

S&T Highlights of China

**December 2010 and January 2011
NSF China Office**

These summaries of science and technology news from Chinese media present information for use by NSF staff and US policy makers; they are not statements of NSF policy. For more information, questions may be directed to nsfbeijing@nsf.gov.

Stem Cell Research in China Will Achieve a Breakthrough within the Next Decade

Zhou Qi, Chief Scientist with the stem cell project at the Chinese Academy of Sciences (CAS) predicted that the most likely candidate for China to win a Nobel Prize during the next 10 years is its stem cell research. "China needs 5-10 years to shift from basic research to clinical application and another 10 years to realize large-scale clinical applications." Zhou said.

Bai Chunli, Executive Vice President of CAS at the annual National Meeting of CAS on January 26-27, pointed out that Stem Cell is among 4 of the strategic research projects designated by CAS. Others include nuclear fission, space science and clean energy. Bai said CAS will establish a world-class research platform by incorporating the 4 core research centers in Beijing [focuses on project materials and organ construction], Shanghai [focuses on establishing stem cell regulations], Guangzhou [focuses on biology and medicine] and Kunming [focuses on clinical animal experiments] and the resources of 17 research institutions around the country.

CAS Launched Innovation 2020 Plan

CAS held its Annual Work Conference on January 25 in Beijing and announced the implementation of the Innovation 2020 Plan mandated by the State Council. This plan will further strengthen its leading role in China's S&T development with the goals of becoming a world class R&D institution with critical influence within the next decade.

CAS plans to initiate three new piloting strategic research projects including new generation IT, clean coal, and core technology in deep resources exploration in addition to the previous pilot projects in stem cell, nuclear fission, space science and clean energy. By 2020, CAS plans to realize seven goals:

1. Achieve breakthrough in core technology in key strategic areas including space sciences, information, energy, ocean studies, and human health.

2. Optimize and promote basic research in material science, chemistry, physics, mathematics, earth science, astronomy, and life sciences.
3. Improve innovative capability by developing one third of CAS institutes into competitive and influential world class institutions.
4. Acquire excellent innovative talents, specifically 2,000 chief scientists, 3,000 leading scientists, and produce 120,000 graduate students.
5. Expedite conversion from basic research to development by establishing effective nationwide CAS-regional R&D cooperation network.
6. Provide more influential consulting service to national level decision makers.
7. Become the S&T representative of China in international S&T cooperation by more actively engaging in global collaboration and playing a leading or core role in regional S&T cooperation.

President Hu Presented Annual State Top Scientific and Technological Awards to Two Scientists

President Hu Jintao presented two scientists with the annual State Top Scientific and Technical Award on Friday, January 14. This recognition came with a cash award of RMB \$5 million (US \$758,000).

Professor Shi Changxu, a materials expert and a member of CAS, was honored for his research in super alloy steel and new alloy steel, which have been used to produce turbine blades for Chinese fighter aircraft.

Professor Wang Shenyi, a hematologist was recognized for his research that helps improve the survival chances of acute promyelocytic leukemia patients. He was the first scientist to transform cancer cells into normal ones.

National Natural Science Foundation of China (NSFC) Establishes External Evaluation Committee

NSFC hosted the first Evaluation Committee Meeting on December 16-21, 2011 in Beijing. The purpose of this meeting is to invite funding recipients, external and international scientists and others to evaluate the program performance of NSFC. Dr. Richard Neil Zare of Stanford University was among the 13 international scientists invited to serve on the Committee and was elected as the Chair of the Committee. The International Committee held hearings and discussions on the NSFC's strategic role, funding and management efficiency and effectiveness, and program impact,

based on the evaluation report prepared by the China National S&T Evaluation Center.

The Committee will provide recommendations for the next phase and the framework for drafting the international evaluation report to be included in the final evaluation report.

State Councilor, Madam Liu Yandong, met with the Committee members on Dec. 17, 2010, and sought their recommendations to further improve the NSFC's performance and future development.

NSFC's self-evaluation process was well received, as providing a role model for transparency in the award of scientific funds.

China Ranked 4th in the World in R&D Spending

China's scientific research and development (R&D) total spending was RMB \$580.2 billion (US \$87 billion) in 2009, fourth in the world after the United States, Japan and Germany, according to the national R&D resources survey conducted by the National Bureau of Statistics (NBS) released on Nov 23, 2010.

