

# Tech Development for Society, Path to Well-being

## Dialogue

By Staff Reporters

Belarus scientist Sergey Antonovich Chizhik is known for his work in physics, micro- and nano-scale surface mechanics, and nanodiagnosics. As the first deputy chairman of the Presidium of the National Academy of Sciences of Belarus, Chizhik is an advocate for international scientific collaboration who received the Chinese Government Friendship Award in 2024. He sat down with *Science and Technology Daily* to reflect on his journey through the world of scientific discovery and cooperation with China.

**What inspired you to choose your research field?**

**Chizhik:** My academic career began more than 40 years ago. After graduating from the Mechanics and Mathematics Department of the Belarusian State University, I got a job at the Institute of Mechanics of Metal-Polymer Systems of the National Academy of Sciences. It seems surprising to me that already in 1982, we understood the importance of processes occurring in the contact zone of solid surfaces at the nanoscale. Since then, I have been studying friction in very exact precision contacts, for example, in magnetic recording devices of personal computers. The path to nanotechnology and nanodiagnosics opened to me.

**Which research achievements are you most proud of? How have they influenced the development of your field?**

**Chizhik:** I am most proud of our results in the development of many measurement technologies and devices based on atomic force microscopy. A small team from my laboratory devel-



Professor Sergey Antonovich Chizhik. (COURTESY PHOTO)

oped and created an original sample of an atomic force microscope back in 1993, including all components of a very precise scanning unit, a control electronics unit, and the necessary software. The devices provide a "trip" to the nanoworld. They visualize it and allow you to touch it, and determine many properties of materials on the nanoscale. Several dozen devices are in operation in our country and abroad. Our devices are used to conduct research in surface engineering, micro- and nanoelectronics and cell microbiology.

**How important is technological development for a country and society, especially in the context of the current wave of technological and industrial transformations?**

**Chizhik:** The role of science in our time is enormous. Understanding the structure of the surrounding world opens up new and unexplored ways to solve the pressing problems of humanity. Technological development for society is

the path to well-being. However, at the same time, we must be vigilant. New technologies can also be dangerous. But technological development cannot be stopped. It is a constant and intensive process. Today's pace of development of human civilization certainly requires the highest pace of technological developments and there are high expectations from science.

**Which area of China's technological progress impresses you the most?**

**Chizhik:** China is amazing. It is developing at a tremendous pace and actively promoting technological progress. I often visit China and since 2002, I have seen amazing changes taking place. I always say that China is technologically developing the whole world. We use technological benefits developed in China. The most impressive parts are the innovations that come into our daily lives, new solutions in electronics, the automobile industry, high-speed trains and much more.

*You've worked closely with Chinese partners, including Harbin Institute of Technology (HIT). What benefits have these collaborations brought to both sides?*

**Chizhik:** As one of the leaders of academic science in Belarus and as a scientist, I devote a lot of effort and attention to cooperation with China. Our scientists cooperate with many universities, academic institutes and companies in China. We also cooperate at the regional level with many provinces of China. We create joint laboratories and centers in many areas of science and technology. Heilongjiang province (in northeast China) has been a long-standing partner of Belarus. We have prepared a large monograph on micro-electromechanical systems. I hope that it will be possible to translate it into Chinese and it will serve as a foundational course for educational cooperation related to HIT. I want our young scientists to receive master's and scientific degrees at HIT. We are pleased to accept students from China to study at the Belarusian National Technical University and the Academic University.

**What do you think are the unique strengths of Chinese researchers?**

**Chizhik:** We are in constant contact with our Chinese colleagues, including participation in online seminars and conferences. It was the Chinese partners and friends who stimulated the continuity of cooperation. Their focus on the final result and the practical implementation of developments in new products is amazing. The culture of China is very ancient, covering thousands of years of historical periods. I have visited many historical places in China and am very interested in the teachings and wisdom of Confucius. The experience of modern China is also interesting.

