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SPECIAL ISSUES

More Loans for Small and Medium Tech Businesses

Not long ago, China Banking Regulatory Commission and Ministry of Science and Technology jointly issued a guidance document to enhance loan support for small and medium tech businesses, through the combined strength of banking and S&T industry. Efforts will be made to support the small and medium tech businesses having proprietary innovations, and desirable for expanding internal demand, readjusting economic structures, creating more jobs, and securing a steady and relatively fast economic development.

The document stipulates that S&T authorities at all levels and national high tech parks

shall consolidate relevant resources to establish capital funds for small and medium tech businesses, and provide policy and environment support for making loans available for small and medium tech businesses by setting up guarantee firms, recommending S&T loans, and providing needed consultations. China Banking Regulatory Commission shall encourage and guide banking institutions to establish S&T advisory panel, providing professional views and comments for S&T loans. Meanwhile, a range of supporting mechanisms, including risk assessment, accreditation, and measurement shall be established. Efforts will also be made to loosen the approval of S&T loans and impose a more lenient attitude towards the bad loans owed by small and medium tech businesses. S&T loans can also be guaranteed by taking patents or intellectual property as a deposit.

Scientific Stimulus for Grain Yield Increase

Not long ago, the Chinese Academy of Sciences kicked off an initiative in Changchun to raise grain yield in northeast China through scientific and technological means. The initiative attempts to gather S&T strength of research institutes and centers affiliated to CAS in the region to facilitate agricultural development and promote food security in the locality. Under the initiative, proven agricultural techniques and products will be diffused to different areas in line with local needs. Pilot projects launched at the stage include high yield Jilin corn, mechanized soybean growing, and growing rice in cold areas.

INTERNATIONAL COOPERATION

Environmental Change be Compared

A seminar, sponsored by the Chinese Academy of Sciences, opened on May 25, 2009 to officially launch a comparative study of remote sensing applications in monitoring environmental change. The cooperation project, jointly initiated by Australia, Brazil, Canada, and China, was named ABCC to study global change through space based earth observation technologies.

The 10-year cooperation project will be implemented in a three-phase manner. Phase 1 will last for four years. Researchers who are not from the founding countries may become part of the project in the capacity of non-official member state. Phases II and III will see an expanded scope for the comparative study, allowing more countries to be part of it.

The project works on four major elements that are sensitive to global environmental change: ice, snow, and lakes; arid and semi-arid areas; cold and high-altitude areas, and human activities in the urban areas. Scientists will establish experimental areas for the four elements, collecting new data and working out new algorithms for future applications. The project will also facilitate the establishment of a digital earth prediction platform, and

provide its scientific findings to decision makers.

Improved Understanding of Color Vision Evolution

Prof. ZHNAG Shuyi at East China Normal University School of Life Sciences, in collaboration with British and Irish scientists, proposed a new concept to interpret the evolution of visual systems of bats, which challenges the traditional theory that a poor light environment contributes to lost visual functions. A paper introducing the findings was published in the May 26 issue of online journal *the Proceedings of the National Academy of Sciences*.

Researchers found that most bats have kept a due-color vision for both ultraviolet and red colors, like most mammals, though bats have had a nocturnal life history as long as 52 million years. Furthermore, both non-echolocating and echolocating bats saw no significant differences between them in visual functions.

Researchers have for the first time made gene expression data available for the study, along with the algorithms for reconstructing intact ancestral opsin genes. Based on the new approach, they made the following interpretations to the lost visual functions of some bats: non-echolocating bats were originally living in the trees. In the evolution, some habitats have been turned into dark caves, which led to the lost visual functions in these bats. In the context of CF bats, however, a more developed echolocating capability contributed to the lost visual functions. Well developed hearing capability dwindled the visual functions of CF bats. To adapt to the environment, the degradation of a sensor would automatically enhance the functions of other sensors in a compensatory manner. This works like a blind person who would have an enhanced feeling and hearing capability once his or her visual functions were lost. Compensatory evolution mechanism makes an important guidance for studying the evolution of animals' sensory systems and their nocturnal life.

RESEARCH AND DEVELOPMENT

World's First Quantum E-Government Network

Researchers, led by GUO Guangcan, an academician of the Chinese Academy of Sciences, and Prof. HAN Zhengfu, at the Key Lab of Quantum Information jointly established by the University of Science and Technology of China and the Chinese Academy of Sciences, have created the world's first quantum e-government network run by Wuhu Municipality, Anhui Province. The network is designed with a proprietary unilateral confidential communication scheme working on the equipment enjoying the same functions. The event indicates that China has put its quantum findings into practical applications.

