

Scientists with business flair in demand

Despite the economic crisis in the Pacific rim of Asia, job opportunities for scientists, in particular ethnic Chinese scientists, are growing. Demand for those with business experience is strong as countries invest in applied research and development to try to climb their way out of their difficulties.

This Careers and Recruitment feature was written by David Swinbanks and Richard Nathan of Nature's Tokyo office.

In the early 1990s, waves of Chinese scientists returned to Taiwan and Hong Kong from the West to positions in universities and government research institutes (see *Nature* 383, 11; 1996). The 'golden era' for academics in these two economies is now largely over, and there are far more applicants than posts. But opportunities for scientists are opening up in business and in some areas of research, for example, in the application of biotechnology to agriculture, fisheries and medicine.

Taiwan is continuing to build science parks that are a major source of employment. And government leaders and academics in China and Hong Kong are discussing setting up science parks in the region between Guangzhou and Hong Kong.

The next few years may be the best time for Chinese scientists to return to China. The Chinese Academy of Sciences has just announced a major recruitment drive to bring back 600 Chinese scientists as the academy reorganizes for the next century (see box above right). Prospects look particularly bright for those working in genomics. Centres for human genome research are being set up in Shanghai and Beijing, with substantial financial support from the government as well as from state-owned companies, and there are also several initiatives by Western companies in this area (see page 602).

Commercial opportunities

China has one-fifth of the world's population and vast natural genetic resources, so it is not just government officials and scientists

New blood for Chinese academy

"Now is a golden opportunity for Chinese scientists to return to China," says Chunli Bai, a vice-president of the Chinese Academy of Sciences, explaining the academy's plans dramatically to reorganize its 123 institutes over the next 13 years. The number of institutes and the 68,000 permanent employees of the academy will be drastically reduced by the year 2010, but 600 scientists will be recruited over the next three years (see *Nature* 394, 7; 1998).

"We are looking for bright young people under 45, most of them from overseas. We want people who are good in science but also people who have good management skills, for example, people from industry experienced in corporate management," Bai explains. "We expect about half to be pure scientists, but that is not a precise figure."

The recruits will be offered accommodation, equipment, graduate students and 2 million yuan (US\$240,000) in

start-up research funds. They will be given the title 'research professor', which will entitle them to supervise graduate students. The positions will be long term on a 'tenure track' system. Scientists will be assessed every four years and if they fail to meet standards they will be "out", says Bai. Only after passing three such assessments (after 12 years) will lifetime employment be offered.

To compensate for the academy's rather low salaries, the recruits will be given performance-based bonuses. "We will take care of them," says Bai, and give them "more and more support".

There will also be many openings in the academy for 'mobile' researchers, such as graduate students, postdoctoral fellows and visiting professors. The academy hopes to more than double the number of such 'mobile' people to 10,000 in the next three years, and to further boost the number to 30,000 by 2010.

who are interested in genomics. "We see great commercial opportunities," says Paul Watkins of the US pharmaceutical company Axys, which has set up a joint venture in Shanghai — Shanghai GeneCore BioTechnologies — with Perkin Elmer Applied Biosystems and SiniWest Holdings. This consortium is searching for genes involved in liver cancer under a contract with the Chinese Ministry of Science and Technology, but it expects to branch out into other areas, including applications of biotechnology to agriculture and fisheries.

The US agricultural giant Monsanto has just obtained permission from the Chinese

authorities for the commercial release of its genetically modified bollworm-resistant cotton. Bollworm has devastated cotton output in China, the world's leading producer of this crop. Monsanto is collaborating with the new Institute of Molecular Agrobiology in Singapore (see page 604).

In Taiwan too, government science officials are abuzz with talk of the need to develop agrobiotechnology (see page 603).

Scientists with experience in business are particularly sought after. "We want people trained in the West with corporate management skills as well as a sound scientific background," says Ming-Wei Wang, chairman

Tsinghua University recruits for excellence

Tsinghua University in Beijing is one of China's leading universities. It has a much stronger reputation in engineering than in science — but that is about to change. In the 1950s, Chinese universities were forced to specialize, following the model of the former Soviet Union. As a result, Tsinghua lost its five science departments to neighbouring Peking University. Now, however, a new science building will open shortly on Tsinghua's huge campus of 50,000 faculty members, their families, students and support staff.

In the new building is a Centre for Advanced Study modelled on the Princeton

Institute for Advanced Study in the United States. The centre will focus on theoretical studies of basic sciences, and be led by Hwa Tung Nieh, who has recently returned to China from the State University of New York at Stony Brook. There will be a core of seven or eight professors who will be "very, very carefully selected", says Nieh. Twelve associate professors will be hired on five-year contracts. "In principle" they will have to leave after five years, although they will probably get positions elsewhere in the university. Bin-lin Gu, a vice-director of the centre and dean of science, hopes the centre

will become an "incubator" of high-quality scientists in the university.

There will be 20 postdoctoral positions in mathematics, theoretical physics, chemistry and possibly biology. Nieh expects to get many recruits from overseas, in particular Europe, as well as from local universities. The centre's faculty members will receive supplements to double their salaries compared with other university staff, and housing will be provided. "In five years, we should have a reasonable centre," says Nieh. "In 10 or 20 years, as China's economy grows, we hope to become a great centre."

Openings in human genome research in China

Three new centres for human genome research in Shanghai and Beijing offer about 100 positions for genome researchers and more genome initiatives are expected soon from the Chinese government (see *Nature* 394, 109; 1998).