China's total spending on R&D includes RMB \$27 billion (US \$398 million) on basic research, RMB \$73 billion (US \$10.7 billion) on applied research and RMB \$480 (US \$70.6 billion) on experimental research and development.

The Chinese government investment in R&D was RMB \$135.8 billion (about US \$20 billion) in 2009, about 4.5 times of the investment in 2000 or an annual increase of 18.3 percent. An estimated 3.2 million people were involved in China's R&D activities in 2009, the largest number in the world.

China has been continuously increasing its investment on R&D. However, the ratio of R&D investment against GDP is at 1.7 percent in China, far behind an average of 3 percent in leading countries worldwide.

China Initiated a New 'Young Thousand Talent Program'

One of China's key strategies to build human resources in science and technology human resources has been to encourage Chinese scientists to return home with attractive start-up package since 2008. To further

increase the quality of scientists and build future generations of researchers in China, the Ministry of Organization initiated this new program in early December. The program aims to attract young leading overseas researchers with Ph.D. degrees, including Chinese and foreign nationals under 40 years old. The goal is to hire 2,000 full time scientists working at Chinese S&T institutions within the next 5 years.

The Program will provide a RMB\$500,000(US \$73,500) stipend, in addition to up to RMB \$1-3 million (US \$150,000 to \$450,000) research grants subject to the proposals. The program's application will be reviewed by a joint panel with members from the Ministry of Education, Ministry of Science and Technology, Ministry of Human Resources and Social Security, Chinese Academy of Sciences, Chinese Academy of Engineering and the Natural Science Foundation of China.

Ministry of Education (MOE) Announced 2010 Top Ten S&T Achievements at Chinese Universities

MOE oversees all the Chinese universities and each year it reviews the accomplishments of Chinese universities and recognizes S&T achievements. The following were recognized in 2010:

Beijing Univ. of Aeronautics and Astronautics. "Real Time 3D graphics platform", PI: Zhao Xiping

Beijing Posts and Communications Univ. "Gbps Wireless transmission and Network", PI: Zhang Ping

Fudan Univ. "Control Mechanism of Acetylated Metabolism", PI: Zhao Shiming

Nanjing Agricultural Univ. "Molecular Breeding and Application of Rice Stripe Resistant High Yield Rice", PI: Wan Jianmin

Tsinghua Univ. "Topological Quantum State", PI: Xue Qikun

Tsinghua Univ. "Structure and Function of Membrane Protein", PI: Shi Yigong

Xian Jiaotong Univ. "Nano Material Deformation Behavior and Size Effect", PI: Sun Jun

Xiamen Univ. "Microbial Carbon Pump", PI: Jiao Zhinian

Central South Univ. "Clearing and Utilization Technology of Refractory Non-ferrous Metal Oxide Ores", PI: Chen Qiyuan

Sun Yat-Sen Univ. "Discovery of Extrinsic Apoptosis Pathway in Chordate", PI: Xu Anlong

China Opens World's Deepest Underground Laboratory

China Jinping Underground Laboratory (CJPL) is the first deep underground laboratory and currently the deepest underground laboratory in the world with rock coverage of 2,400 meters. It was opened in Jinping Hydropower Station at Yalongjiang River in Sichuan province on December 12, 2010. The Lab was jointly constructed by Tsinghua University and Ertan Hydropower Development Company. The CJPL will be used to initiate studies of dark matter.

Chinese Government to Send 12,000 Students Overseas in 2011

The Chinese government will offer scholarships for overseas study for 12,000 Chinese students in 2011, including 6,000 postgraduates and 6,000 researchers and scholars. Key fields for official scholarships include bio-technology, new materials, aviation, engineering and manufacturing, information, education, and financial and accounting.

These state-funded scholarships will be managed by the China Scholarship Council (CSC), an agency affiliated with the Ministry of Education. Chinese government has supported 78,524 students for overseas study from 1996 to 2009, and 44,555 of them returned home after completing their studies. Selection of the students will be based on applications and panel review. The MOE has increased funding to send more graduate students and researchers to overseas.

China's First Spherical Robot with Telescopic Arms

Beijing University of Posts and Telecommunications has successfully developed China's first spherical robot with telescopic arms. The omni-directional movable robot with retractable hands can perform tasks and has improved mobility and environment adaptability. The research team has obtained four patents for the invention in China and one in the United States.

