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China sets its sights on the stars

Cui Xiangqun, president of the Chinese Astronomical Society, talks about the nation's plans for more telescopes and probes.

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Chinese scholars have been making astronomical observations for thousands of years, but the country is a relative latecomer to the field's modern incarnation. That is changing fast, though, as Cui Xiangqun, the president of the Chinese Astronomical Society, explained to *Nature* at the triennial general assembly of the International Astronomical Union in Beijing, which runs from 20 to 31 August.

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Cui Xiangqun, president of the Chinese Astronomical Society.

China is hosting the general assembly for the first time. How significant is that?

It is a testament to the growing recognition of the achievements and potential of Chinese astronomy. For a long time, Chinese astronomers had no access to sophisticated telescopes and lagged behind countries with better infrastructure. This has changed since the 1990s, when astronomy in China opened up to the outside world and the government started to invest in infrastructure for science and technology.

What has that investment done for astronomy?

Observation is central to astronomy, and China needs world-class telescopes to move forward in the field. In 2008, we completed an optical telescope called the Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST) in Xinglong, Hebei province. It can see deep into space and at the same time offers a wide view, which has shed fresh light on galaxy formation.

Three years ago, we started building a 500-metre Aperture Spherical Radio Telescope in Pingtang, Guizhou province. When it is completed in 2016 it will be the largest single-aperture radio telescope in the world.

And since early 2008, we have been building an observatory at the Dome A site in the Antarctic (see 'Chinese astronomers look to Antarctic'). The first of three Antarctic Survey Telescopes, installed in January, should yield results soon.

What are your plans for the future?

We hope to build LAMOST South at a site [not yet agreed] in the Southern Hemisphere to complement its counterpart in Xinglong, enabling all-sky global observations. There are plans for a 4-metre telescope to study solar activity with high resolution and sensitivity. The Dome A observatory will also have a 2.5-metre survey telescope called the Kunlun Dark Universe Telescope, which will search for Earth-like planets outside the Solar System; and the 5-metre Dome A Terahertz Explorer-5, which will study star formation. These cutting-edge telescopes will have an unprecedented view of the Universe from the best observing site on Earth (see 'China aims high from the bottom of the world').

"The key challenge is to translate world-class telescopes in to world-class science."

Meanwhile, there will be a significant emphasis on space-based astronomy in the coming years. China will launch its first astronomy satellite, the Hard X-ray Modulation Telescope, by 2016 to study black holes. The Chinese Academy of Sciences' Purple Mountain Observatory in Nanjing is developing the lead probe for the country's Dark Matter Detection Programme, and the planned Deep Space Solar Observatory will host a 1-metre telescope to study the Sun's magnetic field.

How important is international collaboration?

We are all citizens of the global village and scientific endeavours should have no national boundaries. Exchange of ideas and technology with our foreign colleagues has been crucial for China's scientific achievements in the past few decades. The Antarctic observatory on Dome A, for instance, is the result of a joint effort that includes China, Australia and the United States.

International collaboration will continue to take centre stage. China is now part of the international effort to build a 30-metre optical and infrared telescope in Mauna Kea in Hawaii. It is also collaborating with researchers in Switzerland on a black-hole probe, which will be housed on [the Chinese space-station module] Tiangong-2 when it launches in 2014 to detect γ-ray bursts caused by merging black holes or collapsing stars.

What are the main challenges for Chinese astronomers?

The key challenge is to translate world-class telescopes in to world-class science. There is an urgent need to better coordinate resources and research efforts to make the best use of existing facilities across China [those resources are currently coordinated by the Chinese Academy of Sciences' National Astronomy Observatories of China]. Researchers at all levels need to have access to the telescopes and to grasp the art of data mining in frontier studies.

There are also institutional and cultural issues that must be resolved before China can become genuinely innovative, in astronomy or in other disciplines. Scientists should have a greater say in funding decisions, and we have to overcome the prevailing culture of seeking quick success and short-term gains. The education system also needs to shift its emphasis from memorization and coping with exams to fostering creativity and critical thinking.

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