CHINA SCIENCE AND TECHNOLOGY

NEWSLETTER

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IN THIS ISSUE

INTERNATIONAL COOPERATION

China's Upbeat International Cooperation

A China-US Nanotechnology Institute was opened on June 6, 2005. According to an intergovernmental agreement between China and the United States on S&T cooperation, the Institute, jointly established by Zhejiang University and US California Nano-Systems Institute, will build itself into a research entity integrating R&D, findings spin-off, and associated commercial applications. The Institute will set a role model for S&T system reforms in Zhejiang province, and even for the whole country, as it is built with an internationally advanced operation and management system for handling its human resources, technologies and funds.

On August 2005, China and the United States co-sponsored a forum to discuss advanced reactor technologies, the first of its kind in the area of nuclear technology between the two nations. Two other areas, including health and global changes (climate change and earth observations) have become new endeavors for deepened cooperation between the two nations.

On October 24, 2005, AMD signed an official MOU with the Chinese Ministry of Science and Technology for licensing its microprocessor design technology. According to the MOU, AMD will transfer to the Peking University Microprocessor Center the core technologies for designing X86 microprocessor that is featured with low energy consumption.

On October 27, 2005, China Huaneng Group became an official ally member of a technical project initiated by the US government for future electricity generation technologies. The development makes the first instance witnessing China's large state enterprise being part of a major international cooperation project. According to the plan, the project will construct a commercial demonstration power plant, featured with near-zero emission and an installed capacity of 275MW, in ten years with an investment of USD 1 billion.

In addition, China has launched a range of talks with US based multinationals, high tech businesses, consultations firms, and venture capitals on cooperation in numerous interesting areas, including software outsourcing, new generation air traffic control system, advanced materials and illuminations, LINUX operating system and open software, biochips, cyclic economy, equipment reutilization, and venture capital. Both sides have reached consensus on extensive ranges of topics, and expect a solid implementation.

China also enjoys positive progresses in collaboration with the EU, under the latter's S&T framework. In celebrating the 30th anniversary of diplomatic relations established between China and the EU, a high level forum on S&T strategies was jointly staged by both sides on May 12, 2005 in Beijing. The event provides China and EU members an opportunity to build up their mutual understanding in S&T development planning and associated implementation.

As of September 2005, China has become part of 108 projects initiated under EU's 6th S&T Framework, with the involvement of some 160 Chinese universities and research institutes, and an investment of 418 million euros in total. The projects have covered priority areas agreed upon by both sides, including information technology, energy, materials, life sciences, agriculture, environment, and natural resources. It is worth mentioning that China has become a country having most cooperation with the EU in information technology, overtaking Russia and the United States.

Up to date, China has established S&T cooperation ties with 152 countries and regions, and signed intergovernmental S&T cooperation accords with 96 countries. China is also a member of more than 1000 international cooperation organizations.

China-France Focus on Lab Security

To implement a regulation on managing the labs having highly pathogenic strains, issued by the State Council, to strengthen Chinese labs' biosecurity and associated management, and to promote international exchanges and cooperation in the field, a lab biosecurity seminar, jointly sponsored by the Chinese Ministry of Science and Technology, the Chinese Academy of Sciences, China National Accreditation Board for Laboratories, and French Embassy in Beijing, was convened not long ago. The meeting, physically held in Wuhan by the Wuhan Institute of Virology, a part of the Chinese Academy of Sciences, attracted the participation of nearly 100 representatives from 37 organizations, including the Chinese Academy of Sciences, Chinese Academy of Medical Sciences, Chinese Center for Diseases Control and Prevention, the University of Science and Technology of China, Wuhan University, Huazhong University of Science and Technology, and enterprises.

Participants discussed a range of biosecurity issues, involving labs' design, construction, maintenance, and management. Participants also heard the lectures made by experts from the French National Agency for Food Health Security, the Chinese Academy of Sciences, China National Accreditation Board for Laboratories, Chinese Academy of Architectures, and Wuhan University. The meeting also staged a round-table discussion of differences

between China and other countries in handling biosecurity issues, and associated training and exchanges. During the meeting, participants visited China's first class III biosecurity lab accredited by the State.

