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WILSON PANG



Scientists such as Yue Wan are reaping the rewards of international experience.

LAB LIFE

Full circle

Researchers who return home to East Asia aim to maintain networks and global standing.

BY VIRGINIA GEWIN

Many junior scientists from East Asia do their degree or post-PhD training abroad, but return home to develop their careers. The booming economies of several East Asian regions offer significant opportunities for new principal investigators. *Nature* spoke to four researchers who have recently returned to East Asia about the opportunities and challenges they face as they launch labs, seek talented lab members and forge and maintain collaborations.



HUBS OF ASIAN SCIENCE
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YUE WAN Be adaptable

Structural genomicist, Genome Institute of Singapore

When I returned to Singapore in 2013 to start my own lab, I was excited to reacquaint myself with my Asian culture, especially as it becomes less conservative due to globalization. I had spent the previous decade in the United States, after receiving a scholarship from the Singaporean government's Agency for Science, Technology and Research (A*STAR) to develop well-trained PhDs to support Singapore's

budding biomedical industry. Singapore is a small republic that built itself from almost nothing, with no natural resources, to a first-world city-state that prides itself on excellence, perseverance and resilience.

After earning my bachelor's degree in cell biology at the University of California, San Diego, I ended up at Stanford University in California for my PhD, where we developed a new protocol for conducting genome-wide measurements of RNA structure in yeast (M. Kertesz *et al. Nature* **467**, 103–107; 2010). We followed that work with studies of RNA-folding stability in yeast, and on the variation in RNA structure across the human transcriptome, the collection of gene readouts in a cell (Y. Wan *et al. Nature* **505**, 706–709; 2014).

Most A*STAR fellows return as postdocs, ►

► but in 2013, Singapore launched a fellowship programme that offered newly returned PhD holders enough money to start their own labs straight away. That same year, I became the first fellow at the Genomics Institute of Singapore. All of a sudden I had to work out how to hire people, create a budget and get orders in. It was a steep learning curve.

It was also an oddly isolating position. Most of my colleagues, and even I, didn't know what being an independent fellow meant. Postdocs didn't hang out with you, and neither did principal investigators (PIs). Former mentors advised me to make myself visible by speaking up at every staff meeting. That is hard, especially as a female scientist at an institute with few female PIs. But I realized that I had the money and independence to do what I wanted, so I did.

Singaporean research tends to be more applied and translational than US science — geared towards areas of strategic importance to society. One challenge is that priorities for funding can shift every 5–10 years to shape economic growth, so researchers must be adaptable.

In 2016, I received an A*STAR investigatorship, which gave me 6 million Singapore dollars (US\$4.4 million) for 6 years and allowed me to take a senior-scientist post. I also earned several international fellowships, including a Branco Weiss Fellowship from the Swiss Federal Institute of Technology (ETH) in Zurich, a L'Oréal–UNESCO (United Nations Educational, Scientific and Cultural Organization) fellowship for women in science and an EMBO Young Investigator Award, which helped me to collaborate with scientists worldwide.

I've had my lab for five years, and have had two children during that time. Singapore currently offers four months' paid maternity leave for most citizens, but I didn't take it either time. I worried that my lab would tank if I were away for four months. I took three weeks off after each birth. For the following two months, I worked two hours a day to help my staff members to stay on course. Then I returned to work full time.

The Asian family structure is close knit. My parents live close by and are happy to take care of their grandchildren. Hired help is more affordable here than in the United States. Without those support structures — including my husband, who splits his time between his labs at the Genome Institute of Singapore and Nanyang Technological University — there would be no way for me to put in the hours necessary to run my lab.

NETHIA KUMARAN

Maximize visibility

Cancer biologist, University of Science Malaysia

Since returning to Malaysia after four years in Australia, I've noticed that people are

more aware of the importance of science and engineering, and that more girls are encouraged to pursue science. I first became interested in cancer biology as an undergraduate in microbiology, when I learned that viruses could cause cancer. I was studying at the University of Science, Malaysia, and searched for a mentor, but there weren't many experts in that field in Malaysia at the time.