The research was funded by the National 863 Program's Intelligent Robot Project, a priority R&D area for China since 1986. Robotics research is a fast growing interdisciplinary research area in China.

Chinese Research Ship Embarks on a Year-long Global Voyage

The Chinese scientific research ship Dayang Yihao, or Ocean One, started a year-long global trip that covers the Pacific, Atlantic and Indian oceans, with its main research mission on hot liquid sulfides and deep-sea biological diversity. This was China's 22nd deep-sea scientific research mission. A total of 431 scientists will join the research in different phases of the voyage. The ship carries "Sea Dragon 2," a remotely-operated underwater vehicle and newly self-developed deep sea drilling machines. The ship was managed by the China Ocean Mineral Resources R&D Association under the State Oceanic Administration.

The voyage was regarded as a kick-off of deep-sea scientific research in China's 12th Five-Year Development Plan (2011-2015). China has put deep-sea exploration as one of its national S&T strategic priorities. The voyage is regarded as a critical step for China to further its research on deep-sea resources and to promote its marine science.

CAS Invests in Integrated Circuit Park

The Chinese Academy of Sciences will invest RMB \$1.25 billion (US\$183 million) to establish an Integrated Circuit Innovation (IC) Park in Zhongguancun area, known as China's Silicon Valley in Beijing. The Park will focus on R&D, design and manufacturing of integrated circuits with an estimated annual production valued at RMB \$10 billion (US \$1.47 billion). CAS plans to invite and cooperate with research teams and enterprises from China and abroad to create a world class IC industrial base and aims to eventually realize the conversion from research to economic development.

Chinese leadership has called on the CAS to play a lead role in advancing China's innovation oriented development. CAS has, in addition to conducting basic research, also pursued commercialization of research projects in several key areas, including the computer circuit, solar cell and robotics industry. In 2008, the sales of CAS spin-off companies reached RMB \$ 171.6 billion (US\$25 billion). The most well-known CAS owned company is Lenovo.

University of Macau (UM) Received Two Major Research Funding

MOST approved two new State Key (SK) Labs at the University of Macau. These include one that will be jointly established by UM and Fudan University. The research will focus on analogue and mixed-signal integrated circuits by utilizing the advanced nano-chip technology, and will train masters and doctoral students and postdoctoral researchers. UM aims to develop the Lab into the most important silicon chip research center in China.

The other SK Lab aims to become the World Health Organization (WHO)'s center for cooperation in traditional Chinese medicine and an international platform for S&T cooperation in traditional medicine.

UM Rector Wei Zhao has also received MOST funding support and serves as the chief scientist of an internet research project aimed at developing a new internet technology. The research team includes members from the CAS, Tsinghua University, Tongji University and East China Normal University. Wei was a former Director for NSF's Division of Computer and Network Systems.

US Scientist received CAS 2010 International S&T Cooperation Award

Emeritus Professor Stephen Porter from the Department of Earth and Space Sciences and Quaternary Research Center of the University of Washington and two other Professors from Japan and Australia received the CAS Annual Award for International S&T Cooperation.

Professor Porter was recognized for his collaborative research with Professor An Zhisheng from the CAS Xi'an Institute of Earth Environment on Chinese loess, particularly for his efforts to promote closer cooperation and exchanges between the young scientists from both countries.

Established in 2007, the CAS annual award for International S&T cooperation is to honor those eminent international experts who made outstanding contributions to China's global collaboration in science and technology.

CAS/CNIC Joins iGENI Global Network

CAS Computer Network Information Center (CNIC) and the International Center for Advanced Internet Research (iCAIR) at Northwestern University signed a Memorandum of Understanding on January 27 in Beijing to enhance their cooperation in future Internet related activities including research, development, and networking. The CNIC will join the NSF funded U.S. Global Environment for Network Innovations (iGENI) program and participate in three partnership activities:

- Design and implement processes that optimize research and development of the future Internet through programs based on new architecture, technology, and experimental testbeds.
- Undertake the development and implementation of experimental research testbeds, and cooperate on developing the International Global Environment for Network Innovations (iGENI).
- Design and implement processes that will enable communities to researchers to use experimental testbeds.



Dai Bowei, Deputy Director of CNIC and Director-General of China Science and Technology Network (CSTNet), and Joe Mambretti, Director of iCAIR and PI of iGENI signed the memorandum of Understanding.