



International Knowledge Centre  
for Engineering Sciences and Technology  
under the Auspices of UNESCO  
联合国教科文组织国际工程科技知识中心

# Newsletter

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International Knowledge Centre for Engineering Sciences  
and Technology under the Auspices of UNESCO





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联合国教科文组织国际工程科技知识中心**

The International Knowledge Centre for Engineering Sciences and Technology (shortened as “IKCEST”) is a category 2 centre under the auspices of the United Nations Educational, Scientific and Cultural Organization (shortened as “UNESCO”). IKCEST was established on June 2, 2014. The Chinese Academy of Engineering is responsible for the operation and management of the IKCEST.

Under the auspices of UNESCO, IKCEST is a comprehensive and international knowledge centre devoted to the engineering sciences, technology and applied technology. IKCEST aims at connecting engineering sciences and technology institutions globally, assembling various digital resources relating to engineering sciences and technology, building up a public data service platform and corresponding service environment, and coordinating the building of various professional knowledge systems, thus providing knowledge-based services at a global scale in the form of consultancies, scientific research and education for policy-makers and engineering science and technology professionals in the world, with particular reference to the developing countries.

The specific tasks and functions of IKCEST are as follows: to establish an international engineering and technology resources hub; to establish a public data service platform, and to develop the technology for mining and analyzing knowledge from big data; to cooperatively build professional knowledge service systems, and to build capacity in developing countries; to foster interdisciplinary engineering talents with big data processing ability; and to assist UNESCO to fulfill its aims and support its action plans.



# CONTENTS

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## IKCEST News

- 04 The 3rd and 4th Training Program for Silk Road Engineering Science and Technology Development of 2017 (the 10th and 11th in total) held by the IKCEST Silk Road Training Base
- 06 Expert seminar on top-level design plan for IKCEST construction held in CAE
- 09 IKCEST representative attended CISTRAT expert evaluation meeting
- 10 IKCEST Disaster Risk Reduction Knowledge Service System 2017 project launch meeting held in IGSNRR
- 12 The 5th IKCEST Training Program for Silk Road Engineering Science and Technology Development of 2017 (the 12th in total) held by the IKCEST Silk Road Training Base
- 13 IKCEST and ISTIC held joint international training program
- 15 UNESCO Beijing Office Director and ICEE Council and Advisory Committee members visited IKCEST
- 16 IKCEST platform 2017 edition officially launched
- 17 Training Program for Silk Road Engineering Science and Technology Development held by IKCEST Silk Road Training Base in Xinjiang University
- 19 IKCEST Intelligent City Knowledge Service System 2017 project launch meeting held in Shanghai
- 22 IKCEST Silk Road Training Base held thematic lecture for Silk Road robot competition participants
- 24 IKCEST representative attended UNESCO Regional Workshop on Accelerating Science and Technology to Foster the Implementation of the Sustainable Development Goals in Asia and the Pacific in East Timor

## CKCEST News

- 26 Joint Research Centre for Knowledge and Intelligence inaugurated at Tsinghua University
- 26 ISTIC delegation visited CKCEST for exchange on Knowledge Organization System development
- 27 Meeting held in Beijing to launch sub-centre evaluation task
- 27 Meeting held in Beijing to launch data standard normalization task
- 27 CKCEST sub-centre launch training meeting held in Beijing
- 28 Meeting held to kick off resource plan preparation
- 28 CKCEST information push service training workshop held in Tianjin
- 28 CKCEST expert database development debriefing held

## Top News for Big Data Era

- 29 Artificial intelligence written into Government Work Report for first time
- 29 NDRC released list of major projects promoting big data development
- 29 Switzerland launched National Research Programme for Big Data
- 30 State Council General Office issued Implementation Plan for Integration and Sharing of Government Information Systems

## Terms on Big Data

- 31 Knowledge Computing



## » IKCEST News

### The 3rd and 4th Training Program for Silk Road Engineering Science and Technology Development of 2017 (the 10th and 11th in total) held by the IKCEST Silk Road Training Base

The 3rd and 4th Training Program for Silk Road Engineering Science and Technology Development of 2017 (the 10th and 11th in total) on “artificial intelligence and big data-empowered innovation” were held by the IKCEST Silk Road Training Base in Xi'an Jiaotong University on April 15 and May 13. The training courses were attended by 170 foreign students from 41 countries along the Belt and Road, including Yemen, Bangladesh, Zambia, Zimbabwe, Kenya, Kyrgyzstan, Nepal and Vietnam,

and exchange students from Hong Kong, Macao and Taiwan who were studying in Xi'an Jiaotong University, Northwestern Polytechnical University, Xidian University, Chang'an University and China University of Petroleum.

The training course was taught in English and featured the theme of artificial intelligence and big data. The curriculum included three parts, i.e. frontier knowledge of artificial intelligence, cutting-edge knowledge of big data and traditional Chinese

#### The 10th Training Program for Silk Road Engineering Science and Technology Development

Xi'an Jiaotong University 2017 April.





culture. The teaching was mainly conducted in the form of lectures, covering such topics as brief introduction to artificial intelligence, model identification and machine learning as well as related applications, autonomous driving of intelligent driverless cars, advance of information technologies and commercial applications, product-based data management, cloud computing and big data analysis, brief history of China's foreign relations, the history and future of Belt and Road. The training program aims to show to the trainees the core technologies of artificial intelligence and their applications in daily life as well as the innovation and transformation of the integration of big data theories and technologies in different fields and industries, in order to serve the country's development needs and promote friendship and cooperation among Silk Road countries.

