

# Content

Science News from Chinese Media during August 2007  
 Collected and Compiled by the Helmholtz Beijing Office

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## Helmholtz News Concerning China

There is not very much news in August, as scientists of both sides are mostly taking their holidays because of the weather.

On the 15<sup>th</sup> August, a round-table meeting of the German research and research promotion organization was held in the DAAD office. Representatives from the German Embassy, DAAD, DFG, Fraunhofer, Helmholtz and AIF have participated in this meeting. Dr. Hack has provided information on various topics to the attendants: 1, Some activities under the topic TCM (Traditional Chinese Medicine) are going on, with the objective as jointly carrying out scientific approach to TCM studies; 2, EU commission declared a project to set up a European Clean Energy Centre in Beijing. The Centre will be expected as the focal point for all European activities in the field of energy and climate change and a “door” to Europe for the Chinese stake-holders. This project will be financed by the Commission with 2 million Euros p.a. and will be run by a consortium consisted of non-profit-organisations.

The German Premier Mrs. Merkel visited China in August. She had meetings with the Chinese President HU Jintao and Premier WEN Jiabao. As expected she emphasized all the time during the talks the implementation of IPR regulations. And as the executive Chairwoman she shared the opinion with the Chinese leaders in common, climate change, energy and environment are for sure the most important areas for the future cooperation between China and Europe.

As a member of Mrs. Merkel’s German delegation, MP Mrs. Flach has invited through Dr. Hack the office representatives of the German research organisations for a round-table meeting on the 27<sup>th</sup> August in Hyatt Hotel. She tried to have an in-depth understanding on China’s research landscape and the expertise for successful cooperation.

On the 27<sup>th</sup> and 28<sup>th</sup> August, an OECD conference concerning a study on the Chinese Innovation System was held in the Friendship Hotel. Over 200 people were present. This study was a joint cooperation between OECD and MOST. It is described that the Chinese National Innovation System has experienced a tremendous progress. China invests over 30 billion euros for R&D last year (1.4% of GDP) and this figure will be further aggressively expanded many times by the year 2020, accompanied by the consisting 10% GDP growth rate, R&D should reach 2.5% of GDP according to the Chinese Lang and Mid Term Plan. Of course, there are still many structural problems; for instance, at present most spending is for development, fundamental research is just merely over 5%.

Under the invitation of Mr. XIA Shaoqiu, Vice Secretary General of Harbin, Heilongjiang Province, Dr. He from the Helmholtz Beijing Office paid a short visit to this city in Northern China in August. He had also the opportunity to talk with some university officials and to emphasis the future coordination concerning the Helmholtz-CAS student exchange programme.

Helmholtz Beijing Office

## 1 Science News

### 1.1 Energy

#### **China's largest ultra super critical steam turbine generator completed**

**(People's Daily, 2007-08-07)**

A one-million-kilowatt ultra super critical steam turbine generator, the largest of its kind in China, was recently completed by Harbin Electric Machinery Co. Ltd in northeast China.

The generator, with 80 percent of its parts independently developed by China, marks a leap forward in the factory's capability in turbine generator manufacture.

#### **Scientists harness power of dry air**

**(People's Daily, 2007-08-10)**

Could it be a marvelous breakthrough, or just hot air? Chinese scientists claim to have discovered a new clean energy source - simply by using dry air.

The discovery could have positive implications for parts of northern and western China, which have dry climate conditions, according to scientists at Tsinghua University.

"The breakthrough makes it possible to use dry air, instead of electricity, to cool down the water and the indoor air, and be applied at least to power large-scale air-conditioning equipment in office buildings," Jiang Yi, director of the university's architecture science department, who leads the research project, told China Daily.

For decades the world's scientists have been eyeing the potential of turning dry air into a useable energy.

The premise sounds simple enough: dry air absorbs moisture, and in doing so causes the air's temperature to drop.

Jiang said he was confident the energy could be widely applied, and that his team at Tsinghua was cooperating with a company in Xinjiang to produce air-powered air-conditioning equipment.

So far trials in some large buildings had been successful.

"Believe me, the air looks tranquil but it is imbalanced thermodynamically when it is dry," said Jiang, who is also an academic at the Chinese Academy of Engineering.

The process does not produce electricity, but provides a means to allow less reliance on electricity.

The technology could be compared to a solar hot water heater, whereby water is continuously heated as long as there is sunlight.

Currently the air-powered air conditioners can keep room temperature between 25 and 28 C, and scientists are still working to expand the range.

Zhang Fulin, the director of the science and technology office under the Ministry of Construction, said the breakthrough could have great implications for emission reductions.

#### **China tests nuclear emergency command platform**

**(People's Daily, 2007-08-10)**

China Disease Prevention and Control Center revealed on August 7 that the first phase of the project of

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national nuclear emergency command platform has been completed and put into trial operation, Chinanew.com reports. The platform can do real-time monitoring of nuclear power plant operation, obtain real-time data of radiation monitoring and meteorological observations, and automatically receive accident warning messages.

Established in the Commission of Science Technology and Industry for National Defense, the national nuclear emergency command platform has been connected with the emergency command centers and provincial nuclear emergency command centers of Qinshan (Zhejiang Province), Daya Bay (Ling'ao, Guangdong Province), and Tianwan (Jiangsu Province) nuclear power bases. It can exchange information and accidents message with the nuclear power plant emergency headquarters, fulfill intelligent monitoring tasks, conduct analysis and evaluation on radiation consequences of nuclear accidents, and, communicate with foreign institutions and public websites.

### **Nuclear Power Plant to Be Built in NE China**

**(CRI, 2007-08-16)**

China is to begin constructing on Saturday its first-ever nuclear power plant in its northeastern Liaoning province, a key heavy industrial base of the country.

Located in city Wafangdian on the Liaodong Peninsula, the planned nuclear power project, named Liaoning Hongyanhe Nuclear Power Plant, will involve a total investment of 50 billion yuan, or some 6.5 billion dollars. Its first phase project is expected to be completed in 2014, with four-set million-kilowatt turbine generators put into operation, producing each year at least 29 billion kilowatt hours of electricity.

It's believed that the nuclear power plant will substantially improve the energy structure of northeast China, satisfying the regions rocketing energy demands brought about by rapid economic growth.

The new power plant is also expected to help reduce environmental pollution, optimize the region's power grid, and promote the manufacturing industry of nuclear power plant equipment.

Currently about 80 percent of China's electricity is produced from fossil fuels, mainly coal, with hydro power accounting for only 18 percent. Due of the nation's heavy reliance on old coal-fired plants, electricity generation accounts for much of the country's air pollution, which is a strong motivator for increasing the use of nuclear power.

Moves to build up China's nuclear power base commenced in 1970 and the industry has now moved onto a steady development phase.

Chinese first two nuclear power plants were at Daya Bay in Shenzhen and Qinshan, south of Shanghai, with construction starting in the mid 1980s.

### **China has become the biggest solar energy developer**

**(China News, 2007-08-28)**

According to several solar energy experts, China has become the biggest solar energy developer in the world. The solar energy used by China is equal to the heat of 200 million tons of standard coal.

Besides, China is also the biggest solar energy market in the world as well as the biggest solar energy heater producer. China boasts has 90% of the world's key technologies for solar energy development, and has forged several competitive brands in this field.

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### **Chinese scientists contribute to world's 1st fusion reactor**

**(Xinhua Net, 2007-08-31)**

Chinese scientists are making significant contributions to a landmark international science project to build the world's first fusion reactor, a senior official said yesterday.

Jin Xiaoming, director of the Department of International Cooperation of the Ministry of Science and Technology, said the country had succeeded in the trial operation of a miniature version of the planned international reactor and is ready to start construction in collaboration with scientists from other countries.

The 11 billion-euro (15.01 billion U.S. dollars) International Thermonuclear Experimental Reactor (ITER) is the largest-ever scientific research program under multinational collaboration, aimed at incubating a sustained solution of energy production.

China's top legislature, the National People's Congress, yesterday approved the Agreement of Joint Implementation of the ITER Project, which was signed by China, the European Union, India, Japan, the Republic of Korea, Russia and the United States in Nov. 2006, in France.

"Construction of the reactor will begin later this year and the whole project will last for 35 years in four stages of constructing, operating, exploiting and deactivating the ITER facilities," Jin told China Daily.

"China has an equal footing with all participants on deciding key issues of the ITER organization, sharing construction, operation as well as research and development activities, obtaining equal opportunities with the all other parties on intellectual property rights."

The EU will fund roughly 46 percent of the budget. The rest of the participating countries including China will share 9 percent each of the costs.

## **1.2 Earth and Environment**

### **Scientists advocate basic research on mineral prospecting via remote sensing**

**(CAS, 2007-08-07)**

The application of remote sensing in mineral exploration is increasingly facing challenges in today's world in spite of the fact that the application has both promoted resources discoveries and the development of the technology *per se* over the past years, noted scientists at a recent session of the Xiangshan Science Conferences in Beijing.

With the theme of "new challenges facing mineral deposits prospecting via remote sensing," the meeting was co-chaired by Prof. LIU Dechang from Beijing Geological Research Institute under China National Nuclear Corporation, Prof. ZHAO Pengda from Chinese University of Geoscience, and HU Ruzhong from China Society of Remote-sensing Application.

More than 40 experts and scholars from the fields of remote-sensing application in universities and research institutions across the country were invited to explore the following four topics: Scientific issues derived from prospecting mineral deposits by remote-sensing, state-of-the-art detection technology in this aspect and advanced image processing methods, inter-disciplinary integration in the mineral detection by remote-sensing means, and opening up a new prospect for the mineral detection via remote-sensing by addressing challenges and seizing opportunities.

Prof. CHEN Shupeng from the CAS Key Laboratory for Resource & Environmental Information

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System and ZHAO Pengda from Chinese University of Geoscience were invited to deliver central reports on "Difficulties and hopes in the mineral detection through remote-sensing" and "The quantitative prediction and assessment of mineral deposits," respectively.

According to experts, along with the rapid economic development in China, the demand for mineral resources is rising, increasingly making it a bottle-neck issue for the national economy. This includes the "backward prospecting technology and a decrease in proven reserves of major minerals across the country." In order to build up the reserves, it is necessary to beef up the exploration efforts by adopting new expertise and methods in the course of geological work modernization. This should be a major strategic approach to ensure the adequate supply of mineral resources to maintain China's sustainable development.

Participants pointed out that the application of remote sensing in mineral exploration has both promoted the discoveries of the resources and the development of the technology per se over the past years. With the advent of the 21st century, the technology sees a rapid development. The spatial resolution of remote-sensing data, for example, has been upgraded from the magnitude of kilometers or meters to that of centimeters. Similarly, the spectral resolution has been raised from hundreds or dozens of nanometers to several nanometers while the temporal resolution is advancing from several weeks or days to several hours. The radar remote sensing technology is also progressing in their performance, featuring higher resolution, multi-frequencies, and multi-polarization. At the same time, both the expertise for the information processing system of remote sensing and the data-mining are in burgeoning development. Therefore it is certain to say that the prospective for various remote-sensing applications are becoming more and more promising in each and every section of our national economy.

Scholars say that the application of the technology to mineral prospecting, however, is facing more and more challenges in today's world. This is found in the following expressions:

1. The shallow-buried mineral deposits or those visible on the earth's surface are decreasing while the remote-sensing technology has its own limitations in detecting the deep-seated ones. Therefore, theoretical and technical innovation in remote-sensing is necessary to overcome its defects.
2. The development of novel remote sensing detection technology and other state-of-the-art information technologies (such as GIS, 3D-visualization, virtual realities etc.), especially that of hyperspectral remote sensing, has brought about new hopes in direct detection of valuable ores in geological strata. Yet, high spectral satellite data with high spatial resolution suitable for mineral prospect are not available. And the technology to abstract mineralization alternation information from high spectral satellite data with middle-level spatial resolution still in its stage of preliminary exploration. More in-depth studies are needed to develop expertise to be used in direct mineral hunting. Therefore, in order to cope with the current serious challenge in today's grim situation, it is imperative to ferret out new approaches in this regard.

