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CHINA SCIENCE AND TECHNOLOGY

# NEWSLETTER

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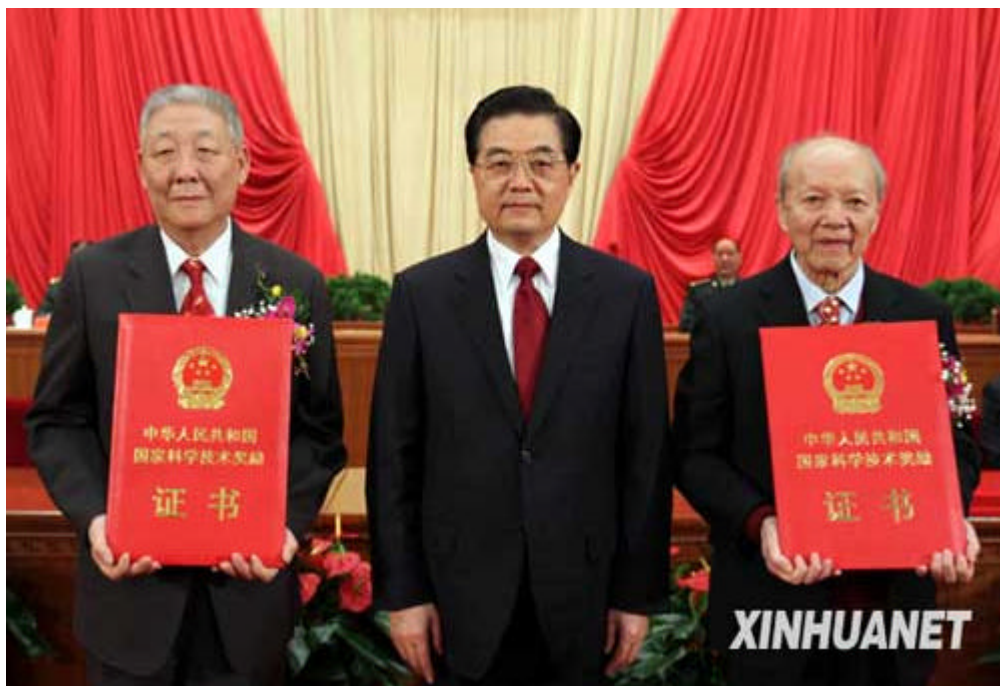
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SPECIAL ISSUES

National S&T Awards Conferred



Chinese President Hu Jintao conferred top S&T awards to GU Chaohao (right) and SUN Jiadong (left).

On January 11, 2010, a grand ceremony, sponsored by the Chinese government, was held in Beijing, where Chinese President Hu Jintao conferred the top S&T awards to GU Chaohao, Chinese Academy of Sciences academician and honorary director of Fudan University Institute of Mathematics, and SUN Jiadong, senior technical advisor to the China Aerospace Science and Industry Corp.. Meanwhile, HU and other senior officials conferred awards to the winners of National Natural Science Award, National Technological Invention

Awards, National S&T Progress Awards, and China International S&T Cooperation Award.

In 2009, 374 projects or individuals were honored with national S&T awards. Two individuals won the top S&T awards. National Natural Science Award had 28 winners for 1 first-place award and 27 second-place awards. National Technological Invention Awards produced 55 awards (2 first-place awards and 53 second-place awards), while National S&T Progress Awards offered 282 awards (3 special awards, 17 first-place awards, and 262 second-place awards). 7 foreign scientists were honored with China International S&T Cooperation Award.

## Agriculture Innovation Forum

A China (Bo'ao) agriculture innovation forum, jointly sponsored by the Chinese Ministry of Science and Technology, Ministry of Agriculture, and Hainan Provincial Government, opened on January 15, 2010. WAN Gang, Chinese Minister of Science and Technology spoke at the opening ceremony. WAN pointed out that China has bred out some 10,000 new crop species, and organized 5-6 large scale species upgrading campaigns since the 11th Five-year Plan period (2006-2010). Improved species has rendered a 35% contribution to the increased yield. A nationwide seeds market operated by multiple major players has been established, with a market value worth RMB 50 billion and seeds application reaching 20 billion kilograms. A range of new crop species and R&D findings have found extensive diffusions. Food related S&T projects have benefited some 300 million mu (1 mu = 0.0667 hectare) of croplands, with a directly increased yield of more than 20 million tons. Hybrid rice has been grown over more than 6 billion mu of croplands, with an increased yield of 600 billion kilograms. Meanwhile, home bred GM cotton species featured with pests resistance has grown over an area reaching 250 million mu, with an increased earning worth RMB 49 billion for farmers. The new drought resistant and water efficient crop species and techniques have been applied to 400 million mu of croplands, enjoying a noticeably enhanced adaptability to climate warming.

