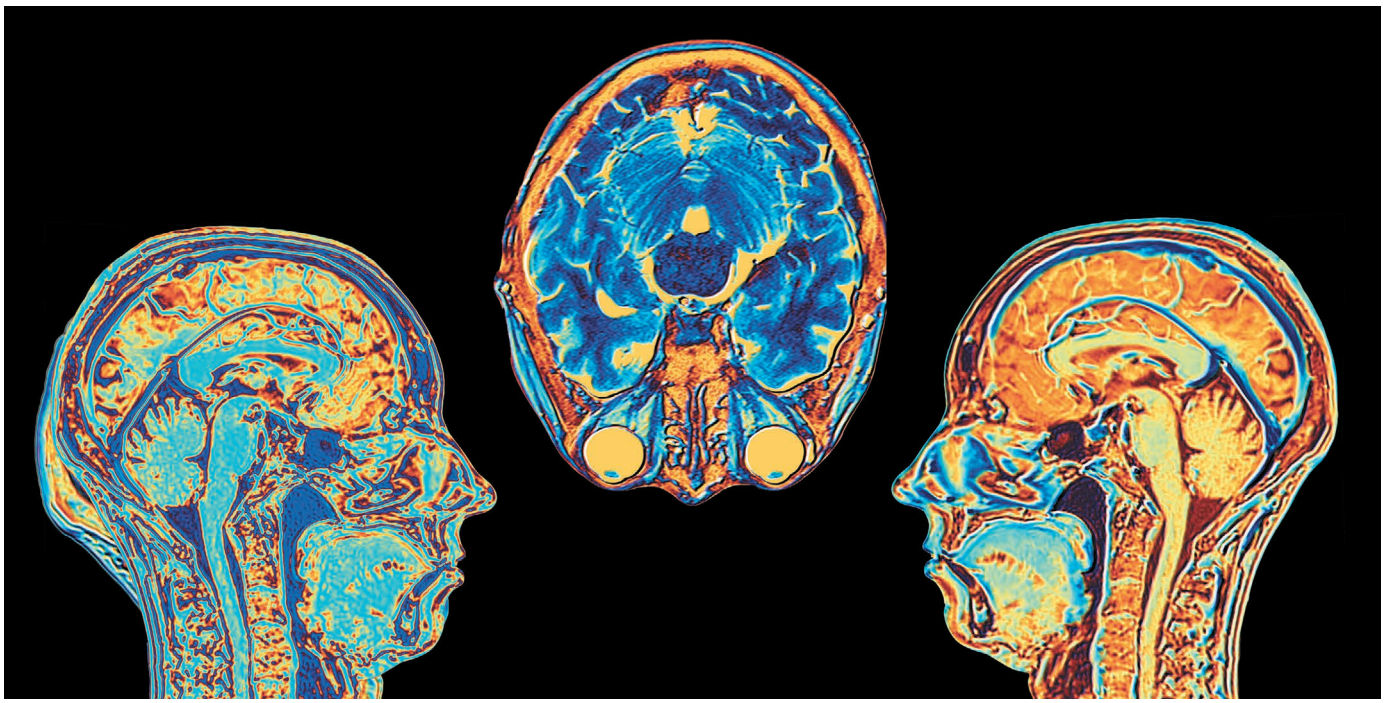
NEWS IN FOCUS

ALFRED PASIEKA/SPL



China's new brain-science centre will host some 50 principal investigators and will also support external researchers.

CHINA

Beijing launches pioneering neuroscience centre

Large research facility will be key part of much-anticipated brain initiative.

BY DAVID CYRANOSKI

For China, 2018 is shaping up to be a big year in brain science. Beijing announced plans last month to build a major neuroscience centre that will rival in size some of the world's largest organizations in that discipline. It will also serve as a core facility for the country's long-awaited brain project — China's version of the high-profile brain-science initiatives under way elsewhere in the world.

The Chinese Institute for Brain Research was officially established in Beijing on 22 March, with an agreement signed by representatives of the Beijing municipality and seven research organizations based in the capital. The agreement named two neuroscientists — Peking University's Rao Yi and Luo Minmin of the National Institute of Biological Sciences in Beijing — as co-directors.

The new Beijing facility will be one of the first concrete developments in China's national brain-research project, which has been under discussion for five years but has yet to be formally announced. The United States and Europe each launched billion-dollar brain initiatives in 2013, and Japan set up a smaller project the following year. South Korea answered with its own initiative in 2016.

China is expected to complement these projects with its rapidly growing cadre of top neuroscientists, abundant supplies of research monkeys and big investments in brain-imaging facilities. "The brain is such a complex system that significant efforts are needed to tame this complexity at an international level," says Katrin Amunts, scientific-research director of Europe's Human Brain Project. China has the potential to provide important insights that relate to the work of other projects, she says.

PLANS AFOOT

Luo says that he will oversee the roughly 50 principal investigators who will have laboratories at the new centre, with Rao taking charge of external grants that will support around 100 investigators throughout China. Luo says that the centre will be similar in ▶

organization and scientific scope to the US National Institute of Mental Health, a major US brain-science funder, although on a smaller scale.