Experts called on more efforts for new technical routes to cope with these challenges and new research breakthroughs so as to accelerate the modernization tempo of geological work and industrialization of remote-sensing IT endeavors in this country. After detailed discussions, they reached consensus on the following issues:

1. Remote sensing technology should be listed as a major operational tool for geological exploration departments, making it a standardized procedure for mineral prospecting.
2. The development of software for remote sensing exploration should be made a component of the

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national key programs.

3. A comprehensive experimental field should be set up for the studies of the underlying mechanism of remote-sensing images of various geological bodies, mineral deposits, and geological phenomena, and for in-depth research into information relevance and coupling between remote-sensing, geo-physics, and geo-chemistry. It could also be used as a training center for professionals in the field.
4. Experts call for an international symposium on remote-sensing exploration and a national workshop on remote-sensing for lunar exploration.
5. A special research project should be launched for developing mini-satellites for mineral prospecting.

### **China upgrades two Antarctic research stations, plans on third (People's Daily, 2007-08-07)**

China has kicked off renovation of its two research stations on the Antarctic, and is planning on a third permanent research base on the continent, according to China's Polar Research Institute. Qin Weijia, deputy director of the institute, said the renovation had started on the Changcheng (Great Wall) station, which was built in 1985 on King George Island.

The renovation, which is to cost more than 100 million yuan (13 million U.S. dollars), is scheduled to be finished by the end of this year.

Qin said the facilities at the station had become outdated and some cement and steel structures had been eroded by underground water. "Some floors have cracked and crumbled, and become very dangerous," he said.

The new facilities will save more energy and be more environmentally-friendly than the old ones, Qin said, adding that they plan to build a new research building and waste and sewage treatment centers.

Work will also begin on the Zhongshan station soon, which was built in 1989 on the Larsemann Hills. According to the State Oceanic Administration (SOA), the third station will be built at Dome-A, the highest point on the continent 4,093 meters above sea level. It is expected to be completed before 2010. China launched its first expedition to the Antarctic in 1984 and the Chinese scientists have carried out 22 scientific expeditions to the South Pole.

### **Aquaculture sewage purifier using large-sized algae as fillings (CAS, 2007-08-09)**

Recent decades have witnessed the rapid development of industrialized marine culture in the world. At the same time, the pollutant discharge produced by marine culture has caused serious environmental problems at coastal regions.

To deal with the issue, a research group headed by Prof. Li Dapeng from the Qingdao-based CAS Institute of Oceanology has developed a cleaning device for cultivating wastewater by employing macroscopic algae as filling material. The feat has recently been granted a patent right for invention from the State Intellectual Property Office.

According to their design, the cultivating device comprises transparent glass boxes stacking with each other with volume shortened layer by layer from bottom to up. The back of a glass box employs sunlight as light source. The top of each box is equipped with an inlet pipe, and bottom with an outlet pipe, serving as the inlet pipe for the next box. The water outlet pipe of the bottom glass box is connected with main water outlet pipe, and the top glass box is connected with main water inlet pipe, while refrigerating pump and water pump are equipped in the pipeline between the main water outlet

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pipe and main water inlet pipe.

The invention is noted for a number of strong points. First, the glass boxes could be filled with large-size marine algae such as the sea asparagus, sea lettuce and pololithon cultured in high-density photo-biological reactors. Then, the seawater flow passes through cooling pumps so that its temperature might be regulated at will. Furthermore, at the pipework's outlet, the water quality can be sampled for a hydrologic analysis while substandard water might be re-pumped by the driving pumps into the top box in a circuit of recycled purification. The invention also features air pumps capable of pouring air directly into the seawater.

When the cultivating wastewater flows into the upper glass box from the main water inlet pipe and contacts with algae completely, the metabolism and photosynthetic oxygenation of the algae will be carried out thoroughly on the condition of using sunlight as light source and aerated by air pump. It can adsorb a large quantity of production factors such as C, N and P to enrich the nutriment stock, and the wastewater will be cleaned by the algae in the middle and bottom of the glass box, and at the same, the photosynthetic oxygenation will increase the dissolved oxygen in seawater to improve water quality.

Based on the biological traits of the large-size seaweed, the invention is noted for its continuous, practical and semi-automated operation, equipped with a controllable system over the culturing conditions, featuring a higher efficiency in utilization of the light energy in a continuous or semi-continuous way.

### **Pollution in Bohai Sea becomes more serious**

**(China News, 2007-08-14)**

Ms. Zhang and her folks in Tianjin are fond of seafood. When seafood becomes abundant in summer and autumn, Zhang will buy some for the family. But in recent years, she has found the quality of sea food has deteriorated.

Zhang said that she is nostalgic for the good old days when the quality of seafood was excellent. Today's Bohai Sea has become one of the worst polluted areas in the country. In Beitang, Tianjin's famous fishing village, our reporter found few boats. When the reporter interviewed two young fishermen, and they admitted that it had become harder to harvest seafood this year because of heavy pollution.

Some Tianjin citizens worry that they will not be able to any sea food in the foreseeable future. From the late 1980s, the variety of marine products has on the decline.

### **KIZ receives 80m yuan funding from "973" Program**

**(CAS, 2007-08-15)**

Three research projects under the charge of the CAS Kunming Institute of Zoology (KIZ) have won the support of the National Basic Research Program (dubbed "973" Program).

The three projects, namely, "biodiversity evolution and protection in Sino-Himalayan region," "artificial selection and genome evolution," and "underlying mechanisms for self-renewal and directional differentiation of rhesus monkeys and their in vivo tracing," will be headed by ZHANG Yaping, WANG Wen and JI Weizhi, all KIZ researchers, respectively.

The funding for the three projects totals more than 80 million yuan (about \$11 million), a record high for the institute to win "973" Program grants in a single year.

The "973" Program is China's on-going national keystone basic research program, which was approved

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by the Chinese government in June 1997 and is organized and implemented by the Ministry of Science and Technology.

### **Artificial Rains and Snows to Boost Qilian Mountain Glaciers**

**(CRI, 2007-08-16)**

Chinese meteorologists have gathered in northwest China's Gansu province, to carry out rain-and-snow making experiments, in a bid to supplement the fading glaciers on the Qilian Mountains.

The frigid waters of the glaciers on Qilian Mountains are the major water supply of local residents' living and industrial life.

However, because of global warming, the glaciers are receding year by year. Small glaciers---with an area of less than 2 square kilometres---are expected to disappear by 2050, going off current receding rates.

Thirty experts from several Chinese academic and meteorological departments started to work together from July 12 in Minle County, Gansu province, trying to produce artificial rains and snows in the region.

Analysis from the experts shows that such artificial rains or snows will increase rain or snow falls in the region by 10 to 15 percent, about 370 to 740 million cubic meters annually.

### **China uses moveable radars to surveil typhoon Sepat**

**(Xinhua Net, 2007-08-18)**

Three moveable radars had been respectively allocated to east China's Fujian and Jiangxi provinces and the central province of Hunan to monitor the movement of typhoon Sepat, said the China Central Meteorological Station (CMS) on Saturday.

Radars were used to help provide timely weather forecast as Sepat approaches.

Typhoon Sepat, the ninth tropical storm to hit China this year, pounded Hualien in mid-east Taiwan at around 5:40 a.m. on Saturday, with sustained winds of 180 kilometers per hour, said the CMS.

Sepat keeps weakening and is expected to land on the coast between Lianjiang and Xiamen of Fujian Province between Saturday evening and Sunday morning.

Sepat will swirl through Fujian and move northwestward to Jiangxi Province, said the CMS.

Influenced by Sepat, torrential rains are forecast to hit Taiwan, Fujian, Zhejiang, Guangdong, Jiangxi and Hunan provinces in the coming three days.

Rainfalls brought by Sepat may relieve drought in Jiangxi, which has been ravaged by the worst drought in the past 50 years, said the CMS.

Experts from the CMS warned Zhejiang, Fujian and Guangdong provinces to be on guard against possible disasters, such as floods, landslides and mud-rock flows, caused by heavy rains.

### **Predation may not be major cause for hare-lynx cycles**

**(CAS, 2007-08-22)**

The classic hare-lynx cycle has been cited as a prime example of how interactions between predators and preys might lead to periodical cycles of both populations. However, a recent study by CAS zoologists shows that it might not be the case. Their work published in the July issue of the Germany-based *Climate Research*.

In the northern parts of Canada, the number of lynx (*Lynx Canadensis* Kerr), a specialist predator

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eating the snowshoe hare (*Lepus americanus* Erxleben), can be estimated from the records kept for the numbers caught each year for its fur. Records at the Hudson's Bay Company since 1730 show that its population size seems relevant with the numbers of its prey; when the hare is few, the lynx is few, and vice versa. The numbers of snowshoe hares tend to reach a peak at about every 10 years.

The regular population cycles, which is frequently mentioned in many biology textbooks, is generally thought to be the result of the prey-predator interactions. These cycles are highlighted in virtually all ecology texts and are often cited as one of the few examples of Lotka-Volterra predator-prey equations, a simple model which shows never-ending oscillations in the numbers of predators and their prey.

By using partial cross correlation and stepwise multiple regression methods, a research group headed by Prof. ZHANG Zhibin from the CAS Institute of Zoology re-analyzed the Hudson Bay Company's hare-lynx time series from 1847 to 1903, to evaluate effects of intrinsic self-regulation, prey-predator interactions and a prominent climate pattern, El Nino/Southern Oscillation (ENSO), on hare-lynx dynamics. Their studies clearly indicate that self-regulation or density dependence may be the major forces driving population dynamics of hare and lynx for this time series. Furthermore, ENSO also has effects on rates of increase in hare and lynx populations.

The study provide valuable insights into this field, applauds Nils Chr. Stenseth, an ecologist from the Oslo-based Centre for Ecological and Evolutionary Synthesis and the Editor of the *Climate Research* in a commentary of the journal. "The study could help to further our understanding of the ecological effects of climate change."

### **Conference on long-term ecological research convenes in Beijing (CAS, 2007-08-23)**

Organized by the CAS Institute of Geographic Sciences and Natural Resources Research (IGSNRR), and the Chinese Ecosystem Research Network (CERN), the International Conference on Long-Term Ecological Research was held on 20 and 21 August in Beijing. It was jointly sponsored by the Chinese Ministry of Science and Technology, the National Natural Science Foundation of China (NSFC), CAS and the International Long-Term Ecological Research Network (ILTER).

Under the theme of "meeting the challenges of sustainable ecosystem management from local to global scale," the conference brought together about 240 scholars from more than 30 countries and regions. More than 70 scholars made presentation at the meeting. Their topics were ranged from biodiversity conservation to socio-economic dimensions of sustainable ecosystem management, and urban ecology.

### **China develops its ecosystem network (CAS, 2007-08-23)**



A total of 36 field research stations for monitoring various ecosystems have been established in China and they are leading the way for the world's long-term ecosystem research, says CAS Executive Vice President BAI Chunli at the opening of the International Conference on Long-Term Ecological Research on 20 August in Beijing.

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Started in 1998 as a founding member of the International Long-Term Ecological Research Network (ILTER), China's Ecosystem Research Network has developed into a comprehensive research platform with five disciplinary centers and one synthesis center in addition to 36 field research outposts.

All the CERN stations engage in monitoring work, research, experiment and demonstration, while the disciplinary centers are responsible for the calibration of monitoring instruments and data quality control. The synthesis center has the function of data exchange engine and inter-disciplinary research. Through its long-term monitoring, research and experiment, demonstration and extension over the years, it has served as an important facility to control desertification, soil erosion, salinization, and eutrophication.