In 2005, after earning my bachelor's degree, I moved to the United Kingdom for a master's in oncology at the University of Nottingham. The Malaysian government offered full scholarships for people doing a PhD in or outside Malaysia. Because there were so few cancer-biology experts in Malaysia, I went to the University of Sydney, Australia, where I earned a PhD in 2012, studying the cell-death pathways of cancer.

I had two excellent mentors in Australia. They helped me to better articulate my findings, learn to collaborate and to speak in public at international conferences. I focused on building my network and collaborations.

I wanted to do a postdoc to get more training and experience, but Malaysia requested that their funded scholars come back as soon as we finished our PhDs. It was a big jump to being a PI when I chose to return to the University of Science, Malaysia, in 2013. Located on the beautiful island of Penang, the university sits in one of the country's more culturally liberal areas.

My mentors in Sydney had taught me that getting a grant isn't just about the proposed research details. Success is also about clearly telling funders why this work is important, how it fits into the bigger picture and why they should give me the money to do it. Although that was helpful, I still needed mentors in Malaysia to help me navigate our grant system. The culture and academic protocols can be very different at home. It was a painful learning process, but I secured grants from the university and one from the Ministry of Higher Education.

In my five years as a PI, research funding in Malaysia has been cut and grants have become increasingly competitive, but my lab has two PhD students and two master's students. Cancer biology is still a small community in Malaysia, although I do have a few collaborators here. I also apply for international grants, but that requires international collaborators. And global collaboration is not an easy process — sometimes I don't even get answers to e-mails I send to researchers overseas.

Right now, I'm establishing my visibility. Because I can't go to international conferences every year due to a lack of funding, I organized

“Global collaboration is not an easy process — sometimes I don't even get answers to e-mails I send to researchers overseas.”



Nethia Kumaran

an international conference in Malaysia in 2017. Winning a L'Oréal–UNESCO fellowship in 2016, after applying for four years in a row, also really helped to improve my visibility.

Having said that, I would have to think hard about leaving Malaysia to take a job in another country. The jobs here are permanent, whereas it seems like there are more temporary positions abroad. That scares me a bit. Ideally, I'll go on sabbatical overseas, pick up new skills and come back home.

MYUNGEUN SEO

Stay competitive

Polymer chemist, Korea Advanced Institute of Science and Technology

In 2012, I co-authored a paper in the journal *Science* with my postdoctoral adviser Marc Hillmyer, a chemist at the University of Minnesota in Minneapolis (M. Seo *et al. Science* **336**, 1422–1425; 2012). It took two years to complete, but he gave me the time and space to put together a whole story. A two-author paper in a high-impact journal is rare these days given the pressure to publish, but I believe that it helped me to secure my current job at Korea Advanced Institute of Science and Technology (KAIST), where I also earned my master's and PhD.

Since my appointment in 2013, I'm happy to be back in the science-oriented city of Daejeon,

which has more than 30 national laboratories as well as industrial research centres. As a chemistry student at KAIST, I visited laboratories in Japan and the United States while researching the self-assembly of small molecules into nanostructures. In 2007, during my PhD, I spent six months as a visiting researcher at the University of California, Santa Barbara, where I learnt a new type of polymerization — one that I still use today, and which has had a huge impact on my research path. I published a paper (M. Seo *et al.* *Macromolecules* **41**, 6413–6418; 2008) that has been cited 100 times so far. These experiences encouraged me to apply for several postdocs abroad, which is how I ended up in Marc's lab in 2009.

After four years, I returned to South Korea, and the on-site interview for my job at KAIST was one of the toughest days of my life. The institute competes with other universities for scientists who will be highly visible in their fields. But the country is experiencing a big wave of retirements right now, so there are good job opportunities.

My start-up package let me purchase a lab bench, fume hood and some crucial instruments to fill my empty space in a new building. I started without a postdoc or technician because it is difficult to find good candidates here. I have 13 students, 4 of whom are female, and 1 postdoc, from India. KAIST successfully increased the number of foreign students and foreign and female faculty members to 10% of the total school population and now aims to increase those

numbers by another 10%. I try to give my students the time they need to put a research story together, as Marc did for me. Three of the papers I have published since starting my lab have had a student as the only co-author.