Shanghai Human Genome Centre. Headed by Zhu Chen of Shanghai Second Medical University. Will have 35–40 researchers in a year's time, divided into four groups: expression profiles; genotyping of disease; single nucleotide polymorphisms; and functional genomics. Liver cancer, which

is prevalent in Shanghai, is a particular focus. Start-up funds of 60 million yuan (US\$7 million) are coming from local and central government.

Beijing Human Genome Centre. Headed by Boqin Qiang, vice-president of the Chinese Academy of Medical Sciences. Will have about 30 researchers in three divisions, devoted to sequencing; genetic resources; and bioinformatics. There will be a focus on cardiovascular disease and diseases of the nervous system. Start-up funds of nearly 100 million yuan (\$12 million) are coming from

central and local government and a state-owned real estate company.

Shanghai GeneCore BioTechnologies. A private sector initiative by three US companies — PE Applied Biosystems, Axys Pharmaceuticals, and Siniwest Holdings — which will have about 30 staff within a year. This joint venture in collaboration with local institutions is hunting for genes that cause liver cancer but expects to branch out into other areas of genomics. The three companies will make an initial investment of \$10 million.

and general manager of Shanghai GeneCore BioTechnologies.

As there is state support for research with a socioeconomic impact, such scientists-turned-businessmen will be in increasing demand. Recognizing this, members of the Overseas Chinese Physics Association (OCPA) last November formed the Chinese Association for Science and Business (CASB) with US-based Chinese professionals trained in science and engineering but working in finance, computer and information technology, and other business sectors. The general secretary of CASB is Ning Luo, of the department of physiology and biophysics at Mount Sinai School of Medicine in New York.

Luo says: "We see growing opportunities in mainland China as well as Hong Kong, Taiwan and Singapore, not only for Chinese scientists, but also for an even larger number of researchers-turned-entrepreneurs, business executives and professionals. On the one hand are the economies and markets which are ripe for extensive infusion of technology products and investment, and on the other hand is a large pool of expatriate scholars in North America, Europe and Japan and other advanced countries, supplied every year by the world's largest overseas student group.

"Because of their earlier economic successes, Hong Kong, Taiwan and Singapore have had much more experience than mainland China in attracting and utilizing returned talents," explains Luo. In this regard, CASB and OCPA, with the National Natural Science Foundation of China, are organizing an international conference in Guangzhou near Hong Kong this month to explore the "untapped mainland China market for scientists and engineers trained overseas", says Luo. For details of CASB and the conference, see www.casbi.aan.net.

Another network of Chinese expatriates is the North American Chinese Association of Science and Technology, established in Boston in 1994 (www.voicenet.com/~yjin/nacast). This has more than 3,000 members including scientists and professionals in

finance, health care, engineering and education. A chapter of the association formed a corporation with the Pudong New Area in Shanghai last January. This body, the Pudong-Princeton Consulting Corporation, aims to help develop health care and telecommunications industries in the Pudong area, which is also the base for one of China's new human genome research centres (see www.voicenet.com/~yjin/ppcc).

Poor salaries

The very low level of salaries for scientists in the public sector in China remains a major disincentive for people to return. Even university professors in richer departments can only expect about 2,500 yuan (US\$300) a month. In some fields, such as physics, salaries are often much lower.

Mechanisms are being devised to supplement incomes with performance-based bonuses and to provide accommodation and large start-up grants to scientists returning to the country.

Zihe Rhao, for example, who returned to China from Oxford University in the United Kingdom, was given about US\$0.5 million in support from Tsinghua University to set up a structural biology laboratory. And university faculty members can now supplement their incomes from government project grants, provided they work in approved areas of socioeconomic impact.

The new genome research centres in Beijing and Shanghai are being set up jointly by universities, the academy of sciences, and local and central government, and will have new employment practices. Most researchers will be employed on contracts rather than on a permanent basis, and will be paid performance-based salaries. Similarly, a new centre for advanced studies at Tsinghua University will employ most of its researchers on five-year contracts (see page 601).

Although scientists can get higher salaries in industry, the business environment on the Chinese mainland is still "far from ideal", says Luo. But the situation is changing. "The Chinese leadership recently have empha-

sized more and more the importance of science, technology and education in the next phase of economic development," he says. "Especially since the onset of the Asian economic crisis, people realize that labour-intensive export-oriented companies, which have been driving the Chinese economy in the last decade, are not sustainable." The economic crisis has provided the "impetus" to develop technology industries, he says. This in the long run will lead to a "much more attractive environment" for overseas scientists.

Short-stay visits

For those Chinese scientists still disinclined to return, there are growing opportunities for short-term visits. The National Natural Science Foundation of China has since 1992 provided more than 200 small project grants a year, worth about 13,500 yuan (\$1,600) each, for research in China lasting a month or two. This year, the foundation has introduced a scheme that provides much larger grants of about 300,000 yuan (\$36,000) for two to three months for 30 or 40 overseas scientists.

Along similar lines, the municipal government of Shanghai has created the Magnolia Foundation to provide monthly stipends for visiting scientists. Taiwan's National Science Council now offers hundreds of postdoctoral fellowships and opportunities for visiting scholars with generous salaries and allowances to attract people back for short- or long-term visits (see page 603). And Singapore has introduced a scheme to attract top scientists to work on a part-year basis for several years (see page 604).

With the exception of Singapore and Hong Kong, there are at present comparatively few job opportunities in the region for non-Chinese scientists. Academia Sinica in Taiwan is beginning to open up positions to other nationalities, and Singapore is very open in its recruitment policies, drawing scientists from Europe, North America, Australasia, India and China. But in the region as a whole the overwhelming number of jobs are for those of ethnic Chinese origin.