### **Scientists sound alarm as black soil erodes in NE China (Xinhua Net, 2007-08-27)**

Chinese scientists are warning that the country's northeast breadbasket regions are in danger of losing their fertility because of soil erosion and degeneration.

"The northeast areas are the granary of the country. Soil erosion and degeneration will jeopardize the nation's grain security," said Zhang Xudong, a soil expert with the Shenyang-based Institute of Applied Ecology under the Chinese Academy of Sciences (CAS).

China's expanse of black soil, spanning Heilongjiang, Liaoning and Jilin provinces and part of Inner Mongolian Autonomous Region, covers more than 35 million hectares. It is one of the three largest black soil areas in the world, along with similar land masses in Ukraine and the United States.

Studies by the Northeast Institute of Geography and Agro-ecology under the CAS and the Heilongjiang provincial soil retention research institute show the thickness of the soil has dropped dramatically from more than 80 centimeters to less than 30 centimeters in the last 60 years.

The density of organic substances in the soil has fallen from 12 percent in the 1940s to less than 2 percent, experts said, adding that about 85 percent of the soil is lacking sufficient nutrients.

The crescent-shaped black soil belt is a leading commodity grain base in China, accounting for 30 percent of the country's total grain output. Its yields feed 10 percent of the country's population.

However, excessive farming, overuse of fertilizers and relentless logging has caused erosion and degeneration of the soil quality.

Soil erosion has adversely affected local ecology, resulting in more frequent droughts, floods and sandstorms, said Yan Baixing, a researcher with the Northeast Institute of Geography and Agro-ecology.

The Heilongjiang Province has suffered spring droughts for 10 consecutive years. Soil became dust, blew away and became sediment in rivers and lakes, raising the river beds and increasing flood risks in the rainy season, Yan said.

"We need do everything to protect the soil from erosion and degeneration now. If we don't take action now, history will be repeated," Zhang said.

Zhang referred to the "dust bowl" disasters which hit the United States in the 1930s, caused by decades of extensive farming that promoted erosion coupled with severe drought. The soils amassed in dark clouds, blackening sky and forcing the exodus of millions at the time.

"We can't kill the goose that lays the eggs. The land must not be farmed in a destructive way," said Zhang.

Last week, China's National Development and Reform Commission (NDRC) issued a plan aimed to

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rejuvenate the northeastern provinces. Protection of the black soil is an important part of their agenda. "Protecting the soil doesn't mean we have to cut more trees to develop arable land. What we need to do is to reinforce the irrigation facilities, and do everything we can to transform the low-yield crop fields into high-fertility land," said Zhang Guobao, NDRC Vice Minister, at a press conference. Researchers said more ponds and reservoirs need to be built to restore soil moisture, and forest belts need to be in place to stabilize the soil. They are also encouraging farmers to leave manure and corn stalks in the field to increase nutrient content. More than 100 million tons of natural fertilizers like manure and corn stalks are produced every year in northeast China, Zhang Xudong said. If used effectively, they could enrich about 5 million hectares of low-yields cropland in five to 10 years, he added.

### **A network for POPs in air established in Tibetan Plateau (CAS, 2007-08-28)**



With an objective of assessing the spatial distribution of persistent organic pollutants (POPs) across Qinghai-Tibet Plateau by means of passive samplers, Dr. WANG Xiaoping and her colleagues from the CAS Institute of Tibetan Plateau Research have been conducting a project entitled "the Qinghai-Tibetan Atmospheric Passive Sampling (QTAPS)." The establishment of the QTAPS network, including 19 sites mainly in background locations, costs the team one-year hard work. By taking advantage of the network, Dr.

WANG has carried out studies on POPs in the snow and atmosphere around Mt Qomolangma. This network includes four transects. Line 1 includes nine stations along north-south transect (Golmod-Amdo-Nagqu-Namco-Lhasa-Xigaze-Lhaze-Tingri-Zhangmu) and Line 2 consists other four stations along another north-south transect (Yushu-Qamdo-Rawu-Yayü). There are two east-west transects involved in this network. There will be Zhongba-Lhaze-Xigaze -Lhasa- Gongbogyamda-Nyingchi-Bomi-Rawu (Eight stations) and Gar-Gêrzê-Amdo-Nagqu-Qamdo (Five stations). The location of the stations covers major part of the Plateau and various climate types. Experts say that it is conducive for them to map the spatial distribution of persistent contaminants across the Plateau and investigate the relationships between the spatial distribution and the relative composition of POPs and further study the effects of climate change and monsoon bloom on the distribution and source age of POPs.

Although the global-scale and long-time survey of the concentration of POPs in air by passive samplers has been widely employed in the world, it is their first time to be introduced into the Qinghai-Tibetan Plateau. And yet data on pollutant concentrations in atmosphere are scarce and the extent of impacts is unknown. There is, therefore, an urgent need to assess contamination status across the Tibetan Plateau. Via long-term studies at the QTAPS network, it is expected to evaluate the impact of the long-range atmospheric transport of POPs on the Plateau environment. Besides, the research itself will reveal the influence of the local climatic pattern and seasonal monsoon on the transport, storage and sequestration of POPs.

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### **A new hypothesis to explain plant bio-invasion**

(CAS, 2007-08-29)

Although both the general-purpose genotype hypothesis and the hypothesis of the evolution of invasiveness predict that invasive species are characterized by particular traits that confer invasiveness, what these traits are still remains unclear. A theory put forward by a CAS botanist and colleagues suggests that the success of an invasive plant in a new habitat is due to its allocation of more nitrogen to its photosynthesis. The hypothesis has been supported by their research on the metabolic comparison between an invasive shrub and five native plants. This pioneering work was reported in a recent issue of *Oecologia*.

As an important contributor to the on-going trend of global change, bio-invasion is a serious ecological problem. The rampant propagation of invasive species poses a threat to the bio-diversity worldwide, the structure and functions of an ecosystem, agriculture, afforestation and animal husbandry. The study of bio-invasion is not only of theoretical significance, but is conducive to the risk assessment of an invasive species, its early prediction, prevention and scientific management. Yet, so far, none of conclusive theories is available for explaining the powerful stamina owned by an invasive species in a new habitat.

Prof. FENG Yulong with the CAS Xishuangbanna Tropical Botanic Garden (XTBG) and co-workers suggest that an invader has higher resource capture ability and utilization efficiency than the natives. To verify their hypothesis, the researchers compared the eco-physiological traits of eight European populations of the invasive plant *Buddleja davidii* Franchet and five native woody species in the aspect of nitrogen allocation. They discovered that *B. davidii* allocated a higher fraction of leaf nitrogen to the photosynthetic machinery than the five native species. This was the most important difference between the invader and the natives, leading to a higher resource capture ability and utilization efficiency in the invader. The invasive species might have possessed the nitrogen allocation trait before introduction. Alternatively, it might have acquired the trait by evolution after introduction. According to the evolution of increased competitive ability hypothesis, an invasive species may increase nitrogen allocation to photosynthesis by reducing allocation to defense.

In order to further test the theory, botanists at XTBG are conducting comparisons between invasive and native species in close affinity and between invasive populations and indigenous populations of an invasive species. At the same time, their work is designed through consideration of the influence imposed by ecological conditions and ontogenetic stages.

### **South-to-North Water Diversion Project encounters water pollution problem**

(China News, 2007-08-31)

“In the South-to-North Water Diversion Project, the rivers and lakes involved in the project are being polluted. We should be highly alert to this problem,” said Nan Zhengzhong, deputy to the NPC, China's top legislature. “If the problem is not solved, all the water involved in the project might be contaminated. At that time, the water diversion project might become a “sewage transfer project,” he said. He made the statement while attending a NPC work meeting held to summarise what NPC had done in tracing the water pollution situation in the Huaihe and Liaohe River regions. During the meeting, many NPC deputies urged to pay high attention to the water pollution problem in the South-to-North Water Diversion Project.

At present, the rivers in many places across China have become either dried or heavily polluted. The

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living conditions of people in these regions are being challenged. “We should pay great attention to this phenomenon and do a great job in preventing water pollution,” said NPC delegate Jia Zhijie.

In order to solve the water pollution problem occurring in places along the North-to-South Water Diversion Project, many delegates suggested that in every province or region where the diversion project passed, local government should take responsibility to tackle the problem in their administrative region. In addition, the central government might set a deadline urging the local governments to solve the problem within a certain time.

### 1.3 Health

#### **World's first cloned rabbit born in Beijing**

**(China News, 2007-08-01)**

Last month, the National Center for Molecular Genetics and Breeding of Animals announced that the world's first body cell cloned rabbit had been born in Beijing. So far, the cloned rabbit is in a healthy condition and its weight has now reached 2 kilograms, the *Beijing Science and Technology News* reported.

Body cells cloning technology has always been regarded as a breakthrough in cloning technology. In 1996, when the first body cells cloned sheep Dolly was born, the news excited the whole world. Since then, scientists have been wondering how they can produce a cloned rabbit through body cells cloning technology. The cloned rabbit born in Beijing is the first cloned rabbit through body cells cloning technology.

Dr. Li Shangang, who initiated the research, chose to use the foetus rabbit to do his experiment. The pregnant cycle for this foetus rabbit was 20 days. He took the body cells from the back skin of the rabbit for cultivation. The cultivated cells were then induced with serum hungry treatment. The nucleus, which carried genetic materials, was then injected into the enucleated oocytes of a rabbit embryo. When the embryo split into 4 embryonic cells, the cells were then injected into the womb of a female rabbit. The cells, after growing in the womb for 28-32 days, finally produced a cloned rabbit. Scientists got the cloned rabbit by applying caesarean section to the parent rabbit.

“When the cloned rabbit was born, it looked blue all over. There were wrinkles all over its body. However, when it grew up, it really looks cute now,” Professor Li said. Before, he always wore a serious look on his face. When talking about the baby rabbit, his face began to show a glimpse of smile. “The world's first body cells cloned rabbit now has pure white furs all over its body. It now weighs 2 kilograms. It stays closely with its mother and is very healthy.”

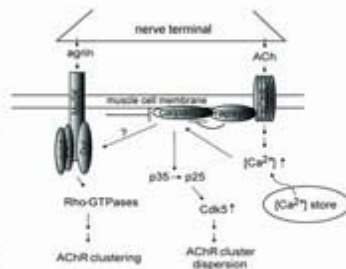
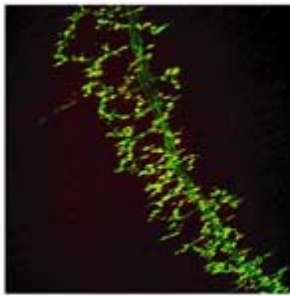
All smiles, Li told this reporter that when Ian Wilmut, the father of cloned sheep, visited his laboratory, he simply wished him “good luck.”

