N0.471

CHINA SCIENCE AND TECHNOLOGY
NEWSLETTER
The Ministry of Science and Technology
People's Republic of China

No.471 April 10,2007

IN THIS ISSUE

*Universities Took Lion's Share of S&T Awards
* Phase Progress for HLPP
* New Abnormal Chromosome Found in China
*Wall-Climbing Robot
*Chinese Made Moon Rover
*Loongson 2E Computer

SPECIAL ISSUES

Universities Took Lion's Share of S&T Awards

China's universities have taken up 50% and more of national S&T awards granted in 2006, and they have been contracted to more than half of scientific and invention projects initiated by the state, said LI Zhimin, Director of S&T Development Center, part of Chinese Ministry of Education, at a news conference held on March 26, 2007.

In 2006, China's universities have harvested 250 national S&T awards. Of 29 national natural science awards granted in 2006, universities have taken up 15, or 51.7% of the total. It is worth mentioning that of the 15 awards collected by universities, 2 are first-place prizes. Universities have collected 25 of the 41 national invention awards, and 106 of 184 S&T advancement awards. Statistics show that universities have taken away 50% or more of the awards in all three categories.

Statistics also show that during the period of 1985-2006, most national awards granted to universities stemmed from research findings, with 50% for natural science, 1/3 for technological inventions, and 1/4 for S&T advancement.

Chinese Scientists Unveiled Desertification Tracks

A ten-year project to study the occurrences of desertification and associated control, led by Prof. CI Longjun, the lead scientist of Chinese Academy of Forestry Science, and jointly undertaken by Chinese Academy of Sciences, China Agriculture University, and Gansu Institute of Desertification Control, has unveiled the tracks of desertification under the influence of climate change. For example, the semi-arid area, represented by Maowusu sandy land, has 1500 years as a development cycle. Meanwhile, the semi-arid area, represented by Guerbantonggute Desert, has 1250 years as a development cycle. The finding, fully in agreement with the dry-wet cycle of climate change at a thousand-year scale, has shown an accelerated development cycle of deserts or sandy lands in the past 10,000 years.

Scientists told reporters that the biological properties of plants and associated biogeophysical process have validated and confirmed the formation and collapse of the socalled 'fertile island" in the course of desertification. They pointed out that the degradation and control of semi-arid areas goes along with a resource specific course of Stipa-drifting sand dune-bushy pastureland.

Derived from the study are a range of models, including a theoretical framework for the formation and development of desertification, and associated monitoring and assessment, and practical technologies and control models for typical desertification areas. The effort combines desertification control with the regional sustainable development, in an attempt to enhance the prevention and control of desertification, and provide technical reserves and role models for the endeavor.

Researchers have completed China's first biological-climatic zoning map for desertification, and established an indicator system at the national level, for large scale desertification monitoring and assessment, which provides a theoretical and methodological framework for nationwide desertification monitoring. They also established a desertification monitoring and assessment platform in Yijinhuoluo of Inner Mongolia. Both results have been used in the nation's desertification monitoring and control planning. Pursuant to the requirements of UN Convention to Combat Desertification, researchers produced a China desertification climate zoning map, which clearly outlines the potential desertification areas in the country.

Control models are also rolled out for desertification areas in different types. For example, they have bred out 11 arboreal and shrub species with strong adversity resistance, enjoying a drought resistance for 100mm precipitation, cold resistance for extreme low temperature injuries and a 90-day growth cycle, and salinity resistance of 1.6%-2.3% for surface sulphate, and 24.16% for the salt content of saline crust for a normal growth. An array of techniques, also derived from the project, including dripping irrigation for the green rims of deserts, "three-system" control techniques for saline land, and sand fixation afforestation techniques for cold sandy areas, have provided technical support for vegetation restoration under extreme conditions.

On the basis of screening plant materials and developing suitable desertification control techniques, researchers have innovatively worked out comprehensive control models for four typical desertification areas: the ecological and economic development oriented preventive and protecting system for oasis in extremely dry deserts; the prevention and control model for arid areas with secondary saline land; the socalled "three belts" desertification control model for semi-arid areas having both agricultural and stock raising operations; and the desertification control model for cold pasturelands over the Qinghai-Tibet Plateau. Desertification resistant plants have been grown over an area of 3.888 million mu(1 mu= 0.0667 hectare) in Xinjiang, Gansu, Qinghai, and Inner Mongolia on a combined basis, with an economic return of RMB 150 million. The plants will be further diffused to grow over an area of 100,000 km^2 in the future.

