijing each sponsor a Thousand Talents program distinct from that of the central government.

These incentives are certainly helping. To date, the central government’s Thousand Talents program has drawn more than 3,000 global experts to China, and the provincial governments’ parallel programs have brought more than 20,000 over the past five years, according to **Huiyao Wang**, director general of the Center for China and Globalization, a think tank in Beijing. Among many high-profile Thousand Talents awardees is Jeff Lehman, the former **continued**

“It’s a very big thing for scientists not to have to apply for grants all the time; meanwhile, grants in Britain and America are increasingly hard to get.”

—David Waxman



“I feel really lucky to have gotten this opportunity, and I highly recommend that everyone moves out of their comfort zone at least once in their life.”

—Melody Toosky

president of Cornell University who launched Peking University’s Transnational Law School and now serves as vice chancellor and chief executive officer of New York University Shanghai.

Wang, who researches issues surrounding the global migration of talent, notes that many of the academics he talks to are acutely aware that opportunities in the West are saturated, while China is pouring resources into narrowing the gap on the science and technology front.

And China has become a more attractive place for foreigners to live, compared with just 10 years ago. “In the old days, foreigners would feel isolated and be the only person traveling with an interpreter,” says Wang. “Now much of China is cosmopolitan and universities are more open; it’s much more convenient to live here.”

Not surprisingly, China draws more scientists from other Asian countries than anywhere else, with Europe and the United States coming in second and third, respectively. As for the foreign student population, South Korea supplies the highest number of scholars, followed by the United States and Japan, according to the China Association for International Education.

Meanwhile, the number of Chinese living overseas is increasing; however, more and more are now coming back. In 2009, the number of Chinese overseas students who came back to China exceeded the 100,000 mark and has continued to increase each year at increments ranging from 20 to 40 percent annually, according to the State Administration of Foreign Experts Affairs.

CURRENT CHALLENGES

Certainly, China still has challenges to overcome while advancing toward being a world-class scientific research hub. **Fei Li**, who earned his Bachelor’s from Peking University and his Ph.D. from the University of Washington, says the Chinese respect products that

have a scientific basis, which makes working as a nutrition scientist in the country much more rewarding. He was drawn to the opportunity to help participate in developing China’s science and technology sector at its early stages, and has found plenty of opportunities in different research areas.

Yet he has observed that China is still working toward becoming a more hypothesis-driven scientific culture, moving away from a model that has historically been driven by studies of empirical observations. He also feels that the country’s science is heavily focused toward applied and translational science rather than basic science. The funding is geared more toward results-oriented projects that “can rapidly contribute to GDP growth, [rather] than basic research that may have more fundamental effects in the long run,” says Li, who is currently supporting an American nutrition company’s R&D business in the Asia Pacific region, including China, from one of its offices in Singapore.

Further, while many institutes and universities in Beijing and Shanghai are world-class, the atmosphere and opportunities for international academic exchanges and collaboration can still be lacking at institutions in smaller cities, says CAS’ Wang. It would help, Wang says, if funding programs provided more coherent and strategic support for institutes and universities in these cities. Scientists in smaller cities might also need to pay special attention to seeking out their own opportunities for advancement and exchange.

But scientists do feel China’s academic environment is moving in a positive direction. Researchers in China are publishing more papers in elite journals year over year, and certainly, in a country where most of the top leaders are scientists and engineers, the focus on these important fields is sure to continue.

Melody Toosky has found her time in China “priceless.” A Ph.D. in microbiology and immunology, she had offers to work at startup pharmaceutical companies and in academic laboratories in California. But she wanted to do research on infectious diseases and was drawn to a laboratory at Tsinghua University to research adaptive mistranslation of mycobacteria. So she accepted a contract to pursue her postdoctoral studies there, and says her time in China has allowed her to “break through the veil of my own ideologies, culture, and mentality and gain a deeper appreciation for the universal pursuit of scientific methodology.”

Toosky works mostly with Chinese Ph.D. students, and describes the work the group is doing as “cutting edge.” They are in the process of publishing results just 18 months after she arrived. “I feel really lucky to have gotten this opportunity, and I highly recommend that everyone moves out of their comfort zone at least once in their life,” she says.

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