The Chinese centre will be a partnership between Beijing's premier biomedical institutions, among them the Chinese Academy of Sciences, the Academy of Military Medical Sciences, Peking University and Tsinghua University. Luo says it will support projects that use the latest biomedical methods, such as high-throughput single-gene sequencing, precision genome editing and big-data processing. He also hopes to develop better imaging tools, including a voltage sensor that can directly record neuronal activity, and high-speed-imaging microscopes that will allow detailed views of brain activity.

This year, Luo plans to use 180 million Chinese yuan (US$29 million) provided by the Beijing municipal government to hire the first five or six research groups, and to install them in a building already constructed by the municipality, which is across the road from his institute. When operating at its full capacity of 50 researchers, which Luo plans to have within 5 years, some 400 million yuan per year will be needed. He hopes to secure this from the brain-science project, with a substantial amount still coming from Beijing.

Luo says that it will be a "docking site" for the Chinese brain project, which has been in planning since the United States and Europe launched their programmes. So far, few firm details about the project have been released. Scientists who spoke to *Nature* say they expect that the government will officially launch the initiative some time this year.

STAFFING CHALLENGES

In the meantime, other facilities are preparing their bids for support from the national project. A large science park under construction in Shanghai will house a 'southern centre' for neuroscience research. The centre's organizers say this will support many more principal investigators than its Beijing counterpart, which scientists are dubbing the northern centre.

Feng Jianfeng, a computational biologist and head of Fudan University's Institute of Science and Technology for Brain-inspired Intelligence, has been involved in organizing the Shanghai projects. He says that one focus will use artificial intelligence (AI) to study brain diseases. Feng adds that, with 190 million yuan from the university, he is already setting up a brain-imaging facility that will house the largest number of magnetic resonance imaging devices in Asia, and will be based at the southern centre. AI algorithms will screen the images, comparing diseased brains with healthy ones, to form part of the world's largest brain database, he says.

Another programme expected to be integral to the country's brain-science initiative is an international connectome project, which is being designed by Mu-Ming Poo, director of the Institute of Neuroscience in Shanghai. Connectome projects attempt to map out all the neural connections in the brain.

Finding enough researchers might be the greatest challenge for both the individual centres and the Chinese brain-science project. Jeffrey Erlich, a neuroscientist at NYU Shanghai, says that, as well as hiring top neuroscientists, the initiatives will need to fund postdoctoral positions and graduate-school research posts offering internationally competitive salaries.

"That would increase the number of top students going into neuroscience," says Erlich. "Then, in five to ten years, China could have a fresh crop of top young scientists." ■

ASTRONOMY

Exoplanet hunter will seek worlds close to home

NASA's mission is designed to spot planets orbiting nearby bright stars.

BY ALEXANDRA WITZE

Filling the shoes of NASA's Kepler spacecraft won't be easy. Since its launch in 2009, Kepler has discovered nearly three-quarters of the 3,700-plus known exoplanets. And there are thousands more candidates waiting to be confirmed.

So NASA is taking a different approach with its next planet-hunting mission. On 16 April, the agency plans to launch the US$337-million Transiting Exoplanet Survey Satellite (TESS), which will scrutinize 200,000 nearby bright stars for signs of orbiting planets. TESS will probably find fewer worlds than Kepler did, but they are likely to be more important ones.

"It's not so much the numbers of planets that we care about, but the fact that they are orbiting nearby stars," says Sara Seager, an astrophysicist at the Massachusetts Institute of Technology (MIT) in Cambridge and deputy science director for TESS.

TESS is meant to identify planets that are close enough to Earth for astronomers to explore them in detail. Team scientists estimate that the spacecraft will discover more than 500 planets that are no more than twice the size of Earth (P. W. Sullivan *et al. Astrophys. J.* **809**, 77; 2015). These worlds will form the basis for decades of further studies, including searches for signs of life. "We'll see a whole new opening of exoplanet studies," Seager says.

"We'll see a whole new opening of exoplanet studies."

Both Kepler and TESS are designed to scan the sky for planetary transits, the slight dimming that occurs when a planet moves across the face of a star and temporarily blocks some of its glow. For most of its mission, Kepler stared at a deep but narrow slice of the Universe — peering out some 920 parsecs (3,000 light years) from Earth but covering only 0.25% of the sky. Its celestial census showed that planets were common throughout the Milky Way. "We found that planets are everywhere," says Elisa Quintana, an astrophysicist at NASA's Goddard Space Flight Center in Greenbelt, Maryland.

MEETING THE NEIGHBOURS

By contrast, TESS will go shallow and broad — looking at stars within 90 parsecs of Earth but covering more than 85% of the sky. Its 4 cameras will give the spacecraft a field of view about 20 times the size of Kepler's (see 'Scanning the sky'). TESS will sweep the southern sky first and then, after a year, turn its attention to northern stars.

The observing swathes in each hemisphere will overlap at the south and north ecliptic poles, which are points perpendicular to the plane of Earth's orbit. That's by design, because NASA's James Webb Space Telescope, now planned for a 2020 launch, will also be able to study those regions at any