RESEARCH AND DEVELOPMENT

Phase Progress for HLPP

Chinese scientists who lead the Human Liver Proteome Project (HLPP) announced recently that they will be able to accurately tell the pathogenic causes behind different hepatitis and liver cancers, through blood testing using the biochip connected to a computer. The new technique not only reduces the possible pains in diagnosing, but is also helpful for working out a right therapy.

XU Tianhao, an assistant research fellow at the Beijing Proteomics Research Center told reporters that the protein/antibody chip, made of silica gel and looking like a glass plate used in regular blood test, carries a hundred or thousand of protein antibodies as reagents. They can accurately indicate the changes in liver proteomics. As a result, researchers can spot the pathogenic causes behind liver diseases. The breakthrough makes liver disease diagnosis and treatment more accurate, and "one individualized therapy for each patient" possible.

Up to date, Chinese scientists who are part of the Human Liver Proteome Project have successfully sequenced 6,788 highly credible Chinese adult liver proteomics, and established a blueprint for human organ proteomics, the first of its kind in the world. They have also produced a network chart showing interactions between some 1000 proteins, and screened out more than 2000 strains of protein antibodies.

New Abnormal Chromosome Found in China

An abnormal human chromosome karyotype, discovered by Henan S&T University Medical School, has recently been confirmed by China's genetic research authority as a new abnormal human chromosome karyotype reported for the first time in the world. The chromosome karyotype has been made part of China's database for abnormal human chromosome karyotype.

In November 2006, a female patient visited the No. 1 Hospital affiliated to Henan S&T University for her primary amenorrhea and underdeveloped secondary sex characters. She was suggested to have a chromosome examination at the University's medical school. She was then diagnosed having an abnormal chromosome, with misplaced 3rd chromosomes (two regular chromosomes and one sex chromosome).

Researchers have consulted both China's database for abnormal human chromosome karyotype and the international registration database for abnormal human chromosome karyotype, and found no matches.

Researchers then sent analysis results to China's National Key Lab for Genetics for further confirmation. The latter has reached the following conclusion: the newly discovered abnormal karyotype (46，X，t(X；5；6)(p11.2；q35；q16) is a brand new karyotype reported for the first time in the world. It is the first case involving misplaced 3rd chromosomes, especially between regular and sex chromosomes.

Chinese Made Moon Rover

A MR-2 Moon Rover, jointly developed by a dozen of research institutes, including Shanghai Space Agency, Harbin Institute of Technology, Shenyang Automation Institute, and National University of Defense Technology, made its debut on March 31, 2007 at Shanghai Academy of Spaceflight Technology. The Rover, 1.5m tall, 1.2m long, and 0.8m wide, sits in a room covered with fine sands. The 6-wheel rover showed its tricks for slope climbing, obstacles crossing, proprietary obstacle avoiding, and ground telemetering control, under the commands of operators.

The Rover, applied with a 6-wheel rocker-bodied walking system, is able to climb a slope of 30 degrees, and cross over an obstacle of 25 cm. It is designed with a walking speed of 100m per hour, and a top gear at 5cm per second. With the help of a proprietary visual navigation system, it can 'see' the terrains 3 meters ahead of it. The Rover plans the traveling route through a 3-D map it creates on its own. It is programmed to divert from a slope which is larger than 30 degrees, or a boulder higher than 25cm, or a pit of 2m across. Its developer told reporters that the Rover is only a prototype, and a range of key technologies have to be worked out, in an attempt to allow the Rover being able to physically roam over the moon, including an adaptability that ensures the rover surviving extreme temperatures and an environment with 1/6 gravity of the Earth, nighttime power supply, and visual navigation.

