

Pursuing scientific excellence

The University of Science and Technology of China has **NURTURED ASPIRING SCIENTISTS ON ALL FRONTS.**

Due for completion in 2022, the world's most powerful wide-field survey telescope of its class in the northern hemisphere, the 2.5m Wide Field Survey Telescope (WFST) is being developed by physicists at University of Science and Technology of China (USTC). WFST provides the most comprehensive images for the latest scientific research, surveying up to 6,000 degrees square of the northern sky in multiple colours every night.

USTC astronomers have also recently identified a unique natural laboratory to investigate

IT CREATES ONE OF THE MOST ADVANCED SYNCHROTRON RADIATION LIGHT SOURCES IN THE WORLD

the re-ionization process of the Universe. They located the most distant massive protocluster of galaxies in the epoch of re-ionization found to date, demonstrating the merging of individual intergalactic medium (IGM) bubbles in the early Universe.

Another facility, the National Synchrotron Radiation Laboratory, Hefei Advanced Light Facility, hosts the National Synchrotron Radiation Laboratory (NSRL) to integrate advanced measurement technology, and create one of the most advanced synchrotron radiation light sources in the world, with ultrahigh temporal, spatial and energy resolution.

This work is illustrative of USTC's dedication to exploring new scientific frontiers. As part of the prestigious C9 League of Chinese universities, it is set



WFST Telescope, providing unprecedented images of the northern sky

to transform the international research landscape. Among Chinese universities ranked by the Nature Index, USTC is the No.1.

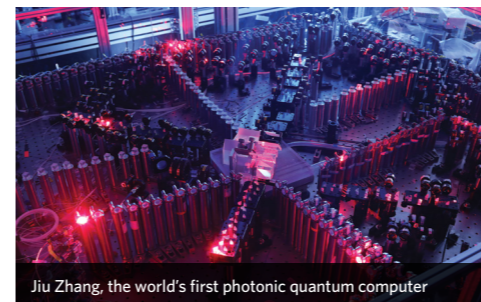
REINFORCING TRADITIONAL ACADEMIC STRENGTHS

A long tradition of academic excellence at USTC's departments of physics and chemistry has made them internationally renowned. In 2020, USTC's chemistry discipline ranked second among global research institutions and first among global universities in the Nature Index. In particular, nanoscience, energy-related materials, single-atom/molecule

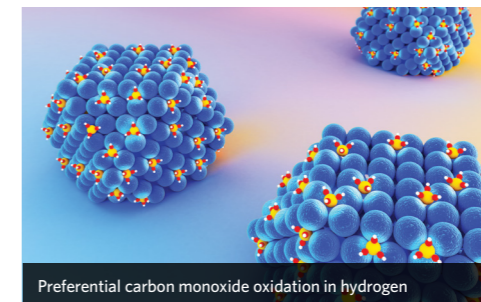
measurements, soft matter and theoretical chemistry are some of its world-leading research fields.

Jiu Zhang, the world's first photonic quantum computer, the brainchild of Jian-Wei Pan, a member of the Chinese Academy of Sciences, can outperform the most powerful supercomputer in solving a sampling problem. Pan also founded USTC's division of quantum physics and quantum information in 2001.

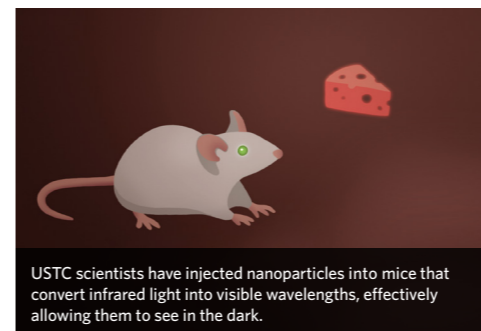
Breakthroughs in selective carbon dioxide conversion by electrocatalysis and preferential carbon monoxide oxidation in hydrogen were selected as the