The grant funding situation fluctuates year to year — and is highly competitive, with a roughly 10% success rate. Despite this, I recently learnt that in addition to a personal grant to continue my basic research, a team that I am part of has won a 7-year grant of US\$10 million to explore the chemical architecture of self-assembled molecules.

I'll probably apply for tenure in 2020. Since KAIST's graduate school of nanoscience and technology launched in 2008, only one person has sought, and ultimately achieved, tenure. Publishing a number of papers is always helpful, but the content is considered more important, as is which journal you publish in. International visibility is also key to securing tenure. In March, with US colleagues, I organized symposia at the annual American Chemical Society meeting in New Orleans, Louisiana, that brought together world leaders studying how complex polymers self-assemble.

KIM HEI-MAN CHOW Stay connected

Neuroscientist at Hong Kong University of Science and Technology

In 2013, Karl Herrup, a neuroscientist at Hong Kong University of Science and Technology, advertised for someone with expertise in Wnt signalling, a crucial pathway that regulates the fate of cells. He hired me, even though I was a cancer biologist with no background in neuroscience, in hope that a fresh perspective would prove valuable.

I'd studied Wnt signalling as a molecular-biology PhD student at the University of Hong Kong. During my third year, I presented my research identifying a potential drug target that could regulate Wnt signalling at the American Association for Cancer Research meeting in Washington DC.

“The bond is stronger when you can talk in person and discuss current research together.”

After my presentation, I received two invitations to pursue a postdoc in the United States. I chose to go to Cornell University in Ithaca, New York, to work with biomedical engineer Xiling Shen in 2010, but I had never used a computational-biology or systems-biology approach. My experience at Cornell rewired my approach to biomedical research.

One reason that clinical trials can fail is that we tend to look at only one thing at a

time. With systems biology, we first look at the whole picture and screen whether a gene or protein is the major cause of disease. Then we use molecular-biology tools to focus the research. Six months after arriving at Cornell, however, I had to return home to care for my sick mother. I couldn't devote myself to full-time research, so I worked for a medical editor for a year while my mother recovered.

My first year in Karl's lab was frustrating, because I had to learn about the brain from scratch, but I decided to seize this chance to expand my skills and launch a second career applying a systems-biology approach to studying Alzheimer's disease.

In my experience, students and postdocs in the United States tend to be freer to explore ideas that are unrelated to the PI's work. In Hong Kong, most students do research that has already been laid out by their supervisor. Both ways have pros and cons. Hong Kong attracts a lot of foreign professionals because it's very accessible to cities such as Tokyo, Taipei, Seoul and Singapore. It is also a cosmopolitan metropolis where old tradition blends with Western culture and post-modern trends — perfect for a foodie like me.

Funding opportunities are perhaps the biggest difference between the United States and Hong Kong. In the United States, there are federal and non-profit foundations that fund small projects or fellowships for postdocs; in Hong Kong, there is very little, and most early-career scientists are unaware of international opportunities.

I published my first neuroscience paper within 12 months of joining Karl's lab, and have since secured grants from the US Alzheimer's Association as well as from the Institute for Advanced Study.

I have been a research assistant professor for the past three years. It is a 'grey' position between postdoc and fully independent assistant professor. I can apply for grants and conduct my project independently, but I'm still affiliated with Karl's lab.

I'm also building my profile in the field through other fellowships, including one with the World Economic Forum, to explore other collaborations as I prepare to start my own lab, which I hope to do next year.

To maintain international relationships, I make myself available for Skype calls in the evenings and on weekends. And, crucially, I see colleagues such as Shen in person whenever I can. The bond is stronger when you can talk in person and discuss current research together.

My goal is to get a couple of high-impact publications before I start looking for my next job. Hong Kong is a small place, and space is limited owing in part to an influx of researchers from mainland China, so I'm open-minded about eventually taking a position elsewhere. ■

INTERVIEWS BY VIRGINIA GEWIN

These interviews have been edited for clarity and length.



Myungeun Seo