The forum is designed to promote R&D finding exchange, business talks, and international cooperation. Some 800 participants from universities, research institutes, seeds factories, and government agencies, including Ministry of Science and Technology, Ministry of Agriculture, and Hainan Provincial Government, attended the event.

RESEARCH AND DEVELOPMENT

## Third Navigation Satellite Launched



At 0012, January 17, 2010, China sent its third navigation satellite aboard a CZIIIC launch vehicle into the preset orbit, from the Xichang Satellite Launch Center. China has been working a Compass navigation system designed with 5 geostationary satellites and 30 non-geostationary satellites, expecting to cover the entire globe. Before the geostationary navigation satellite launched, China has blasted off 4 experimental navigation satellites and 2 Compass navigation satellites. According to a plan, the Compass navigation system will cover the entire Asia Pacific region around 2012, providing navigation, time keeping, and short message communication services. The system will be able to cover the entire world in 2020. The navigation system is designed to provide both open and authorized services, with the former providing free worldwide positioning, speed measuring, and time keeping services at a precision of 10m for positioning, 0.2m/s for speed measurement, and 10 nanoseconds for time keeping. The authorized service will provide tailored services for positioning, speed measuring, and time keeping in line with customers demand.

**New Findings for Cancer Treatment**

A study team, led by Prof. Zhang Hongbing with the Chinese Academy of Medical Sciences Institute of Basic Medical Medicines, published their findings on rapamycin regulating cell differentiations in the recent issue of the *Journal of Clinical Investigation*. The patented finding brings new hope for treating malignant tumors. ZHANG said mTOR, a protein kinase, may overreact to cause the occurrence of tumors, when activated by multiple upper stream genetic mutations. He and his team have sorted out the pathway that leads to the underdifferentiation of cancerous cells. They believe that the over-activated rapamycin inhibits differentiation through Notch signaling, which results in the underdifferentiation of tumor cells while enhancing the malignancy. That means rapamycin or NOTCH inhibitor can be used to restore cells' differentiation capability, suggesting that NOTCH blocking may prevent the worsening of tumors caused by over activation of rapamycin. The finding points out a new direction for clinically induced cell differentiation and targeted cancer treatment.

## Avian Leukosis Viruses Cloning

Not long ago, researchers at Shandong Agriculture University have for the first time in the world rolled out the specific monoclonal antibodies of subgroup J avian leukosis viruses, and corresponding indirect immunofluorescent diagnosing techniques. According to a briefing made by Prof. CUI Zhizhong, the chair of the project, researchers separated the viruses from different birds, including broiler, young chicken, and egg layer, and duplicated the same tumors. The ten consecutive year separation, identification, and epidemic analysis has confirmed that subgroup J avian leukosis viruses is a major avian leukosis subgroup prevailed in China, which provides a solid evidence for preventing the disease.

Meanwhile, researchers have completed the full genome sequence of 10 subgroup J avian leukosis strains and the cloning of 1 infected subgroup J avian leukosis strain. In addition, they prepared the national standards for avian leukosis diagnosis, and associated comprehensive prevention and control measures, including monitoring, live vaccine based contamination check, separation, and cleansing.

## Cassava Genome Charts

Chinese Academy of Tropical Agriculture has completed the deep genome sequence of three cassava species, and obtained a quasi full genome chart with the help of super high flux sequencing techniques. In 2006, the Academy established a research team to work on the full genome sequence of cassava. It took only one year for researchers to complete the deep genome sequence of three cassava species, including Ku50, W14, and CAS36. Meanwhile, a Solexa-454-BAC based mosaic strategy was employed in the data assembly. The data collected creates a foundation for understanding the molecular regulating mechanism that makes cassava's starch accumulation and droughts resistance possible.

## Top Basic Research Progresses Unveiled

Top ten Chinese basic research progresses achieved in 2009, selected by the experts organized by the Basic Research Management Center, part of Chinese Ministry of Science and Technology, have recently been unveiled. They are: Beijing Positron and Electron Collider has been successfully upgraded; China's carbon balance status of terrestrial ecosystems has been mapped; the mechanism causing Brachydactyly type A1 was unveiled;  $\beta$ -arrestin2 signal loss was proved to cause insulin resistance; induced pluripotent stem cells were confirmed with a full range development capacity; metal sodium was shown to be turned into a transparent insulator under high pressure; the ultrahigh intensity of nanocrystalline copper was better understood; the superconductivity of copper oxide superconductors under high temperature and associated theories has enjoyed a deepened understanding; potential functional genes were discovered in super hybrid rice; and key evidences have been found for the origins of birds.