*Su Simiao from HIT also contributed to this article.*

## My China Story

# Telling China Story Through the Lens

By Dan Tomozei

A picture can speak a thousand words without uttering a single one. A great photograph tells an entire story, including details, emotions, and the power to transcend time. Seen through this lens, China is like a rich and magical time machine where we live amidst cultures and traditions spanning millennia.

From the Yangshao culture that dates back 5,000 years to the new transportation networks, you can travel through thousands of years in mere minutes. This is one of the messages China sends to the world today: respecting our ancestors and history as a precious symbol for now and the future.

I have taken photographs for more than a decade in China and this selection gives my insights into China's development, journeying through a millennium. The first photo shows a sundial, an ancient Chinese invention used for timekeeping by observing the sun's shadow, which was used for several millennia. Then there's the Temple of Heaven, the largest existing ancient sacrificial architectural complex in China. The images of Qianmen Street in Beijing and skyscrapers show China's excellent job in preserving historical buildings and cultural landmarks, passing down its millennial-old traditions and civilization.

Observations over the past 14 years reveal China, vast and complex, pursuing development, primarily human development. In 2021, China successfully eradicated absolute poverty, demonstrating unique determination and setting a model for other developing countries.

These photos, taken in different parts of China, capture moments when people play ethnic instruments, attend events in traditional attire and a couple take wedding photos.

Through these images, I gained a deeper understanding of the success in poverty alleviation. It enables me to capture such joyful moments across different regions.

From another angle, education, ethics, respect, and loyalty remain fundamental elements of Chinese society. I

particularly admire the Chinese model of development based on its history, culture and social patterns. These elements empower China and imbue it with special value.

The educational aspects depicted in these photos may differ from what many might expect. As I mentioned, China holds the inheritance of its history and culture in high regard, which continues to influence contemporary education and play a crucial role in nurturing children's spirit.

Children still learn traditional calligraphy and opera. Moreover, Chinese students participate in tree planting annually, actively protecting the ecological environment. To me, the concept of "education strengthening the nation" is indeed indispensable to achieving modernization with Chinese characteristics.

Today, China's efforts in protecting, inheriting, and promoting culture might be unparalleled globally. With imagination, originality and strength, national memory is elevated through culture, and the link between culture and memory is secured through boosting the economy and tourism.

When I arrived in Beijing 14 years ago, China was conducting its first tests on high-speed trains. Today, China boasts the world's largest railway network, exceeding 46,000 kilometers. It has also developed one of the most extensive highway networks and built new modern cities.

Photos of Beijing and Shanghai illustrate the change; what once required an overnight train ride between the two cities now takes just 4.5 hours on the high-speed train, the Fuxing. This showcases the astounding "China speed."

Time, people, education, culture, and development are key elements of China's success. As a media professional, I will continue to use my camera and writing to document China's stories, narrate its development, and convey the beauty of China to the world.

*The author is a Romanian expert from CGTN who was presented with the Chinese Government Friendship Award in 2024.*



Dan Tomozei. (COURTESY PHOTO)

# SKA Tunes into the Universe

## Science Outreach

By Staff Reporters

Radio astronomy is the branch of astronomy that studies celestial objects using radio frequencies. Every object in



A view of one of a 64-dish radio telescope system in Carnarvon. (PHOTO: VCG)

the cosmos gives off unique patterns of radio emissions at different wavelengths; the radio wavelengths that can be received from Earth range from a few millimeters to tens of meters, which are capable of penetrating interstellar matter and Earth's atmosphere and carry tons of astronomical information. However, traditional radio telescopes are not sensitive enough to detect faint cosmic signals. The Square Kilometer Array (SKA), now under construction, is like a magnifying glass, providing unprecedented observation capabilities through a large-scale radio telescope array and advanced integrated aperture technology.