The quantum e-government network has integrated three existing networking technologies in the world to be a multifunctional confidential communication network with multiple levels, able to meet the needs of different clients. One can secure a completely confidential communication between any two points in the network, for safe voice, text, and graphic communication. It also works fine for conference call that needs large communication resources and transmission of confidential documents.

DOA Estimation Based on Fourth-Order Cumulants

A study team, chaired by YE Zhongfu at the University of Science and Technology of China, has recently found a solution to address DOA estimation in the presence of unknown mutual coupling, based on fourth-order cumulants. A paper introducing the findings was published in the May online issue of *Signal Processing*.

In recent years, researchers led by Prof. YE have made an in-depth analysis of the effects of mutual coupling errors on uniform linear array based on the existing mutual coupling models, and found that under a uniform linear array, mutual coupling has an effect equivalent to a small beam former on each array element. Such an effect is completely same on the elements sitting in the middle of the array, though different on the elements at the both ends. Researchers effectively wiped out the impacts of mutual coupling on signal processing by making the elements at the both ends an auxiliary element. Experiments show that super resolution direction estimation approaches, including MUSIC, GESE, and ESPRIT, and self-adaptive beam forming methods, such as SCB, have seen a noticeable improvement in the presence of unknown mutual coupling. Meanwhile, mutual coupling coefficients can be calculated out to be a reference for further validation. The new approach has also been applied to 2-D direction estimation for evenly distributed arrays.

Software for Writing Correct Chinese Characters

Prof. SONG Rou, Beijing Language and Culture University, in collaboration with Prof. LIN Min at Inner Mongolia Normal University, has developed a computer program able to key in and identify Chinese characters in a correct manner based on the description of the form of Chinese characters, and a database containing the common errors that a foreign student may fall into when writing a Chinese character. The system, important for both foreign students learning Chinese and international Chinese language service, makes a powerful tool for helping foreign students learn the Chinese language.

The new system is made up of 20,902 Chinese characters, coded under international standards, and a database gathering the typical errors made by European and American students in learning Chinese. The errors were collected from more than 1,000 papers (500,000 Chinese characters) written by foreign students. The system is also designed

with statistical analysis of common errors.

The system, working with the help of a pen or a mouse, is able to recognize Chinese characters without being trained in the first place. It also works with other popular editing tools and database, allowing incorrect Chinese characters being corrected.

Flying Robot for Disaster Relief

A proprietary multifunctional flying robot, developed by CAS Shenyang Institute of Automation, was tested for its performance at an earthquake exercise held on May 12, 2009 in Beijing, and approved for a limited production. The flying robot, in large and small specifications, looks like a helicopter in shape, having a camera installed at the lower part of the front. With a rotating wing of 3m, and a body length of 3m, the large model is of a 120-kg lifting capacity for 40 kg of payloads, working at 100-kilometer maximum cruising speed an hour with a maximum endurance for 4 hours. The smaller model is designed with a take-off weight at 40kg, and 15-kg payloads, able to run 70 kilometers an hour for up to 2 hours. With a preset target, the flying robot is able to take off, cruise, and touch down on its own. In the field exercise, it has completed a range of preset missions, including taking off, suspension in the air, tracking, low-air information gathering, and touching down.

According to a briefing, the flying robot can be employed to work at earthquake, flood, and fire scenes, or dispatched to watch important facilities, monitor toxic gases over chemical plants, examine power lines and oil pipelines, act as regional air-land and air-sea communication relay, and spray pesticides over croplands and forests.

NEWS BRIEFS

China Launches Mars Probe in Late 2009

A Chinese made Mars probe made its debut at an international fair for aviation and space technologies and equipment opened on May 28, 2009 in Shanghai. According to head of Shanghai Space Agency, Mars probe, named Yinghuo I, will be blasted off in the second half of the year. It will reach and settle down in Mars orbit in 2010, after a 10-month and 380-million-kilometer journey.

The probe has so far completed all the required tests and calibration. With a weight of 115 kg and designed life span for two years, the probe will be equipped with the payloads of plasma detector, optic imager, fluxgate magnetometer, and occultation receiver. The probe is designed to understand Mars and its space environment, the reason that has led to the disappearance of water on the Mars, and the evolution of space environment

between the earth and planets, creating a basis for deeper space probe in the future. The probe will travel surrounding the Mars, though not make a landing on it.