#### **Mechanism for the "positive and negative interactions" in the formation of neuromuscular synapse**

**(CAS, 2007-08-01)**

Neuromuscular synapses are formed between motor neurons and skeletal muscle fibers. AChRs are concentrated at the postsynaptic membrane, which guarantees efficient and accurate neurotransmission. AChR clustering is a dynamic process, whereby nascent clusters underneath nerve terminals are

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ACh activates calpain to destabilize AChR clusters. Agrin increases the interaction of rapsyn with calpain and inhibits calpain activity to stabilize AChR clusters at the NMJ.

stabilized by agrin, a motor neuron derived glycoprotein, and the AChR-associated protein rapsyn. Meanwhile, motor neurons release negative signals to disperse non-innervated clusters and refine clusters at the synapses. Genetic studies suggest that ACh may serve as a negative signal. Such counteractive interaction leads to eventual dispersal of non-synaptic AChR rich-sites and formation of receptor clusters at the

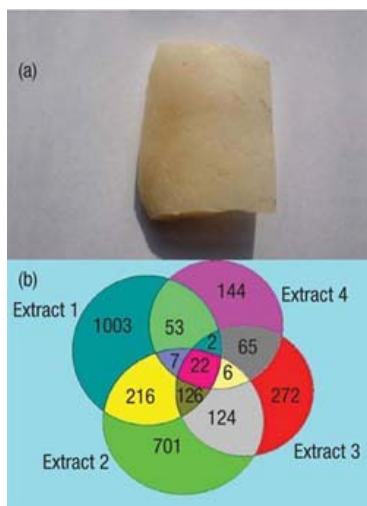
postjunctional membrane. However, the underlying mechanisms are not well understood.

As reported on 19 July by *Neuron*, a research team led by Dr. LUO Zhenge from the Institute of Neuroscience under the CAS Shanghai Institutes for Biological Sciences found that calpain, a calcium-dependent protease, is activated by the cholinergic stimulation and is required for induced dispersion of AChR clusters. Interestingly, the AChR-associated protein rapsyn interacts with calpain, in an agrin dependent manner, and this interaction inhibits the protease activity of calpain. Disrupting the endogenous rapsyn/calpain interaction enhances CCh-induced dispersion of AChR clusters. Moreover, the loss of AChR clusters in agrin mutant mice was partially rescued by the inhibition of calpain via over-expressing calpastatin, an endogenous calpain inhibitor, or injecting calpeptin, a cell-permeable calpain inhibitor. These results identify a critical signaling mechanism by which ACh destabilizes AChR clusters and reveal a novel function of rapsyn in regulating AChR clustering and NMJ formation. The results presented in this paper also provide insight for studies of neuromuscular disorders.

This work was jointly supported by grants from CAS, National Natural Science Foundation of China, Shanghai Science and Technology Development Foundation, "973" Program, and Key State Research Program of China.

### A new method to extract protein from bone

(CAS, 2007-08-03)



Cracking the bone proteome. (a) Dog skull fragment that was demineralized in 1.2 M hydrochloric acid. (b) Venn diagram showing protein overlap of the four extracts from demineralized bone.

Elucidating the bone proteome is essential for understanding normal bone physiology as well as diseases such as osteoporosis. However, the best way to extract the necessary proteins for proteomic analysis has been a bone of contention among researchers. Because bone is mineralized and almost solid, classical protein extraction methods cannot be applied efficiently. In a recent issue of *Journal of Proteome Research*, an efficient method to extract proteins from bone for proteomic analysis has been invented by a research team

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led by ZOU Hanfa at the CAS Dalian Institute of Chemical Physics, and co-workers from the Shanghai Tissue Engineering Research and Development Center, and Suzhou University.

Most bone proteomic studies have used in vitro systems such as cultured osteoblasts and osteoclasts. However, these systems are unlikely to recapitulate the in vivo protein expression of bone cells, which are normally embedded in a hydroxyapatite matrix. Other researchers have attempted to extract proteins from bone by finely grinding it, a very labor-intensive process. Furthermore, bone pulverization tends to extract large amounts of highly abundant structural proteins such as collagens and proteoglycans, which can overwhelm the detection of lower-abundance proteins.

Zou and co-workers extracted proteins from dog skull by demineralizing bone fragments in 1.2 M hydrochloric acid. Bone proteins were extracted sequentially by using three different lysis buffers for a total of four bone extracts (including the acidic extract from the demineralization). The demineralization process removes calcium and other minerals from the bone tissue and dissolves the mineral matrix while keeping most of the organic matrix intact. According to Zou, "the removal of the mineral matrix exposes the cells in the bone, which facilitates extraction of proteins. In contrast to the pulverization of bone, our approach is very simple and allows high-efficiency protein extraction." Compared with bone pulverization, the demineralization protocol extracted  $\sim 1.3\times$  more total protein.

The researchers used a shotgun proteomics approach to identify the proteins extracted from bone. The proteins were digested with trypsin, and the resulting peptides were separated by 2D LC. Then, MS/MS analysis was used to identify the peptides and their corresponding proteins. The researchers identified 2479 unique proteins from the four bone extracts. Of these, 816 unique proteins were assigned with high confidence after the identification of at least two peptides. Using this more stringent identification criterion, the researchers reported a false-positive rate of 0.48%. "This is the first large-scale proteomic analysis of bone tissue using the shotgun approach," says Zou. "The four-step sequential protein extraction protocol is able to exhaustively extract proteins from bone for comprehensive proteome analysis."

The shotgun proteomics approach was essential for developing the method of protein extraction by bone demineralization. The strongly acidic conditions used for bone demineralization are likely to degrade proteins, which is a major concern for conventional protein analysis techniques. If proteins are degraded into fragments by acid, they cannot be separated and identified by methods that operate at the protein level, such as 2DE. Zou says, "Thanks to the emergence of shotgun proteomics, protein degradation is no longer a problem, because separation and identification take place at the peptide level."

Little overlap was found among the four protein extracts from the sequential extraction protocol; this indicates that the steps are complementary. The largest proportion of proteins (40.5%) were acid-soluble and were extracted by the 1.2 M hydrochloric acid in the bone demineralization step. Most collagen proteins and proteoglycans were not among the top 10 peptides; this surprised the researchers, because bone pulverization extracts large amounts of these proteins. The unusually low yield of structural proteins helped the analysis, because the lower-abundance proteins could be detected. Zou notes that the "collagen was converted to insoluble bone matrix gelatin during the demineralization with hydrochloric acid, which may explain why not much collagen-series protein was extracted. We're not sure why not much proteoglycan was detected."

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### **CAS, Tianjin to join hands in studying nanotechnology for cancer treatment**

**(CAS, 2007-08-08)**

A delegation led by Prof. HAO Xishan, president of Tianjin Medical University Cancer Institute and



Hospital (TMUCIH), paid a visit on 1 August to the CAS Institute of High-energy Physics (IHEP) and the CAS affiliated National Center for Nanoscience and Technology (NCNST).

The Tianjin visitors held talks with IHEP Director CHEN Hesheng and Executive Vice Director of NCNST WANG Chen on the comprehensive collaboration between CAS and the hospital on nanotechnology studies for cancer diagnosis and treatment. Director-general of the CAS Bureau of Basic

Research ZHANG Xian'en and Vice President of the CAS Beijing Branch JIAO Junlu were present at the meeting to listen to the report by the three sides.

TMUCIH, the birthplace of oncology in China, boasts one of the most famous modernized cancer hospitals in the world. The three parties have agreed to draw up a detailed roadmap soon for cooperation in basic and clinical research in the field.

### **Diabetics in North China Face Higher Amputation Rate than South**

**(China News, 2007-08-08)**

Diabetics in north China are more likely to suffer from foot ulcers and amputations than those in the south of the country, according to a new survey.

The survey of 634 patients in 14 first-rate hospitals in seven provinces and two municipalities showed that people living north of the Yangtze River are more likely to suffer diabetes-induced foot ulcers.

Diabetics in the north are also more likely to have aggravated local ulcers, greater risk of coronary heart disease and eye damage. The rate of recovery from foot ulcers in the north is lower than the south.

Research shows that 2.6 percent of diabetics in the south suffer amputations, while the figure is 9.7 percent in the north. The reason was the diet and lifestyle differences between the north and south, said Wang Yuzhen, a doctor at the 306 Hospital Affiliated to People's Liberation Army of China, who led the research. The diet of northerners generally contained higher levels of sugar and fat, and relatively less fibre, said Wang.

"Drinking and smoking also contribute to the high incidence of diabetes and diabetes-induced foot ulcer," said Wang.

Foot ulcers are a common complication of diabetes. After ten years with the condition, 40 percent are at risk of foot ulcers, which can lead to amputation or even death. The study showed that a diabetic has a foot amputated every 30 seconds somewhere in the world.

Wang said the best way to avoid the ailment was to change to a healthy diet and to give up drinking and smoking.

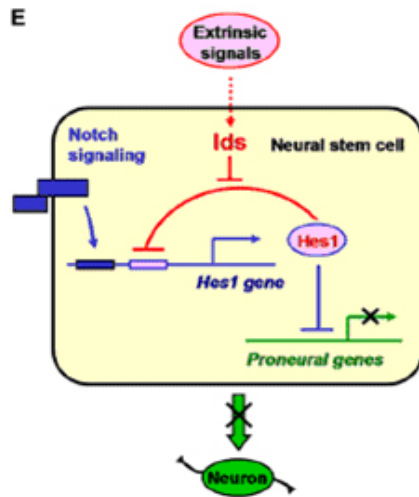
### **New mechanism found for neural stem cell maintenance**

**(CAS, 2007-08-10)**

Teaming up with co-workers from Japan, UK and US, CAS biochemists have revealed a novel

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mechanism for maintaining neural stem cells in early embryos. Their work was published on the 6 August issue of *Cell Development*.



Neural stem cells (NSCs) are a type of stem cells that resides in embryonic and adult neural systems with the capacity of self-renewal and differentiation. They can give rise to new nerve cells (called neurons) and other cells that support nerve cells (called glia), forming a complete central neural system (CNS).

Previous studies have shown that the maintenance of the NSC pool is essential for normal neural development. Precocious neurogenesis could reduce the number of neurons and lead to a lack of glial types, impeding the normal development of the central neural system. Although progress has been made in identifying some components of the genetic program involved in regulating NSC maintenance, the detailed underlying

mechanisms still remain largely unknown.

During studies of the neural development of chick and mouse embryos, a research team led by Prof. JING Naihe from the Institute of Biochemistry and Cell Biology, found that both Id, the dominant negative regulators of proneural proteins, and Hes1, one of the basic helix-loop-helix transcription factors that regulate mammalian CNS development genes, are highly expressed in an embryo's early neural tubes where NSC are concentrated. However, Ids are expressed prior to proneural genes and share an overlapping expression pattern with Hes1. Overexpression of Id2 in the chick hindbrain upregulates Hes1 expression and inhibits proneural gene expression and neuronal differentiation. By contrast, Hes1 expression decreases, proneural gene expression expands, and neurogenesis occurs precociously in the Id expression inhibited chick and mouse embryos. Mechanistic studies show that Id proteins interact directly with Hes1 and release the negative feedback autoregulation of Hes1 without interfering with its ability to affect other target genes. These results indicate that Id proteins participate in NSC maintenance through sustaining Hes1 expression in early embryos. Taken together, these results strongly support the notion that sustained Hes1 expression by Id proteins is a critical mechanism for maintenance of the NSC pool in early embryos.

Scientists say that the discovery will not only shed new light on the underlying mechanism for abnormal development of the neural system, but also lay an important basis for the studies of brain tumor treatment and prevention, as well as stem cell therapy as Id is known for driving the growth of cancer.

### **Institute of Biomedical and Health opens in Shenzhen (CAS, 2007-08-16)**

The Institute of Biomedical and Health was formerly set up at the CAS Shenzhen Institute of Advanced Technology on 15 August in south China's coastal city of Shenzhen, a close neighbor of Hong Kong. CAS President LU Yongxiang sent his congratulations upon the establishment. Its nameplate was jointly unveiled by CAS Vice President SHI Erwei, Vice Executive Mayor of Shenzhen LIU Yingli, and Pro-Vice Chancellor of the Chinese University of Hong Kong Kenneth Young.

The new institute is an important S&T initiative of CAS to offer services to the healthcare of the 1.3

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billion Chinese people by promoting the development of the medical instrument industry, says Prof. Shi. "In the near future, it will focus on the image-guided intelligent medical platform and the technologies for low cost healthcare."