Both Chinese and French experts thought highly of the meeting, believing the seminar would spur up Chinese biosecurity labs to move in a scientific, professional, and standardization direction. It is also suggested that follow-up seminars be sponsored, and personnel be exchanged to strength the effect.

LINUX Reference Lab

A LINUX Standard Base Lab, jointly established by China Electronics Standardization Institute and Intel, made its recent debut in Beijing. The development makes China second country in the world possessing such facility after the UK.

The LINUX Standard Base Lab is established with the support of the Chinese Ministry of Information Industry, in an attempt to encourage Chinese IT businesses to learn internationally accepted standards and associated core technologies. The efforts will raise the compatibility of LINUX operating system and associated application software, while drastically bringing down industrial development costs. The lab will provide evidences for formulating a national LINUX standard, and help software vendors to stick to a unified standard.

So far a number of domestic software vendors, including RedFlag Software and S^2C, have passed the LINUX Standard Base certification. Some local authorities have staged bidding for procuring LINUX operating systems.

RESEARCH AND DEVELOPMENT

Biotic Extinction is a Phased Process

XIE Shucheng and YIN Hongfu, a professor and an academician with China University of Geosciences, in collaboration with British scholars, have concluded from their study of molecular fossils unearthed from the Permo/Triassic (P/Tr) boundary at Meishan in South China that faunal mass extinctions in Earth history have experienced at least twice biotic crisis. Prof, XIE and others separated microbialites from marine food chain fossils, and calculated time variations using these biomarkers. They concluded that there occurred at least twice drastic microbial changes across the P/Tr

boundary. For example, the biomarkers present two maximum values at 26th and 29th levels of the Meishan section, which indicates two multiplication peaks for the bacteria. In the meantime, researchers discovered two biotic extinction peaks for invertebrates at 25th and 28th-29th levels, which occurs right before the two multiplication peaks, showing a well connected coupling.

XIE points out that each biotic extinction is followed with a microbial multiplication peak, which reflects microbial responses to the catastrophic events that caused the extinction and initiated ecosystem changes. Their findings show that the catastrophic events occurred 250 million years ago is multi-phased in nature. Major causes of the events come from the inner earth, rather than the outer one. The finding is published in the journal *Nature*.

Animal Robot

On December 31, 2005, a white mouse was acting turning right, left, marching forward, and making circles on the scene under the computer commands, with an accuracy of 100%, at a robot research center of Shandong University of Science and Technology. Recently the animal robot passed an experts' validation check.

The animal robot, jointly developed by automation experts and physiologists, is a real mouse with a brain implanted with mini electrodes that work with computer signals. Computer signals exercise controls over the mouse' nerve cell clusters, which in turn direct its movement. Researchers also developed a multi-channel remote controller to send separate signals to corresponding nerve cell clusters.

The success of the experiment not only means man's control of animals' movement via electric signals, but also predicts that artificial signals would eventually act the same as the electric signals generated from the brain and body. Through standardization and commercial applications, the system can be used to meet diverse needs of humans and animals, and will bring up huge theoretical and practical values for many areas, including neurosciences, pharmaceuticals, and recuperation.

Large Scientific Instruments Sharing

An ion probe sharing system, jointly created by the Beijing Ion Probe Center, the Chinese National Institute of Metrology, and Jinlin University, has recently applauded for a success. Built on a control system and public broadband network, the new platform can make users feel like making an experiment in person on the scene, through remotely controlled ion probe

operation. Users can observe changes of sample images, and collect experimental data online on a real time basis. The system can accommodate a cooperative experiment by a number of scientists in different places. Researchers have found solutions to 7 technologies key to the instrument's remote operating, and developed 8 sub-systems for remote operation of an ion probe mass spectrometer, and remote controlled experiment integrations among many others. The platform, made up of an online sharing center, and two workstations in Yichang, Hubei Province, and St. Paul in Brazil respectively, currently operates on a trial basis.