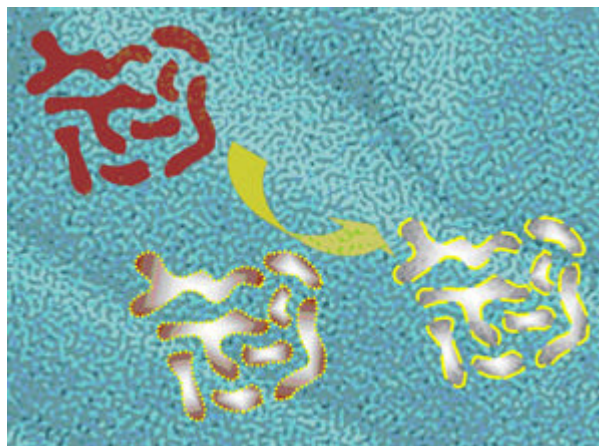
Probing Mars is a cooperative project between China and Russia. Chinese made Mars probe will be launched together with a Russian made Mars probe for a joint expedition to Mars and its satellite.

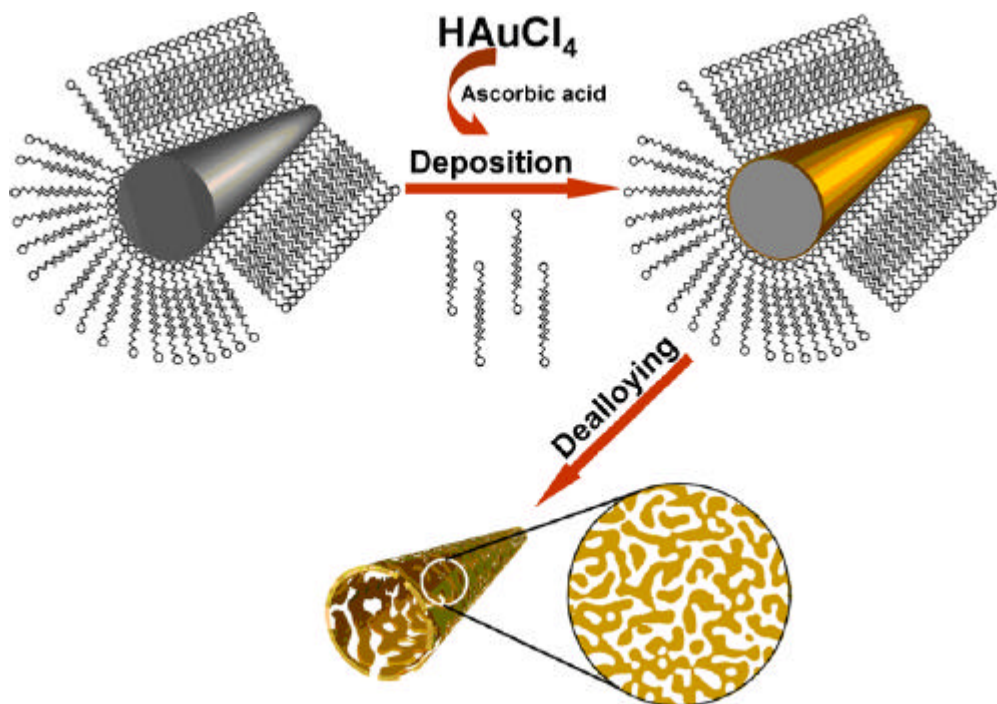
Chinese Made PET Device

NEUSOFT announced on May 26, 2009 that it has successfully developed a proprietary Positron Emission Tomography (PET) device that has accredited by FDA, bringing more hope for the early detection of a range of diseases, including tumor and cardiocerebrovascular diseases.

Positron Emission Tomography is an advanced no-injury diagnosing technology, through which one can observe cellular metabolisms in human body, and obtain an early picture of changes in brain and heart. Thanks to its 4-year painstaking efforts, NEUSOFT has eventually rolled out a proprietary PET device that works better than traditional X-ray, CT, and MRI.

Nanotubular Mesoporous Bimetallic Nanostructures





A research team, led by Prof. DING Yi at Shandong University Key Laboratory of Liquid Structure and Heredity of Materials, part of the Ministry of Education, has achieved substantive progresses in working out a nanotubular mesoporous bimetallic nanostructure with enhanced electrocatalytic performance. Researchers obtained mesoporous copper with a 3-D continuous structure through dealloying, before rolling out a nanotubular mesoporous bimetallic nanostructure with enhanced electrocatalytic performance under low temperature. The study, published in a recent issue of *Advanced Materials*, was supported by a grant from a number of S&T initiatives, including Major Scientific Research Program sponsored by the Chinese Ministry of Science and Technology, and the National 863 Program.

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