### Center for Computational and Evolutional Biology opens in Beijing (CAS, 2007-08-27)

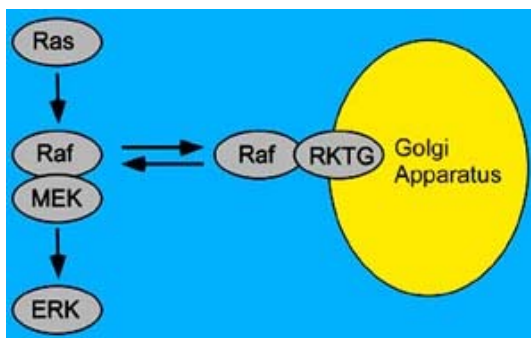
The Center for Computational and Evolutionary Biology (CCEB) was officially inaugurated on 23 August at the CAS Institute of Zoology (IOZ) in Beijing. Prof. YANG Ziheng from the University College London (UCL) was invited to head the center.

As a non-entity institution affiliated to IOZ at its initial stage, the center will be an open, interdisciplinary and pan-institutional organ with aims to strengthen the cooperation and exchanges between biologists, mathematicians, statisticians and computer experts, says Prof. ZHANG Dexing, vice director of IOZ.

At present, it has 14 members, who are researchers from such CAS institutes as IOZ, the Institute of Botany (IOB), the Beijing Institute of Genomics, the Institute of Genetics and Developmental Biology (IGDB), the Institute of Microbiology, and the Academy of Mathematics and Systems Science. It also has 10 visiting professors from overseas institutions, including UCL, University of California, North Carolina State University, Arizona State University, Duke University, both in US; University of Berne in Switzerland, University of Copenhagen in Denmark, and European Bioinformatics Institute.

The ceremony was followed by distinguished lectures by Prof. Yang, Prof. Bruce Rannala from University of California- Davis, GE Song from IOB, HAN Jingdong from IGDB, and TAO Yi from IOZ.

### CAS researchers find a novel protein regulating ERK pathway (CAS, 2007-08-31)



The ERK (extracellular signal-regulated kinase) pathway plays a critical role in the vital processes of living cells such as proliferation and differentiation. Recently, CAS scientists in Shanghai have discovered a novel mechanism of spatial regulation on ERK pathway. The result will be published in the 4 September issue of *the Proceedings of National Academy of Sciences (PNAS)*.

The ERK signaling pathway is under strict control in healthy cells. Difference in factors such as cellular types, types of stimuli, as well as the strength and duration of stimulation could lead to various ERK signals, causing distinctive biological functions. Anomalies in the ERK signal-regulated mechanism may invoke the emergence of cancers. Recent studies have indicated that RAS and MEK, two major components of the ERK pathway, are under the control of spatial regulation. However, scientists were not clear whether or not Raf, a protein that bridges RAS and MEK in ERK pathway, is also under similar control.

A research team led by Prof. CHEN Yan at the Institute for Nutritional Sciences, the CAS Shanghai Institutes for Biological Sciences, has found a new negative regulatory protein for ERK pathway. Their

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study indicates that a new protein, named as RKTG (Raf kinase trapping to Golgi), is implicated in the spatial regulation of Raf kinase.

The scientists found that RKTG is a close homologue of adiponectin receptors. Adiponectin plays an important role in the regulation of energy and glucose metabolism. Different from adiponectin receptors, RKTG is specifically localized at the Golgi apparatus, a major subcellular organelle that packages large molecules for transport within the cell. Through interaction with Raf-1, RKTG can sequester intracellular Raf-1 to the Golgi apparatus, whereby interfering with the interaction of Raf-1 with its upstream and downstream proteins. In addition, RKTG reduces the activation of Raf-1 kinase and blocks the signal transduction from RAS to its downstream targets, finally leading to the inhibition of the ERK pathway. This scheme of regulation is further supported by their study with the mouse. When RKTG is deleted, enhanced ERK activation is observed in many tissues. When activated by growth factors, the phosphorylation of ERK increased and prolonged in cells isolated from the RKTG knockout mouse.

This discovery is important in revealing a novel mode of regulation on Raf kinase. It not only demonstrates that Raf-1 is under spatial regulation, but also uncovers a new mechanism in which the ERK signaling pathway is modulated by subcellular compartmentation at the Golgi apparatus. Considering that the ERK pathway plays a pivotal role in cancer formation, this study will be of great help in further understanding the molecular mechanism underlying excessive proliferation of malignant cells.

### 1.4 Key Technologies

#### A new feat on novel chiral catalyst systems

(CAS, 2007-08-30)

The development of highly active, selective and stable solid chiral catalysts is a focus point of the chiral catalyst research. In general speaking, the activities of heterogeneous chiral catalysts are inferior to their homogeneous counterparts. A recent study by CAS researchers may shed new light on the issue.

Their work titled "Enhanced Cooperative Activation Effect in the Hydrolytic Kinetic Resolution of Epoxides on [Co(salen)] Catalysts Confined in Nanocages" was published in the recent issue of *Angewandte Chemie* (International Edition).

In their investigation, researchers YANG Hengquan, YANG Qihua, LI Can and colleagues from the CAS Dalian Institute of Chemical Physics have succeeded in confining homogeneous chiral catalysts in nanocages, while at the same time allowing the reactant and product molecules to enter and leave the nanocages freely. They have tried to assemble two or more different homogeneous chiral catalysts into the novel "nano-reactors", and found that the activities of the confined chiral catalysts were remarkably enhanced, even higher than the activities of these chiral catalysts operating in conventional homogeneous reactors. By adopting this kind of technique, it is possible to prepare novel chiral catalyst systems possessing both the advantages of homogeneous as well as heterogeneous catalysts, namely, high activity and selectivity of the former and easiness of separation of the latter. Preliminary theoretical calculations have proved that the activation energies of coupled reactions over this kind of

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dual-site catalysts are far lower than those of single-site catalyst systems. This concept is also feasible for many other reactions conforming to a dual-site coupling mechanism.

### 1.5 Structure of Matter

#### A new small angle x-ray scattering station operational

(CAS, 2007-08-02)



The Small Angle X-ray Scattering (SAXS) Station with the Beijing Synchrotron Radiation Facility (BSRF) was put into operation at the CAS Institute of High Energy Physics in July.

In recent years, the number of SAXS users has been increasing, giving rise to the construction of a new SAXS station. The new SAXS beamline 1W2A and the protein crystallography beamline 1W2B will share the same front end, which is ejected from 1W2.

Approximately, 2-mrad synchrotron radiation x-ray on horizontal direction is captured and monochromized by triangle-bending Si (111) crystal. The monochromatic light fixed at 0.154nm is focused onto the detector. The station is equipped with Mar165 CCD detector, curved one-dimensional gas detector, ion chambers, four-blade slits, exposure shutter and sample stage etc.

The SAXS beamline performance and its experimental conditions have been greatly improved and are much better than the old one. The initial reaction from the first two users has been very positive. At present, the SAXS station is in its normal SAXS mode. Further improvement will be made depending upon the users' requirements and the budget availability.

#### China to construct large telescope

(People's Daily, 2007-08-02)

The Guizhou Provincial Development and Reform Commission Monday announced that it will launch the world's largest single-aperture spherical radio telescope as one of the state's key sci-tech infrastructure projects in the Buyi and Miao Autonomous Prefecture in south Guizhou Province.

The Chinese Academy of Sciences and Guizhou Province will join hands in constructing a 500m-aperture spherical radio telescope by making use of the innovative design of Chinese scientists and the unique karst terrain and extremely quiet electronic wave environment in Guizhou. This platform for astronomical observations and research has reached international advanced level. It will provide important support for the country to conduct study and research on dark matter and dark energy, the origin of the universe, the evolution of the space and the search for the origins of life outside the Earth.

#### Conical target gathers high energy electron

(CAS, 2007-08-06)

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Teaming up with a research group led by ZHAO Wei from the CAS Xi'an Institute of Optics, Fine Mechanics, and Physics, ZHANG Jie and his colleagues from the CAS Institute of Physics have collaboratively achieved a major breakthrough in strong field physics. Researchers have for the first time directly observed high energy electron beams emitted along the surface of conical targets, which constitutes a direct evidence for the role of conical targets in gathering high energy electrons.

In the experiment, the researchers raised the output of neutrons threefold, by sending super strong laser beams to the conical targets. Researchers assumed that there can be two possible physical processes in the experiment: 1) conical target plays a role of gathering strong laser beams, allowing laser beams sending their energy to the top of the conical target, which would greatly raise the effective coupling between laser beams and plasma bodies; 2) strong laser beams emitted from a large angle may produce high energy electrons inside the target, which would also gather at the tip of conical target, allowing all the energy they carries to rest in the compressed target pellets, which in turn greatly increase the number of neutrons in the pellets. Scientists have so far confirmed the first process through experiments. Unfortunately, they did not produce direct experimental evidences for the second process, though they promised to continue the efforts for collecting more evidences.

Researchers made an in-depth and thorough investigation into the confirmed physical process, and found that a strong laser beam can produce a MeV electron beam along the surface of target, when it is emitted from a large angle. This proves for the first time the role of conical target in gathering high energy electrons. The finding is important for people to understand the role of a conical target in fast laser nuclear fusion process. It also creates an easy and simple approach to produce stable high-energy electron beams with small divergence angle and fine directionality. The high-energy electron beam produced from the process is of importance to the genesis of super fast electron diffraction and super short X ray pulse, and electron injection in the tall wave acceleration.

### **Studies on universe structures receive funding from "973" Program (CAS, 2007-08-09)**

A research team led by Prof. JING Yipeng from the CAS Shanghai Astronomical Observatory (SHAO) recently got a shot in the arm. Its research project "large-scale structures in the universe and the formation and evolution of galaxies," has won the support from the National Basic Research Program (dubbed "973" Program).

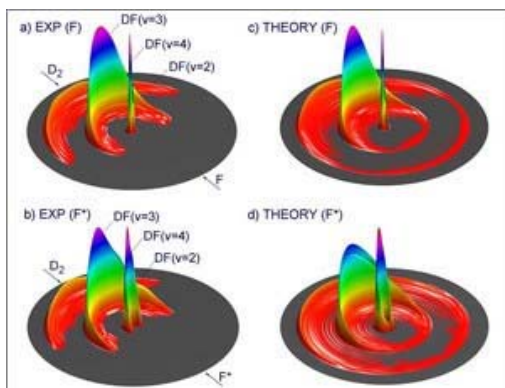
With the support from the Ministry of Science and Technology, the researchers will probe, in the future five years (2007-2011), into key scientific issues concerning the formation and evolution of large-scale structures in universe and the structures and evolution of the Milky Way on the basis of their previous achievements of interdisciplinary studies and by taking advantages of its observation advantages at the Large Sky Area Multi-Object Fiber Spectroscopic Telescope.

Coordinated by SHAO, the consortium is making up of more than 60 scientists from eight institutes and universities across the country. Focusing on large-scale structure in the universe, its research will address six major issues, namely, dark matter energy and cosmological parameters, theories and numerical simulations of the universe formation, studies of the Milky Way and its neighboring galaxies, high-redshift observation of the universe, activities of galaxies and formation of super-massive black holes, and stellar formation and evolution of galaxies.

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### A case where BO Approximation breaks down (CAS, 2007-08-30)

The Born-Oppenheimer (BO) Approximation is ubiquitous in molecular physics, quantum chemistry and quantum chemistry. However, CAS researchers recently observed a breakdown of the



Approximation in the reaction of fluorine with deuterium atoms. The result has been published in the August 24 issue of *Science*.

Proposed in 1927 by Max Born and Julius R. Oppenheimer, the BO approximation suggests that since nuclei are so much more massive than electrons, they must move much more slowly. Hence the motions of the two can be separated (the nuclei can be considered as stationary points around which the electrons move). It is still indispensable in quantum chemistry and used for the establishment of a molecular dynamic model for a simple chemical or physical system.