China's FEPG6.0

Not long ago, the Academy of Mathematics and Systems Science, part of the Chinese Academy of Sciences, and Beijing FegenSoft jointly announced that they have successfully developed a FEPG6.0 for high performance computer applications. The development means the finite element programs that are extensively used in teaching, research, and engineering can also be calculated on large computers, or on dual and multi-core personal computers, taking full advantage of the physical performance allowed for a computer.
The new version provides a finite element program for high performance personal computer and large computer. According to a briefing, the latest FEPG software offers 5 versions in two series: FEPG.PC and FEPG.NET, in an attempt to meet different FEP needs ranging from personal computers, to servers, and further to parallel computers.

The proprietary software, the only finite element programming tool with open source codes in the world, makes a FEP generating platform for computer and network applications. The effort has raised China's position in developing high-performance computing software.

Loongson 2E Computer

A computer with a Loongson 2E chip as its heart made its debut on March 28, 2007 in Beijing. The development heralds China's

On March 28, 2007 in Beijing. The development heralds China's low-end desktop and notebook PC equipped with China's proprietary CPU being rolled out of the labs to the marketplace.

The Institute of Computing Technology, part of the Chinese Academy of Sciences, and Jiangsu Menglan Group jointly established in May 2004 an industrial base for making Loongson chips. Researchers have successfully worked out low-end desktop and notebook PCs equipped with Loongson chips, through developing the core technologies, and combining both key and application technologies. The manufacturing base has developed a bulky production capacity, enjoying 10 national invention patents and 4 utilities.

In addition to its "China heart", Loongson computers are equipped with Chinese made operating system, and office software, enjoying noticeable strength in both energy consumption and performance. Having a capacity equivalent to that of an Intel Pentium IV processor, a Loongson notebook PC is fully up to the routine requirements for a computer. The built-in security system is able to fend off most prevailing viruses, and its coding processor supports encrypted data saving and transmission, allowing a maximum security for users. Enjoying the strength in price, Loongson computers are welcomed by government, farmers in rural areas, schools, troops, and low-income urban residents.

Wall-Climbing Robot

A wall-climbing robot, specially designed for anti-terrorism operations, recently made its debut at the Harbin Institute of Technology.

The research team, headed by Prof. SUN Lining, Director of the Institute's Robot Lab, and Dr. LI Mantian, head of the project, chosen the model from some ten prototypes it has developed. The wall-climbing robot has met a range of indicators as required by the contract.

According to a briefing, the wall-climbing robot works on a 4-whell structure with negative pressure cups and single sucking disk, enjoying numerous merits, including fast movement, reliable absorption, adaptability to diverse wall surfaces, low noise, compactness, and easy operation. In a hostage taking case, criminals usually hide themselves in a room, which makes anti-terrorist troops difficult to assess the inside situation. A wall-climbing robot, equipped with reconnaissance equipment, can be used to shoot the internal pictures of the room, through a remote control device. The pictures will be transmitted to a mobile base several hundred meters away. Anti-terrorist troops can judge the situation using the evidences provided by the robot. The robot is also designed with a firearm module for emergency attack.

Powerline Supports Intelligent Electric Appliances

SUN Yuning, head of China Intelligent Grouping and Resource Sharing (IGRS) Standard Working Group, recently told reporters that China's domestic vendors have geared up to develop intelligent electric appliances that support powerline based data transmission. As a result, optic-fiber and wireless network vendors will be challenged for their monopoly status in data transmission.

According to an accord inked between China IGRS Working Group and Consumer Electronics Powerline Communication Alliance (CEPCA), China IGRS Working Group and CEPCA will jointly establish a powerline telecommunication accreditation center in Beijing, allowing consumers to choose powerline as a data transmission medium for household information network. The effort will save consumers from sophisticated network and TV cable wiring in a household environment.

Intelligent Grouping and Resource Sharing (IGRS) is a technical standard initiated by Chinese enterprises, in an attempt to realize an obstacle-free interconnection between computer, electric appliances, and other electronic products, a development direction the next generation information industry is heading for. China IGRS Working Group is working with CEPCA to provide more connection options for household information appliances.

Comments or inquiries on editorial matters or Newsletter content should be directed to:
Mr. Mao Zhongying, Department of International Cooperation,
MOST 15B, Fuxing Road Beijing 100862, PR China Tel: (8610)

58881360 Fax: (8610) 58881364

http://www.most.gov.cn