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IN THIS ISSUE

- * **Disciplinary Development Reports**
 - * **WAN Met with American Guests**
 - * **Uropygial Gland Contributes to Sex Signals in Budgerigars**
 - * **Fat Protein Structure Unveiled**
 - * **First Cloud Computing Platform**
 - * **Progresses for Earth Probe**
 - * **China Heart for Petaflop Computer**
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SPECIAL ISSUE

Disciplinary Development Reports

An academic capacity building meeting, sponsored by China Association for Science and Technology, was held on April 8, 2010 in Beijing. BAI Chunli, Vice Chairman of China Association for Science and Technology and Executive Vice-President of the Chinese Academy of Sciences, briefed the audiences of the latest developments of 26 academic disciplines, including atmospheric science, and the research findings on four disciplinary history, including China Geology History.

In 2009, China Association for Science and Technology organized the preparation of disciplinary development reports in 26 areas for the period of 2009-2010, including atmospheric science and paleontology, in an attempt to exhibit the scientific progresses achieved in these areas. Meanwhile, five national associations, including Geological Society of China, started to work on the Chinese history of geology, communication science, the combined development of both traditional and western medicines, and chemistry, and rolled out the history books of these disciplines after two-year efforts.

The series disciplinary reports (2009-2010) were compiled by 56 academicians and 1561 experts. Some 2300 experts and scholars reviewed the reports, and made their comments.

INTERNATIONAL COOPERATION

WAN Met with American Guests



WAN Gang, Chinese Minister of Science and Technology met with Jeff Bingaman, Chairman of U.S. Senate Energy and Natural Resources Committee and his party on March 29, 2010. Both sides exchanged views on energy cooperation between the two countries, especially in the area of new and renewable energy.

WAN pointed out that the Chinese government attaches great importance to S&T

innovations in the area of energy, especially energy efficiency technology, and to the development and utilization of renewable energy. In recent years, China has promulgated a range of policies and legislations to facilitate the development of new and renewable energy. In addition, the Chinese government has initiated an array of campaigns to introduce a thousand electric automobiles in ten major cities, to diffuse the application of photovoltaic technology and products, and to spread semiconductor illumination technology, in an attempt to cope with international financial crisis and nurture strategic emerging industries. WAN also told his guests that China is preparing an S&T development plan for the 12th Five-year Plan period (2011-2015), in which the energy component will have an enhanced focus on energy efficiency/emission reduction and associated industrial restructuring. He hoped that the visit of Mr. Bingaman and his party will facilitate the future energy exchanges and cooperation between the industrial sectors of the two countries.

Mr. Bingaman briefed the other side of shale gas reserves in the United States. He also hoped China would enhance its technology cooperation with the United States in the area of IGCC and natural resources.

Hadron Collider Experiment

The European Organization for Nuclear Research (CERN) announced on March 30, 2010 that beams collided at 7 TeV in the LHC at 13:06 CEST, or 19:06 Beijing time, marking the start of the LHC research program. Chinese scientists are part of the experiment.

According to a briefing, LHC channels have four detectors, including CMS, ATLAS, LHCb, and ALICE. Four Chinese research institutes were part of the CMS experiment. The Chinese team, made up of the scientists from CAS Institute of High Energy Physics and Peking University have successfully built some CMS components, and were involved in preparing the technical design of CMS. CAS Shanghai Institute of Ceramics provided 5000 PbWO₄ Crystals to the CMS experiment, and the University of Science and Technology of China was part of the efforts to develop EMC. Chinese CMS team also established a remote control center for the purpose at CAS Institute of High Energy Physics, sharing real-time control of the CMS experiment with CERN and Fermi National Accelerator Laboratory.

Chinese scientists from CAS Institute of High Energy Physics, Shandong University, the University of Science and Technology of China, and Nanjing University have made major contributions to the design and development of the detectors and EMC in the ATLAS experiment.

At present, Chinese scientists in the CMS and ATLAS labs are working on the daily operations and data analysis, getting prepared for the discovery of new particles, including the Higgs boson and physical phenomenon in the coming experiment.

Uropygial Gland Contributes to Sex Signals in Budgerigars

A team, led by ZHANG Jianxu at CAS Institute of Zoology, has proved in a budgerigars study that birds use their body odor to show their gender and sex attraction. For example, birds pass their body odor mainly through uropygial glands possessed by most birds for secreting sexual dimorphism. Researchers found noticeably more volatile octadecanol, nonadecanol, and eicosanol in ratios in males than in females, making them putative male pheromone candidates. Researchers also found that when 'combing' feathers, birds would smear the surface of feathers with their odor for enhanced expression, which overthrew the traditional belief that the uropygial gland mainly makes feathers water proof and reflect the light at different wavelengths. The finding was published in the recent online issue of *Chemical Senses*.

Before this, ZHANG and coworkers have made quite a number of studies of sexual dimorphism in vertebrates. They shifted their attention to birds, started from March 2007. In the spring of 2008, researchers started to keep 100 budgerigars in a co-ed manner. They would separate the females from the males one day in advance before the experiment, so as to achieve desirable results. They eventually proved the existence of sexual dimorphism or chemical senses in the birds through GC-MS.