Differential scattering images of reactions between excited and ground-state fluorine with D<sub>2</sub>.

According to the approximation, the chemical reaction between the fluorine atom in its excited state (F\*) and

deuterium (D<sub>2</sub>) could not occur. However, in a recent experiment conducted by a research group led by YANG Xueming with the State Key Laboratory for Molecular Reaction Dynamics attached to the CAS Dalian Institute of Chemical Physics observed the reaction by using a state-of-the-art facility they have developed.

At the lowest collision energy, the scientists found that F\* is 1.6 times more reactive than F, although reaction of F\* is forbidden within the BO approximation. This fact indicates the BO approximation cannot be applicable to this reaction. Before long, this important process in non-adiabatic dynamics has been depicted by researchers from the University of Maryland after full quantum scattering computation by using precise potential energy face with multi-coupling.

Because non-adiabatic dynamics is a hot topic in molecular reactive dynamics and a cutting-edge area of theoretical chemistry nowadays, the discovery achieved by the Dalian scientists is considered an academic breakthrough with an exceptional significance as it is conducive to making clear the reactive mechanism which governs the system of this kind of chemical laser devices. In addition, the breakthrough signifies Chinese research in this aspect has reached the disciplinary forefront so far accomplished by the international community.

## 1.6 Transport and Space

### China capable of using space technology for weather forecasting, pollution control (Xinhua Net, 2007-08-02)

China's development of space technology may not only be a means to fulfill the government's space dreams - it can be used for precision weather forecasting and pollution control, according to a

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meteorological expert who works for China's manned space program.

"The space program demands an extraordinarily high level of precision and accuracy in weather forecasting. The information we need to get, like wind speed, intensity, direction and cloud formation, is very specific," Li Yonghui, director of the meteorological station of the spaceship monitoring and recovery unit at the Xi'an Satellite Control Center.

Li said the technology could be used in meteorological services for large-scale events, like the Olympics. "We can forecast weather changes for a specific stadium at specific times," he said.

The same technology can also be used in pollution control.

"For example, if we want to build a chemical plant, the technology can be used to calculate the speed that pollutants spread, and assess the scope of the pollution," Li said.

Xi'an Satellite Control Center is a major Chinese institution responsible for recovering satellites and spaceships.

### **Chinese experts suggest ending Chang'e I by having it bump into the moon (People's Daily, 2007-08-09)**

China's first circumlunar exploration satellite, Chang'e I, may end its one-year mission by bumping into the moon, said chief scientist of China's moon probe program.

After using up fuel, Chang'e I will fall onto the moon. While there are several disposal plans, the generally accepted one is to have it bump into the moon purposefully, said Ouyang Ziyuan Wednesday at a meeting in southwest China's Guizhou province.

"We may get some results from the bumping, whether they are big or small," he said.

He said China's moon exploration program is divided into three phases -- "circling the moon", "landing on the moon" and "back to earth".

Named "Chang'e" after the legendary Chinese goddess who flew to the moon, the program aims to eventually place an unmanned vehicle on the moon by 2010. Chang'e I will obtain 3D images of the moon's surface.

He said thirty Chinese songs will be played on the satellite. "It will take about half a month before Chang'e I enters its work orbit," Ouyang said, "playing the songs would be helpful for tracking conditions of the satellite."

### **2007 Space Information System Software Testing Launched (MOST, 2007-08-10)**

Entrusted by the Department of High and New Technology Development and Industrialization of MOST, the National Remote Sensing Center of China (NRSCC) organized China Association for Geographic Information System, the International Association of Chinese Professionals in Geographic Information Sciences and China Association for Environmental Remote Sensing (CAERS) to conduct the annual testing of the software of such spatial information systems as the geographical information system, remote-sensing image processing and satellite navigation positioning application. China has independent copyright to all the three systems. The test was carried out by the Spatial Information System Software Testing Center of NRSCC.

NRSCC held a conference on 31 July to establish the expert committee for the software testing and deploy relevant work. ZHU Boqin, Secretary General of China Association for Environmental Remote Sensing attended the conference. JIN Yiming, Deputy Director-General of NRSCC attended the

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conference and presented certificates to the experts. According to plan, concentrated testing will begin in the middle of August.

### **China made breakthrough in large aircraft tech**

**(People's Daily, 2007-08-10)**

China recently made a breakthrough in large aircraft technology by successfully mastering the "test technology for turbo-fan dynamic engine simulator" in China Aerodynamics Research Center. This technology will provide strong support to the country's project of large aircraft.

Related principal of China Aerodynamics Research Center said that this is a key technology for ground simulation test to tackle before China can develop its own large aircraft. After mastering this technology, scientists can obtain accurate knowledge about the influence of working engine on flight characteristics and driving force.

The success has made China the third country with this technology only next to the United States and the EU.

### **China ready to launch 1st lunar satellite**

**(Xinhua Net, 2007-08-10)**



China will soon launch its first circumlunar satellite as part of its ambitious moon exploration program enters the stage of implementation, sources with the China National Space Administration (CNSA) said here on Friday.

Development of the satellite, called Chang'e I after the legendary Chinese goddess Chang'e who flew to the moon, and the carrier Long March 3A has been completed after numerous tests, said a CNSA official,

who declined to be named.

The moon probe satellite is expected to fulfill a string of missions, including collecting three-dimensional moon images and exploring lunar features.

More than 10,000 scientists and technicians took three years to develop Chang'e I and its supporting systems, a relatively short time compared with other countries, said Luan Enjie, chief commander of the lunar program.

The satellite launch will mark the first step of China's three-stage moon expedition called Chang'e project, which will have a landing on the moon and launching a moon rover around 2012. In the third phase, another rover will land on the moon and return to earth with lunar soil and stone samples for scientific research around 2017.

The moon probe project is the third milestone in China's space technology after satellite and manned spacecraft projects.

### **China develops Beidou satellite monitoring system**

**(CAS, 2007-08-13)**

China has developed its Beidou satellite monitoring system for dangerous chemicals transportation, the Beijing Times reported here Monday.

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The system, which has passed experts review, provides all-day data of dangerous chemicals transportation to Beidou navigation satellite and gives corresponding operational order, the paper said. Scores of sensors, equipped on every vehicle transporting dangerous chemicals, collect data and information of the vehicle as well as road condition.

All the information are stored in a black box and transmitted to the satellite timely and corresponding operational signals are sent to the land control center.

For example, when the traffic accident occurs to a vehicle, the land control center can call the police and give timely rescue after it gets orders from the satellite.

"The whole process, from the accident occurs to the information sent to the land control center, only takes 0.01 second, which is much more advanced and less time-consuming than the monitoring system assisted by traditional GPS", director of the system's research and development center was quoted by the paper as saying.

The system can even monitor whether the drivers has drunk some alcohol, the paper reported, saying sensors installed in the driving cab can detect alcohol level.

"If it's beyond the limit, the control center will cut off the oil-supply to avoid drunk driving," the director added.

China sent its fourth Beidou navigation satellite on Feb. 3 this year to provide all-weather and all-day navigation and positioning information.

By now, China has successfully put four navigation satellites into orbit and the previous three were launched in 2000 and 2003.

### **Chang'e No.1 moon satellite to be launched in 2nd half**

**(China News,2007-08-21)**

China might launch the Chang'e No.1 moon satellite during the latter half of this year and the process might be broadcast live through national TV stations. The launching might take place in Xichang satellite launching center where China's Changzheng No. 3 carrier rocket will carry the satellite into space. Chang'e satellite might first fly around the moon 5-7 times. It might take 10-12 days for the satellite to move close to the moon. Later, China will also publicize the photos taken by Chang'e, the *Beijing Evening News* reported.

In the recent launch, the main task for Chang'e No.1 is to carry out some explorations around the moon. It will not fly back to earth this time. In the later stage, China might have Chang'e satellite retrieve some samples from the moon.

China's moon probe project consists of three stages: flying around the moon, landing on the moon and returning from the moon. The whole project is expected to be completed by 2020. By then, China might be able to collect some soil samples from the moon.

The information was released by five scientists who were invited by the website of COSTIND (the Commission of Science, Technology and Industry for National Defense) to answer the public's questions about China's lunar exploration project. The five experts were Hao Xifan, vice director of the Lunar Exploration Engineering Center of COSTIND, Sun Zezhou and Sun Huixian, both deputy chief architects of the lunar satellite system, Jin Zhiqiang, deputy chief designer of Changzheng (Long March) 3A carrier rocket, and Li Chunlai, chief designer of the earth application system for the lunar satellite project.

The outer appearance of Chang'e No. 1 satellite is similar to that of Dongfanghong No. 3 satellite. It is

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in a cubic shape, measuring 2.22 meters long, 1.72 meters wide and 2.2 meters high. Compared with Shenzhou No. 6 space shuttle, Chang'e No. 1 is smaller both in size and in weight. The satellite is equipped with a solar battery system, in the shape of a folding wing, on both sides. When the "wing" stretches to its full size, its total length can reach as many as 18 meters. The satellite's weight can reach 2,350 kilograms when taking off. The battery is able to work for one year, the experts say.

The five scientists stressed that China's moon probe project would be carried out for scientific exploration, its sole purpose being for the peaceful use of space resources. The project has nothing to do with any military purposes and China will not seek any national interest with other countries in launching the project. In light of this, Chang'e No. 1 satellite will not carry any weapons with it, the scientists said.

### **China's home-built commercial short-haul jet to be named by public (People's Daily, 2007-08-29)**

The public are being asked to submit names for China's first independently developed commercial regional jet, currently known as the ARJ-21, a source with the AVIC I Commercial Aircraft company said on Wednesday.

The company would stop accepting submissions on Sept. 28, and the name, which will have two to four Chinese characters, would be finalized and released at the end of December, the source said.

The person responsible for the winning name will receive 50,000 yuan (6,623 U.S. dollars).

The domestically-built, mid-size, short-haul airliner is expected to roll out of the workshop at the end of the year, said Luo Ronghuai, general manager of AVIC I Commercial Aircraft, a subsidiary of China Aviation Industry Corporation I, the developer.

The ARJ-21's maiden flight is scheduled for March 2008 and mass production will begin in 2009, said Luo. Chinese experts said the ARJ-21 has given China a late but powerful presence in its own commercial aviation market, which until now has been dominated by foreign aircraft manufacturers such as Boeing and Airbus.

The project is also seen as preparation for China's own big jet (with more than 150 seats) project, an undertaking that was shelved for about 30 years. Chinese experts say they need two decades to produce a big plane.

## **2 News from Universities**

### **40% top Chinese students choose to study abroad (People's Daily, 2007-08-13)**

About 40 percent of the top students in college entrance examinations have chosen overseas universities for their postgraduate studies, according to a survey.

Most of them have stayed overseas after finishing their intended courses, showed a survey that tracked 130 top performers in college entrance exams from 1977 to 1998.

Dubbed zhuangyuan, which means top contestants in the imperial examinations in feudal China, these students have been lauded by the media as examples for their younger peers.

The survey, released on the China Alumni Association website, found it worrying that many of the top students would not stay in China for higher studies despite the country's rapid development in the past

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few decades.

The government should find better ways to hold back talented students, said Cai Yanhou, a professor with Central South University in Changsha, capital of Hunan Province.

UNESCO figures show Chinese students comprise 14 percent of international students, the highest in the world. Their favorite destinations for higher studies are the US, Britain and Japan. Some experts said handsome scholarships, better job prospects and more opportunities to pursue further studies are the main attractions of foreign universities.

But Cai, who also led the survey team, said "top in exams" does not necessarily mean "top in career" because the study found none of the top students at college entrance exams had become a top Chinese expert or academic.