The top basic research progresses were selected by vote by academicians of the Chinese Academy of Sciences and the Chinese Academy of Engineering, the lead scientist of National 973 Program and experts of the advisory and consultation panels under the same Program, and directors of national key labs, based on the S&T news published by S&T News Heralds, China Science Foundation, Chinese Academy of Sciences Proceedings, and China Basic Sciences.

## National Talents Program

Not long ago, an array of Chinese government agencies, including Ministry of Human Resources and Social Security, Ministry of Science and Technology, Ministry of Education, Ministry of Finance, State Development and Reform Commission, National Natural Science Foundation, and China Association for Science and Technology, jointly publicized the national candidates for the so-called New Century Talents Program in 2009. Of the 806 national candidates unveiled, 640 are doctoral students, or 79.4% of the total, 118 postdoctorals (14.6%), 293 doctoral tutors (36.4%), and 170 returned overseas Chinese students (21.1%). Most of the candidates have already been listed for the future human resources development at government agencies both at the local and central levels.

## CARR Neutron Beam Applications

A ceremony was held on January 15, 2010 in Beijing to kick off neutron beam applications for China Advanced Research Reactor (CARR), a major research project undertaken by China Institute of Atomic Energy, under the National 973 Program. CHEN Dongfeng, the lead scientist for the project told reporters that researchers will work on a range of key scientific issues, including iron based superconductivity, novel hydrogen storage, negative thermal inflation, and multiple iron systems, taking full advantage of the 5 neutron scattering spectrometers opened to the public at China Advanced Research Reactor. They will also make no-injury test and work life assessment of large airplane tail wings and spacecraft cowling.

### Antibody Drug Platform

An antibody drug R&D platform was put into operation on January 13, 2010 in Beijing. The platform expects to roll out series antibody drugs in 5 years. The development will expand the antibody drug industry in the city to a scale worth RMB 5-10 billion. At the opening ceremony of the platform, Beijing Municipal S&T Committee, General Hospital of People's Liberation Army, and Yangtze River Pharmaceutical jointly inked a strategic cooperation accord to promote antibody drugs related experiments and commercial applications. The platform is designed with a number of key labs and pilot projects. Pilot projects will be created to address the bottleneck issues restricting the scale commercial applications of R&D findings, in an attempt to establish a pilot-production chain taking advantage of both industrial and social resources, and provide services to all antibody drug developers in the city.

### Novel Explosive Detector

Chinese scientists have developed a super sensitive detector able to pick out well hidden explosives, using the molecular marker technology. CHENG Jiangong, the inventor of the technology and a research fellow at CAS Shanghai Institute of Microsystem and Information Technology said that the novel detector with a weight only of 1.2 kg has registered a screening speed 10 times faster than the regular detectors currently applied in the country. It takes only 5-8 seconds for the device to pick out explosives. Pollution, radiation, and side effects free, the instrument is able to tell explosive traces by picking up the smell of explosives, like a police dog, enjoying a super sensitivity up to 0.1ppt.

### Tomato Residues Become Green Food

CAS Lanzhou Institute of Chemical Physics and Gansu Greenness Biotech recently announced that they have turned the lycopene, linoleic acid, and vitamin E extracted from the residues of tomato ketchup industry into green food. Researchers separated the lycopene and produced the green food using an array of advanced technologies, including

tomato residue screening, enzyme based decomposition, and liquefied gas based extraction, and fixed phase purification. The efforts provide a valid technical support for extracting valid polar compounds from natural produces.

According to a briefing, the new technologies, enjoying potential economic and social benefits and academic/scientific values, have raised the added values of tomato ketchup industry, spurred up the economic development in the agricultural sector, and increased farmers' income. Meanwhile, it developed a green food featured with cancer prevention and antioxidation. The new techniques have been diffused to the tomato ketchup industry in Zhangye, Gansu, expecting an annual output worth RMB 14 million and tax payment of RMB 3.6 million.

## Grove Mountains Height Measured

During the 26<sup>th</sup> scientific expedition to the Antarctica, Prof. WANG Zemin working for the Polar Mapping Lab under the State Bureau of Surveying and Mapping and Wuhan University Polar Mapping Center, has calculated the height of the Mason Peak in the Grove Mountains to be 2,365 meters, or 22 meters higher than the Mount Harding sitting in the core area of the Grove Mountains. To achieve the best possible precision, WANG selected three baseline points on the ice surface near the Mason Peak. He measured the precise geographic positions of the three points, before determining the height of the Mason Peak through triangle elevation survey using the sophisticated theodolites sitting on the three points.

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Comments or inquiries on editorial matters or Newsletter content should be directed to:

Department of International Cooperation, MOST 15B, Fuxing Road , Beijing 100862, PR China E-mail:[hzs\\_dyzdc@most.cn](mailto:hzs_dyzdc@most.cn) Fax: (8610) 58881364

<http://www.most.gov.cn>