According to a briefing, the system allows scientists in different places to work on a same experiment, observing an analytical process and comparing the results on a same instrument. The process can be replayed for real-time exchanges.

Mutation Chart for Chinese Man's No.21 Chromosome

With the support of the National 863 Program, the National 973 Program, and the Shanghai Municipal Committee of Science and Technology, a research team, chaired by HUANG Wei, research fellow at the China National Human Genome Center, Shanghai, has analyzed over 20,000 SNPs in the No. 21 human chromosome, and compared more than 300 typical Chinese specimens with that from other ethnic groups in the world. In collaboration with Fudan University School of Life Sciences, the CAS-MPG Partner Institute, Shanghai Biochips Co. Ltd., and Shanghai Southern Gene Co. Ltd., the research team has produced a gene mutation chart for Chinese man's No. 21 chromosome, based on an analysis of over 20 million gene subtypes. The finding of the unique study of genetic mutations of Chinese population was not ago published in the Proceedings of the *National Academy of Sciences*.

The chart presents an important application value for detecting risk populations in China, and for working out corresponding preventative measures. In the meantime, it provides a theoretical basis and technical reserves for screening and developing medicines that tailor to the needs of Chinese populations.

Novel Gasification Furnace into Operation

China's first proprietary coal-water slurry gasification furnace, developed by Chinese engineers with 10 intellectual properties, has been put into operation at Shandong Guotai Chemicals. Compared with its imported counterparts, the furnace enjoys doubled payload scalability, with lower oxygen consumption, higher coal efficiency, and purer carbon monoxide and hydrogen outputs. The gas derived from methanol production can be directly used for electricity generation. It is worth mentioning that the

furnace accommodates diverse ranges of coals, especially high-sulfur coals of low melting points. The new technology produces almost no hazardous gases when burning high-sulfur coals under high temperatures, as they are desulfurized into harmless by-products.

NEWS BRIEFS

National Guidelines for S&T Development

The Chinese State Council released on February 9, 2006 the National Guidelines for Medium- and Long-term Plans for Science and Technology Development (2006-2020). The Guidelines sets a target to raise the weight of China's research and development expenditures in GDP to 2.5% or above, with an S&T advancement contribution rate reaching 60%, and a reduced dependence on foreign technology by at least 30%. It also expects that the increased number of Chinese invention patent grants and citations of Chinese S&T papers will make China sit on 5th place in the world.

The Guidelines points out that China's S&T development will head for a set of general objectives up to 2020: significantly enhancing China's proprietary innovation capacity, remarkably raising China's S&T capacity in promoting economic and social development and safeguarding national security, and providing an enhanced S&T support for building a full-fledged well-to-do society. China also strives for a noticeably fortified position in basic scientific researches and frontier technologies, expecting a range of S&T findings of international importance. The efforts will turn China into an innovation-oriented nation, and lay a solid foundation for China becoming a world S&T power in the mid-century.

China's Top Ten Popular Science Events

Chinese scientists, popular science activists, and S&T journalists have recently selected out China's top ten popular science events for 2005. They are chronologically listed as: extensive spread of highly pathogenic strains of bird flu, China hosting series of activities for World Physics Year, Hebei Province's taxation incentives for popular science activities, approval of the construction plan for a new National S&T Hall, China's first Popular Science Day, the successful mission of Shenzhou 6 spacecraft, national honors accredited to rural popular science activists, centenary ceremony for GAO Shiqi, a renowned Chinese popular science activist, popular show for building a saving oriented society, and environmental protection warning for a major contamination disaster over the Songhuajiang River.

The selection of top ten popular science events, sponsored by the Popular Science Daily, a part of China Association for Science and Technology, has run for four consecutive years. The event has won firm support of scientists, popular science activists, and readers, with an increasingly enhanced social influence.

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