The entrance exam is just one of the numerous exams a person will go through in his life and that can't foretell his future achievements, said Wang Xuming, a spokesman for the Ministry of Education. He criticized the media hype over the so-called zhuangyuan.

Some of them are just more adaptable to exam-oriented education than their peers, experts said.

The media fill pages and time slots with their "success" stories to gain wider readership and viewership. High schools promote their former students proudly to attract new ones, and universities want to show their superior status by recruiting them, they said.

Wang hoped future reforms would do away with the score-oriented method so that students can be judged from all aspects.

### **Chinese university leaders younger, more likely to change job: study (People's Daily, 2007-08-20)**

Chinese presidents of universities and colleges are younger and more likely to change jobs, compared with their American counterparts, according to a study by the "Research Group of Study on the Quality of University Presidents in China".

Chinese university presidents are 52 years old on average, six years younger than their American counterparts, while they stay in office for an average of 4.1 years, compared with 6.6 years in office for American college heads.

Only 4.5 percent of Chinese university presidents are women, while 21.1 percent of their American counterparts are female.

The investigators have found most Chinese universities and colleges have opened their own websites, as the Internet has been widely used by these higher learning institutions as a major means of communication.

This is the first such survey by Chinese, while the American Council on Education (ACE) carried out five such investigations in 1986, 1990, 1995, 1998 and 2001, respectively.

The survey included information of 1,500 Chinese universities and colleges and used statistical results of a similar survey conducted by the ACE.

### **3 Innovation Management**

#### **China to build 100 national labs for technical development**

**(China News, 2007-08-01)**

According to the National Development and Reform Commission, China will build 100 technological labs during the 11th Five-Year Plan Period (2006-2010).

As science and technology, particularly in the creative industry, are placed on top of the development strategy agenda, it is natural for China to set up more national labs to enhance its industrial and scientific competitiveness.

The new labs will do research in the fields of next-generation network, wireless communication, pharmacy, renewable energy development, ecology, etc, all of which are greatly needed in China.

It is believed that the research of the national labs will inject new vigor into manufacturing industry in China, and greatly promote China's position on the international industrial chain.

The national labs of oceanic industry, shipbuilding, express railway will be established pretty soon, and those of other industries will be set up in the foreseeable future, too.

#### **China invests a lot on science and technology**

**(China News, 2007-08-01)**

According to Shang Yong, Vice Minister of Science and Technology, China invested more than 300 billion yuan on the development of science and technology, about 1.4% of the country's GDP. Currently there are 35 million scientific researchers and technicians in China, ranking the country No.1 in the world in terms of the number of sci-tech personnel.

"China has placed science on the top of its development strategy agenda," said Shang. "Particularly the central government has invested a lot on education, which is the fundament of science and technology."

In 2006, 7 provinces and autonomous regions' investment on science and technology increased by nearly 100%, while the proportion of increase in several others was 50%.

"Nowadays, we have 1.36 million scientific developers in China, and 25 million college students, with 5 million graduating every year. I am proud to say that we have such abundant human resources in China," Shang told our reporter.

#### **WIPO report shows patent applications increase in China**

**(People's Daily, 2007-08-10)**

Patent applications in China increase very quickly in recent years, which reflects the rising level of innovation in the country, the World Intellectual Property Organization (WIPO) said on Friday.

In 2005, for which latest complete statistics are available, China's patent office experienced the highest growth rate of 42.1 percent in resident patent filings, the UN agency said in its annual world patent report.

China's patent office processed more than 173,000 patent applications in 2005, among which 93,172 are direct filings by Chinese residents, the report said. Patent applications by non-residents (foreign individuals and companies) also increased markedly in China.

Worldwide, about 1,660,000 patent applications were filed in 2005, an increase of 7 percent over 2004, the report said.

The largest recipients of patent filings are the patent offices of Japan, the United States, China, South

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Korea and the European Patent Office. These five offices accounted for 77 percent of all patents filed in 2005.

According to the report, North East Asian countries, particularly China and South Korea, have significantly increased their share of worldwide patenting, both as a source of patent applications and as a target of non-resident patent applications.

The South Korean patent office received a total of more than 160,000 patent applications (including both resident and non-resident applications) in 2005, an increase of 14.8 percent over 2004.

The geography of innovation is having a significant shift, WIPO Deputy Director-General Francis Gurry told reporters in Geneva.

"A few years ago, they took the patent world by surprise, but it is now very much the expectation that countries like China and the Republic of Korea will continue their rapid developments in innovation, one indicator of which is the number of patent applications filed," he said.

### **MOST Registers Scientific Instruments Developed Indigenously (MOST, 2007-08-31)**

Since the 9<sup>th</sup> Five-year period, MOST has launched the major project of Scientific Instruments R&D for the Key Technologies R&D Program. Over the last 10 years, this project has achieved breakthroughs in a batch of key or common technologies, as well as nurtured bases for scientific instruments R&D and commercialization. A number of instruments have been widely applied in relevant fields, creating a sound social climate for indigenous R&D efforts.

The registration of instrument R&D results is expected to systematically sum up the achievements and experience accumulated in implementing the project during the past 10 years, further promote the indigenous R&D efforts in this field and improve China's capacity of R&D and production of scientific instruments. Such impacts will in turn provide equipment and technical support to resolve the hot and difficult issues in China economic growth.

## 4 China's International Science Cooperation

### **CAS, BP join hands for commercializing clean energy (CAS, 2007-08-03)**



CAS and the BP Group, one of the world's largest oil, gas and petrochemical companies, have jointly announced that they will co-establish a Clean Energy Commercialization Center (CECC). The Memorandum of Understanding for the initiative was signed on 1 August in Shanghai. CAS Vice President JIANG Mianheng and BP Managing Director and Chief Executive Iain Conn were present to witness the event. Earlier, Mayor of Shanghai Municipality HAN Zheng met with representatives of the two sides.

According to the agreement, CECC will be committed to promoting clean coal conversion technology and its commercialization. It is expected to create and offer investment opportunities for relevant value

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chains through coordinating and managing large-scale demo projects that primarily use coal as feedstock for fuel production, chemicals manufacturing and power generation.

The Center will strive to become a profitable and world-class platform for identify, evaluate, select, develop and commercialize strategic cleaner coal conversion technologies. At the same time, it will also integrate and consolidate individual technologies from both within and outside CAS into commercially viable technological systems and solutions in order to contribute to China's clean energy development and energy security.

China, today, represents the world's second largest energy consumer, and coal accounts for more than 70% of China's total energy consumption, said Prof. Jiang at the signing ceremony. "Therefore, cleaner use of energy resources, coal in particular, is critical for the sustainable development of the Chinese economy. Building upon CAS's expertise and advantaged resources in natural science research, and BP's experience and its international best practices in technology commercialization and project management, this new partnership will bring breakthroughs in the development of conversion and commercialization, which will generate materially significant clean energy investment opportunities, contributing to the development of China's energy industry, its economic growth and environment."

Speaking at the signing ceremony, Mr. Iain Con said "Given the increasingly important role China plays in the global economy, China's choice and efforts in promoting new and cleaner energy applications will have a profound impact on both the future of the Chinese economy and the global energy market. I believe the establishment of CECC will play a significant role in facilitating indigenous Chinese innovation capability to meet the environmental and energy challenges faced today by China and the world".

Also present at the ceremony were Director-general of the CAS Bureau for International Cooperation LV Yonglong, Vice Director-general of the CAS Bureau of High-tech Development and Research XIAO Yunhan, and Vice President of CAS Shanghai Branch ZHU Zhiyuan.

The partnership between BP and CAS can be traced back to November 2001, when the two parties jointly launched the "Clean Energy, Facing the Future" program "C a 10-year, US\$10 million R&D initiative. The partnership in the clean energy commercialization centre announced today reinforced BP's commitment to working together with China to address its energy issues and also to contributing to the clean energy solutions to fuel the sustainable development of the Chinese economy.

### **Sino-German Key Technology Project for Sustainable Ecosystem of Three Gorges Area Kicked off**

**(MOST, 2007-08-06)**

Under the Sino-German S&T Cooperation Framework, the bilateral project on key technologies of building a sustainable ecosystem for Three Gorges area has recently been kicked off. Co-headed by the State Council Three Gorges Project Construction Committee, Chongqing Science and Technology Commission and Germany Julich Center, Chongqing University, Tongji University, Huangzhong University of Science and Technology, Institute of Hydroecology of CAS and MWR (Ministry of Water Resource) and Chinese Research Academy of Environmental Sciences will join hands with German university-R&D institutes alliances to implement the project.

Such cooperation was identified as an intergovernmental project on the 6<sup>th</sup> Sino-German Steering Committee on Environmental Technologies and Ecology held in Bonn in March, 2007. Promoted by the Department of International Cooperation, MOST, organizing and implementing entities of both

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sides convened the project working meeting in Chongqing this July, on which German collaborators promised technical and R&D financial input to this project.

### **CAS-BP joint energy program makes sound progress**

**(CAS, 2007-08-24)**

"Clean Energies Facing the Future," a cooperative research program jointly organized by CAS and the BP Group, has made encouraging progress, say experts at an annual sum-up workshop held on 31 July and 1 August at Tsinghua University, Beijing. The CAS Dalian Institute of Chemical Physics (DICP) has been entrusted as the institute-in-charge of the cooperative Program between the two sides.

More than 20 participants were from the BP, including Dr. Guenter Stempel, Director of BP Centre for Global Fuel R&D, Dr. David Robertson, GTP Vice-President of BP, Dr. Theo Fleisch, Senior Consultant, and representatives from Worley Parsons Engineering Co., a cooperation partner of BP. Chinese participants were mainly scientists from DICP, Tsinghua University, CAS Institute of Metal Research, and the University of Science & Technology in China (USTC), all partner institutions of the cooperative program.

Chief Scientist of the consortium, Prof. BAO Xinhe of DICP, delivered a summarizing report on the progress of the program. He also briefed on the present status of the DICP-BP Strategic Partnership, as well as its working plan in the upcoming stage. Oral presentations as well as poster sessions were given by persons-in-charge of the sub-projects of the Program. In addition, five new energy research projects were proposed by scientists of DICP and USTC. Meanwhile, members of the Academic Committee of the program also held discussions on the progress achieved so far and the preparations for the Joint DICP-BP Innovative Laboratory for Energies.

### **China and German Team up for Reclaimed Water Research**

**(MOST, 2007-08-29)**

The Gao Bei Dian Water Environment R&D Centre, the Institute of Nuclear and New Energy Technology of Tsinghua University, and 16 EU members have entered into joint research on multi-stage quality guarantee of reclaimed water".

Building on the advanced concept of multi-stage quality guarantee, this project has made an in-depth study of the quality safety and health risks of the reclaimed water and succeeded in development of a technique for artificial recharge of reclaimed water to underground water which is suitable for the Beijing area. Gao Bei Dian Wastewater Treatment Plant a venue has been set up to turn wastewater into resources with a daily capacity of 300 tons.

The project, together with the reclaimed water demonstration venues in 6 countries including Spain, Belgium, Israel, etc., has been listed in the EU 6th Framework Programme (FP6) as a shared platform for international cooperation in research on artificial recharge of reclaimed water to underground water.

## 5 Miscellaneous

### **More funds for green vehicles**

(Xinhua Net, 2007-08-01)

In response to growing pressure to reduce energy consumption and better protect the environment, the government is to increase efforts to develop and promote vehicles powered by clean fuels, senior officials have said.

Shang Yong, vice minister of science and technology, said in an online interview at china.com.cn yesterday that with the Olympic Games and World Expo just around the corner, the government wants to push vehicles powered by fuel cells, electricity and fixed power.

Wu Ping, a section chief at the ministry, said it had spent 800 million yuan (106 million U.S. dollars) on research work on the three types of vehicles and had already made great progress.