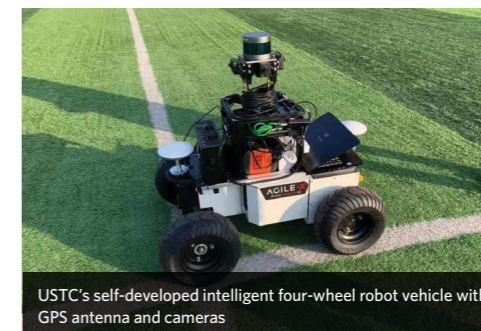
Jiu Zhang, the world's first photonic quantum computer



Preferential carbon monoxide oxidation in hydrogen



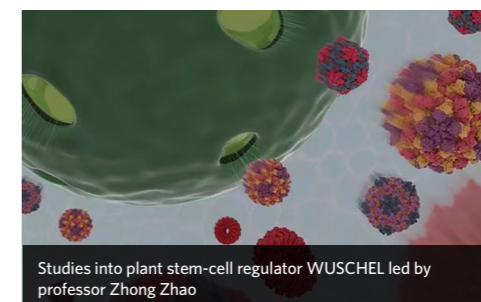
USTC scientists have injected nanoparticles into mice that convert infrared light into visible wavelengths, effectively allowing them to see in the dark.



USTC's self-developed intelligent four-wheel robot vehicle with GPS antenna and cameras



Hefei Advanced Light Facility



Studies into plant stem-cell regulator WUSCHEL led by professor Zhong Zhao

Top 10 Scientific Advances in China in 2016. This new catalyst system for fuel cells addressed a key problem impeding the promotion of hydrogen vehicles, bringing the world closer to a sustainable transport system.

FOSTERING ACADEMIC CROSS-POLLINATION

Apart from green technologies, multidisciplinary growth at the intersection between life sciences and medicine has brought real-world benefits, including bio-integrated nanodevice designs and applications. In developing photoreceptor-binding upconversion nanoparticles

(pbUCNPs), Tian Xue's team has demonstrated that the nanoantennae could extend the mammalian visual spectrum, including near infrared (NIR) light patterns for mice. An injectable, self-powered, biocompatible design complements existing systems without the need for any external device or genetic manipulation.

USTC also hosts more than 10 principal investigators specializing in plant biology, including plant molecular biology, development, epigenetics, and symbiotic fixation nitrogen, which provided key technical support for crop

molecular breeding.

A research group led by Zhong Zhao solved the longstanding mystery of how the tips of plants stay virus-free. They found that the plant stem-cell regulator WUSCHEL inhibits viral protein synthesis by repressing ribosomal RNA methylation, impairing global protein synthesis to limit viral replication and spread.

The USTC team has also been investigating an experimental treatment for COVID-19, adding a known treatment for rheumatoid arthritis to standard COVID-19 care. Results have attracted interest from clinicians around the world, including

Switzerland, among others, as well as from China. Theirs is the only research from a local tertiary institution to become included in the treatment plan for the Diagnosis and Treatment Protocol for COVID-19 (Trial Versions 7 and 8).

PREPARING FOR THE DIGITIZED FUTURE OF CHINA

Creating a smart new world to revolutionize industries and make cities smarter, USTC's Artificial Intelligence of Things (AIoT) team has built a variety of applications ranging from a video transfer platform that does not require a battery, a 'smart bed' that monitors motion and vital signs, a smart-watch based sign language translator, and an efficient in-body wireless power transfer technology.

Backed by the National High Performance Computing Center at Hefei, founded in 1995 and the first of its kind in China, USTC's High Performance Computing has been promoting China's parallel computing and high-performance computing industry. Towards this goal, the research team has developed advanced sensing technologies based on multiple modalities, including vision, acoustic, radio frequency, vibration, and pressure, investigating privacy protection and safety.

USTC sincerely invites scientists from all over the world to work together for global benefit. ■



Email: oic@ustc.edu.cn
Website: en.ustc.edu.cn