Fat Protein Structure Unveiled

Not long ago, researchers at National Institute of Biological Sciences in Beijing and Tianjin University jointly unveiled the crystal structures of FTO proteins for the first time in the world. They also confirmed that the protein is a DNA demethylase. At present, a lab led by Dr. CHAI Jijie at National Institute of Biological Sciences and a lab headed by Dr. LEI Xiaoguang at Tianjin University School of Pharmaceutical Science and Technology are working together to screen out the effective small-molecule compounds through computer aided drug design program and high flux screening, in an attempt to develop new proprietary obesity drugs. Researchers believe that the internationally advanced finding, published in the April 7, 2010 online issue of *Nature*, will create a solid foundation for developing innovative obesity drugs.

First Cloud Computing Platform

Worldhm, the first multi-system and multi-user cloud computing platform made its debut on April 3, 2010 in Beijing. Thanks to 8-year efforts and 2-year trial operation, the application platform has eventually officially opened to the public users. The platform can be operated independently by administrative zoning and economic sectors, though it is able to connect several hundred community websites, forming up a sophisticated Cloud of Cloud system and providing cloud computing services for different website users. The project had landed three innovations, including limitless tiered inheritance, massive database management, and search engine cored optimization.

The platform, created by WORLDHM, is able to be further connected to multi-systems and multi-users at will, allowing data being flown between the connected websites, which means even a village in the rural areas can have an independent website of its own, providing needed commercial services and enhancing the effects of popularizing innovative technologies and products.

Progresses for Earth Probe

An earmark program named Pioneer, launched by the Chinese Ministry of Land and Resources, with the support of Ministry of Finance and Ministry of Science and Technology, to probe the deeper part of the earth, has obtained for the first time the echoes from a depth up to 100km. The development resulted in the establishment of an internationally advanced geodynamic model that allows people to see extensive mineral reserves in a 3-dimensional manner.

In 2009, the program started to work on 42 topics under 8 projects in a full-fledged manner. Scientists collected high quality data from the Qinghai-Tibet Plateau, the peak of Inner Mongolia Plateau, and from the wildness of northeast part of the country. The data has unveiled some important findings, providing valuable deep geological formation data for understanding the structure and evolution of lithospheres in China since the Mesozoic period, and for resources survey and geological disasters warning.

Scientists studied in 2009 the strong echoes bounced back from the mantel of lithospheres and micro matters of the earth, which led to three major findings on diamond and nano metal grains in a chromite mine in Tibet. They also established a transparent mineral reserve model for the mineral belt running from Lujiang to Congyang over the lower and middle reaches of the Yangtze River, the first of its kind in the country.

Extracting Isoflavones from *Trifolium Pratense* L.

A special plant resource lab under the Chinese Academy of Sciences successfully extracted isoflavones from *Trifolium Pratense* L.. The simple but efficient extraction process has recently been granted with a national invention patent. The development creates a major technical ground for developing the health products and medicines containing effective isoflavones elements.

Researchers obtained highly purified isoflavones products through an innovative process. The application of membrane separation technique has not only raised the activity of isoflavones, but also purified the sample solution, which in turn eases the damages to resin, prolonging the work life of resin. In addition, the nano filtering technique has simplified the process by asking no concentration for the sample solution before resin column chromatography.

Enjoying numerous merits, including safe, reduced pollution as the result of applying edible alcohol as the solution, and lower cost, the simple but efficient technique is desirable for mass production. It creates a major technical ground for developing the health products and medicines containing isoflavones elements.

NEWS BRIEFS

CAS Computational Biology Lab Inaugurated



Herbert Jaeckle, Vice Chairman of the Max Planck Society and LI Jiayang, Vice-President of the Chinese Academy of Sciences unveiled the nameplate for the Lab.

The Chinese Academy of Sciences has recently inaugurated a new lab for computational biology at the premises of CAS Shanghai Institutes for Biological Sciences. Herbert Jaeckle, Vice Chairman of the Max Planck Society, Lothar Willmitzer, Director of Max-Planck-Institute of Molecular Plant Physiology, and LI Jiayang, Vice-President of the Chinese Academy of Sciences, were present at the inauguration ceremony. An academic meeting, the first of its kind for the new lab, was held after the ceremony. Experts aired their views on the future development of the new lab, hoping that the Institute will collaborate more closely with other research institutes, striving to provide tools and means for biological studies; focus on major scientific issues, deepening and enhancing the studies in the area; develop a desirable roadmap for the future development, turning itself into a national key lab; expand external fund raising channels for the new lab, striving to gain national research grants; and enhance the capacity building of human resources, attracting more talented people under a broadened view, fostering an capable and innovative researcher team.

China Heart for Petaflop Computer

Tianhe I, the first petaflop supercomputer in the country will be installed with a Chinese made CPU in the second half of the year. The new chip, designed and developed by the National University of Defense Technology specifically for Tianhe series supercomputers, has reached the level of the mainstream CPUs in the world. It will be able to raise the peak speed of Tianhe I from the current 1206 trillion operations per second to a slightly higher level, with an actual computation speed also reaching the petaflop level. The fully localized CPS system enhances the safety of Tianhe I supercomputer.

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_dydc@most.cn Fax: (8610) 58881364

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