The SKA will be built in two phases. The first

phase, often referred to as SKA1, consists of two parts, the Low Frequency Aperture Array (SKA-Low) and the Medium Frequency Aperture Array (SKA-Mid), and is expected to be completed in 2028. SKA-Low, located in Australia, contains 131,072 small antenna units, each about two meters high and resembling a Christmas tree. SKA-Low will receive mainly low-frequency radio waves (50 MHz to 350 MHz) and will be used to study the early stages of the universe after the Big Bang, in particular the period of cosmic reionization. SKA-Mid, with 197 parabolic antennas, each about 15 meters in diameter, is being built in South Africa and will receive medium-frequency radio waves (350 MHz to 15.4 GHz), providing high-resolution images to study objects such as galaxies, pulsars and black holes.

The second phase, known as SKA2, is still under discussion and is expected to include additional antenna arrays around the world to further increase the sensitivity and resolution of the telescope.

The SKA will provide detailed images of the large-scale structure of the Universe by making precise measurements of galaxies and galaxy clusters. Combined with data from the Cosmic Microwave Background (CMB), these observations can be used to more accurately determine fundamental parameters of the Universe, such as the Hubble constant, matter density parameters, and dark energy parameters. The CMB is the microwave radiation that fills all space in the observable universe. With a standard optical telescope, the background space between stars and galaxies is almost completely dark. However, a sufficiently sensitive radio telescope like the SKA can detect a faint background glow that is nearly uniform and not associated with any star, galaxy or other object.

As the world's largest array of radio telescopes, the SKA is like a giant web being woven on Earth to capture the mysteries of the universe. Once completed, the SKA will conduct a wide range of scientific research, including microwave background radiation, galaxy evolution and fast radio bursts.

# 'Little New Year' Around the Corner

## Traditional Eastern Wisdom

By Staff Reporters

Xiao Nian, also known as the "Little New Year" and the Festival of the Kitchen God, is a traditional Chinese festival that marks the beginning of the Chinese Lunar New Year celebration. It honors the Kitchen God, the deity who oversees the moral character of house-

holds, and takes place about a week before the Chinese Lunar New Year.

In northern China, Xiao Nian is celebrated on the 23rd day of the 12th month of the Chinese calendar, while in southern China, it is celebrated on the 24th day. This year it falls on January 22 in the north.

Xiao Nian has its origins in the ancient worship of the Kitchen God, which has many customs associated with it.

One of the most distinctive tradi-

tions of Xiao Nian is families burning the paper image of the Kitchen God they had preserved since the previous year. The old belief was that this would send the deity's spirit to Heaven to report on the family's conduct in the past year.

The Kitchen God is then welcomed back into the home by placing a new paper image of him next to the stove. From this vantage point, he will watch over and protect the household for another year.

Offerings to the Kitchen God include fish, sweet bean paste, fruit, boiled dumplings, and Guandong candy, a sticky treat made from sticky millet and germinated wheat.

Between the Laba Festival, which falls on the eighth day of the last lunar month, and Xiao Nian, families across China do a thorough housecleaning, sweeping out the old in preparation for the New Year.

Xiao Nian is an important Chinese festival because it means people getting ready to usher in a new year, a symbol of their resolution to leave the past behind and welcome a new beginning of happiness and good fortune.

# China-built PV Plant Aids Chile's Energy Transition

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"The inauguration of the CEME1 PV project is another step in the transition of our electricity system away from fossil fuels and towards the decarbonization of our energy matrix," said Diego Pardo, Chile's minister of energy.

Calama is the main city near the site of CEME1 and the main source of labor during its construction in Chile. Nearly 1,000 jobs were created for the locals, and a large number of workers were trained to master skills in civil engineering, mechanical engineering and

electrical engineering, subsequently enhancing the income of the local residents.

The site of CEME1 is also home to wildlife habitats and archaeological sites. The project team hired professional wildlife protection experts and archaeologists, ensuring that local wildlife species and excavated cultural relics were well preserved.

In recent years, China has made use of its rich experience in the field of clean energy to deepen cooperation with Chile in energy investment, power transmission and electric vehicles.