A national campaign to promote the use of alternative fuels such as liquefied natural gas has seen its introduction for buses and cabs in Beijing, Shanghai and Chongqing, Wu said.

"We have had major breakthroughs in battery, electric and control-system technology," Wu said.

Although the new vehicles can cut energy consumption and emissions in half, or even be pollution free, people shun them due to price, Shang said.

"A key focus of our research is to cut costs," he said.

People were also slow to accept new technology, so the government should first adopt them for its own use, he said.

"Promotion of the clean vehicles is not just a commercial activity," he said. "They lower emissions, which can help protect the environment."

Beijing authorities have said 50 "zero pollution" buses powered by lithium-cell batteries will be used as shuttles at the Olympics, while the organizers of the 2010 Shanghai World Expo have said all buses used in the expo center will be pollution free.

"These events will be good platforms for the clean vehicles and demonstrate China's determination to promote clean technology for transport," Shang said.

Separately, Shang rejected accusations from some foreign media that China is the world's biggest producer of greenhouse gases.

"Huge amounts of greenhouse gases, even according to Western reports, were discharged by developed countries during their industrialization processes, dating back 100 years," he said.

### **China's first lab for quality science established at CAS**

(CAS, 2007-08-08)

A research center for quality science was set up on 3 August at the Academy of Mathematics and Systems Sciences (AMSS) under CAS. It is the first of its kind in China.

As an interdisciplinary research area, quality science involves various fields ranging from statistics, operation research, systems control to information and management sciences. The center will be co-directed by Prof. YU Dan from the Institute of Systems Sciences under AMSS and Prof. SHI Jianjun from Industrial and Operations Engineering under the University of Michigan, with Prof. CHEN Hanfu from MASS and Prof. C. F. Jeff Wu from Georgia Institute of Technology as co-chairs of its steering committee.

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### **Satellite Monitoring System for Chemicals Transportation**

**(CRI, 2007-08-13)**

China has developed its Beidou satellite monitoring system for dangerous chemicals transportation, the Beijing Times reported in Beijing Monday.

The system, which has passed experts review, provides all-day data of dangerous chemicals transportation to Beidou navigation satellite and gives corresponding operational order, the paper said. Scores of sensors, equipped on every vehicle transporting dangerous chemicals, collect data and information of the vehicle as well as road condition.

All the information are stored in a black box and transmitted to the satellite timely and corresponding operational signals are sent to the land control center.

For example, when the traffic accident occurs to a vehicle, the land control center can call the police and give timely rescue after it gets orders from the satellite.

"The whole process, from the accident occurs to the information sent to the land control center, only takes 0.01 second, which is much more advanced and less time-consuming than the monitoring system assisted by traditional GPS", director of the system's research and development center was quoted by the paper as saying.

The system can even monitor whether the drivers has drunk some alcohol, the paper reported, saying sensors installed in the driving cab can detect alcohol level.

"If it's beyond the limit, the control center will cut off the oil-supply to avoid drunk driving," the director added.

China sent its fourth Beidou navigation satellite on Feb. 3 this year to provide all-weather and all-day navigation and positioning information.

By now, China has successfully put four navigation satellites into orbit and the previous three were launched in 2000 and 2003.

### **Workshop on women in science opens in Beijing**

**(CAS, 2007-08-17)**



Scholars from more than a dozen developing countries have gathered in Beijing to address issues concerning women in science and technology.

Organized by CAS, the Third World Organization for Women in Science (TWOWS) and the Academy of Sciences for the Development World (TWAS), the International Workshop on Women for Science opened on 16 August in Beijing.

Chaired by Prof. FANG Xin, vice president of TWOWS and member of CAS Presidium, the opening ceremony

was attended and addressed by Vice Chairwoman of the Standing Committee of the National People's Congress and President of All-China Women's Federation and GU Xiulian, Vice Chairman of the Standing Committee of the National People's Congress and CAS President LU Yongxiang, Chief Executive Secretary of China Association for Science and Technology DENG Nan, Vice Secretary General of the Chinese Academy of Engineering SHI Liying, TWOWS President Kaiser Jamil, TWAS Executive Director M. H. A. Hassan and Executive Director of the InterAcademy Council John

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Campbell.

The two-day meeting will focus on five topics, namely, careers for women in science, ways to attract women into scientific careers, factors behind the success of women scientists, ways to encourage the understanding and use of scientific knowledge by women in rural areas, and women in science--prospects and future strategies.

It was announced at the meeting that China will host the Fourth General Assembly of TWOWS in 2009 in Beijing.

### **Female accounts for one third of Chinese scientists**

**(People's Daily, 2007-08-20)**

Women constitute more than one third of scientists in China, according to an international seminar on women in science recently held in Beijing.

"More than 70 women are academicians of the Chinese Academy of Sciences (CAS) or the Chinese Academy of Engineering (CAE), said Deng Nan, vice president of the China Association for Science and Technology, at the seminar.

However, the proportion of women technicians and engineers are significantly low in the engineering field," said Shi Liying, deputy secretary-general of the CAE.

"Currently, the CAE has 38 female academicians, only accounting for 5.4 percent of the total," Shi said.

The China Association for women Scientists was officially established during the meeting, with the aim to help women scientists give full play to their role in economic and social development.

The seminar, which attracted scholars from some other developing countries such as Egypt, India and Mexico, focused on five topics including the relationship between women and science, how to attract more women into the field of science and major factors behind the success of female scientists.

## 6 Information for upcoming Workshops in October

### **1st International Symposium on Surface and Interface of Biomaterials (SIB07)**

Date: October 5 – 7    City: Chengdu, Sichuan Province    <http://www.biomatchina.com/>

### **International Conference of Comparative Physiology, Biochemistry, and Toxicology & 6th Chinese Comparative Physiology Conference**

Date: October 10 – 14    City: Hangzhou, Zhejiang Province    <http://www.2007iccpt-6thccpc.net/>

### **2007 International Conference of Comparative Physiology**

Date: October 10 – 14    City: Hangzhou, Zhejiang Province    <http://www.2007iccpt-6thccpc.net/>

### **9th International Conference on Steel, Space & Composite Structures**

**Date: October 10 – 15    City: Yantai, Shandong Province**

[http://www.cipremier.com/ciframeset.htm?ann\\_upcomingconf.htm](http://www.cipremier.com/ciframeset.htm?ann_upcomingconf.htm)

### **4th Asian-Pacific International Conference on Pollutants' Analysis and Control**

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Date: October 10 – 15 City: Beijing <http://www.rcees.ac.cn/conference/4thapicp/home1.htm>

### **International Conference on Geological Engineering**

Date: October 10 – 15 City: Wuhan, Hubei Province <http://unit.cug.edu.cn/icge/en.htm>

### **iPRES 2007, The International Conference on the Digital Preservation**

Date: October 11 – 12 City: Beijing <http://ipres.las.ac.cn/index.jsp>

### **8th China International Geo-Electromagnetic Workshop**

Date: October 11 – 14 City: Jingzhou, Hubei Province <http://kletor.yangtzeu.edu.cn/cigew/e1.htm>

### **International Conference on Product Design and Manufacturing System**

Date: October 12 – 15 City: Chongqing <http://cme.cqu.edu.cn/PDMS2007/>

### **The IFIP International Conference on Research and Practical Issues of Enterprise Information Systems**

Date: October 14 – 16 City: Beijing <http://www.confenis.org/>

### **The 13th International Workshop on RF Superconductivity (SRF2007)**

Date: October 14 – 19 City: Beijing  
[http://www.pku.edu.cn/academic/srf2007/first\\_announcement.html](http://www.pku.edu.cn/academic/srf2007/first_announcement.html)

### **2007 International Conference on Intelligent Systems and Knowledge Engineering**

Date: October 15 – 16 City: Chengdu, Sichuan Province <http://iske2007.swjtu.edu.cn/>

### **The International Conference on Advanced Fibers and Polymer Materials (ICAFPM)**

Date: October 15 – 17 City: Shanghai <http://www2.dhu.edu.cn/ICAFPM2007/index.htm>

### **The 10th International Conference on Computer-Aided Design and Computer Graphics (CAD/Graphics 2007)**

Date: October 15 – 18 City: Beijing <http://cadcg07.pku.edu.cn/>

### **9th International Conference on Engineering Structural Integrity Assessment**

Date: October 15 – 19 City: Beijing  
<http://esia9.buaa.edu.cn/>

### **International Conference of Health Monitoring of Structure, Material and Environment**

Date: October 16 – 18 City: Nanjing, Jiangsu Province <http://www.hmsme2007.net/>

### **7th International Conference on SHOCK & IMPACT LOADS ON STRUCTURES**

Date: October 17 – 19 City: Beijing  
[http://www.cipremier.com/ciframeset.htm?ann\\_upcomingconf.htm](http://www.cipremier.com/ciframeset.htm?ann_upcomingconf.htm)

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### **7th International Conference on Shock and Impact Loads on Structures (SI07)**

Date: October 17 – 19 City: Beijing <http://www.cipremier.com/ciframeset.htm?index2.htm>

### **The 13th Asia Pacific Quality Organization International Conference & the 6th Shanghai International Symposium on Quality**

Date: October 17 – 20 City: Shanghai <http://222.66.64.131:8080/zhixie/13/e/e-index-sy.html>

### **First International Symposium on Geotechnical Safety & Risk**

Date: October 18 – 19 City: Shanghai <http://www.isgsr.org/>

### **International Conference on Osteoporosis and Bone Research**

Date: October 18 – 21 City: Shanghai <http://www.chinamed.com.cn/icobr2007/>

### **The 4th International Conference on Soils in Urban, Industrial, Traffic, Mining and Military Areas (SUITMA)**

Date: October 18 – 23 City: Nanjing, Jiangsu Province <http://www.issas.ac.cn:81/english/index.asp>

### **Typing Instructions for SS-MS-SD'07 Documents**

Date: October 19 – 21 City: Shanghai <http://www.systemdynamics.cn/main.php?sLAN=en>

### **2007 International Forum on Welding Science and Engineering**

Date: October 19 – 21 City: Beijing <http://www.wse2007.com/news.asp?id=43>

### **8th China Conference on Man-Machine-Environment System Engineering**

Date: October 19 – 23 City: Shenzhen, Guangzhou Province <http://www.mmese.com/e00.htm>

### **The First Shenyang International Colloquium on Microfluidics**

Date: October 21 – 24 City: Shenyang, Liaoning Province  
<http://www.sicom.org.cn/>

### **9th International Symposium on Polymers for Advanced Technologies**

Date: October 22 – 25 City: Shanghai <http://www.pat2007.com/>

### **The IAU Symposium No.249 on extra-solar planets**

Date: October 22 – 26 City: Suzhou, Jiangsu Province <http://iaus249.nju.edu.cn/index.htm>

### **2007 International Autumn Seminar on Propellants, Explosives and Pyrotechnics (2007 IASPEP)**

Date: October 23 – 26 City: Xi'an, Shaanxi Province <http://www.iaspep.com.cn/>

### **The 5th International Conference on Physical and Numerical Simulation of Materials Processing (ICPNS 2007)**

Date: October 23 – 27 City: Zhengzhou, Henan Province <http://nsmp.hit.edu.cn/>

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### **The 2nd International Symposium on Nonlinear Dynamics**

Date: October 27 – 30 City: Shanghai <http://www.2007isnd.com/main.htm>

### **The 15th World Congress of Pharmacology (IUPHAR-2006)**

Date: October 28 – 31 City: Nanjing, Jiangsu Province <http://www.cnphars.org/edefault.htm>

## Abbreviations

- CAS** - Chinese Academy of Sciences
- MOST** - Ministry of Science and Technology
- CRI** - China Radio International