Khan Syed Abdul Rehman from Pakistan spoke at the opening session of the 4th training program on behalf of the trainees. He thanked the organiser for the training opportunity, and applauded the vision of the Belt and Road. He said that the 21st Century Silk Road is not just a route for eco-

nomic and technological exchange but also a platform for peaceful cultural exchanges and he will be devoted to play his due role in this great project.

In addition, the training program also included a tour of the ChinaSoft International Industrial Park, where the trainees visited key exhibition zones including "opening a new era", "big data", "industrial solutions" and "Liberation - software crowdsourcing platform", and learned about the corporate perspective of the IT industry, solutions and typical industrial applications.

At the end of the training, the organiser issued certificates to the trainees who had completed all the courses and passed the exams.





## Expert seminar on top-level design plan for IKCEST construction held in CAE

The expert seminar on top-level design plan for the construction of the International Knowledge Centre for Engineering Sciences and Technology under the Auspices of UNESCO (shortened as “IKCEST”) was held in the Chinese Academy of Engineering (shortened as “CAE”) on April 19, 2017. Chen Zuoning, Vice President of the CAE and Pan Yunhe, former Executive Vice President of the CAE attended the meeting. Other participants included the staff of the IKCEST Project Management Office, platform experts of IKCEST from Shanghai Softline, representatives of the four IKCEST sub-centres and technology research centre, as well as invited experts from higher learning institutions and relevant industries.

During the meeting, Wang Xuanyan, General Manager of Shanghai Softline, briefed the participants on the progress of the IKCEST top-level de-

sign plan. The work was formally launched in November 2016 with the establishment of the expert group on top-level design. After the initial draft was completed, the experts provided feedback through regular on-line and face-to-face meetings. Now, the top-level design plan is ready for approval. Liu Wei from Shanghai Softline explained the details of the draft plan. The ideas behind the IKCEST platform construction consist of three aspects, i.e. content development, O2O model operation and relevant models of services. The most important part is content development, including data, information as well as knowledge and application. The primary task now is to promote integrated construction of the general platform and sub-platforms. The platform group has identified the specific tasks, and formulated a three-year implementation plan to strengthen the construction of the platform.





Next, the four sub-centres reported their plans for the coming three years.

Wang Juanle, Research Fellow at the Institute of Geographic Sciences and Natural Resources Research (shortened as “IGSNRR”) of the Chinese Academy of Sciences, reported on the construction plan for the Disaster Risk Reduction Knowledge Service System. In December 2016, UNESCO sent an official letter, confirming its cooperation with IKCEST in disaster risk reduction. As suggested in the letter, the knowledge service system on disaster risk reduction covers 11 aspects, including disaster meta-data standards or best practices, global disaster meta-database, application of disaster risk reduction knowledge services, academic exchanges and personnel training, which well echo the needs of UNESCO.

Zheng Qinghua, Vice President of Xi’an Jiaotong University, reported on the construction plan for the Silk Road Science and Technology Knowledge Service System. The IKCEST Silk Road training base was inaugurated early this year for the purpose of cultivating practical science and technology professionals from countries along the Silk Road and providing talent support for the going global of Chinese enterprises. In 2017, the knowledge service system focuses on five areas of work, i.e. constructing technology platform, developing education and teaching resources, training Belt and Road professionals, improving the qualifications of teachers and strengthening institutions and systems, so as to better support the pursuit of the Belt and Road initiative.

Guan Jian from Tsinghua University reported on the construction plan for the Engineering Education Knowledge Service System. After one year’s construction, the operation management framework of the knowledge service system has been by and large put in place. In the coming three years, efforts will be made to strengthen the construction of

various engineering education databases, start the operation of the knowledge service system, provide engineering science and technology training for developing countries, and boost the international influence of IKCEST.

Kong Lingyu from Tongji University reported on the construction plan for the Intelligent City Knowledge Service System. To meet the individual needs of the public, scholars and experts, three platforms have been developed, respectively on the world observatory of cities, world knowledge for urban planning education and world intelligent city construction platform. Going forward, new contents will be added to the platform, particularly the world cities basic database suggested by Prof. Pan, and new knowledge services such as city diagnosis, city prescription and report of world cities rankings will be included.

After the presentations, the experts had a discussion on the overall top-level design plan and the construction plans for each sub-centre, and offered many constructive suggestions, such as: as an internet platform, IKCEST should follow the principles of iterative development and constantly improve its products according to customer feedback; the relationship between development and operation should be better defined; the general platform should be more closely tied to the four sub-centres, and strengthen the consolidation of data standards and resources of sub-centres, give considerations to unified user management and interface style and strengthen planning on network security; the sub-centres should promote mutual learning and avoid waste of resources caused by repetitive development; the sub-centres should focus on developing specialty products and building brands; the platform should be better promoted, and incentives should be introduced to stimulate user activity; product scenarios should be better defined to boost user experience and convenience.





Song Dexiong, Executive Deputy Director of IKCEST, gave the following instructions on the implementation of the top-level design plan: first, the purpose of making the top-level design is to better coordinate the relationship between different projects, clarify the tasks of IKCEST as a category-2 centre, and formulate a comprehensive plan for one to three years based on its current functions and future plans to guide the construction of the general platform and the sub-centres; second, the important thing about the top-level design is to make good plans for integrated construction of the general platform and sub-centres. It is hoped that Softline should proceed from the overall perspective, establish an efficient communication mechanism and coordinate the efforts of all participants; third, the construction of the IKCEST platform must display the features of knowledge services, rather than simply pooling and demonstrating information.

The CAE leaders fully acknowledged the progress of the IKCEST top-level design plan, and put forward detailed requirements for the construction of the platform in the next stage. Vice President Chen Zuoning gave three instructions: first, on technology management, it is hoped that Softline should work with the Project Management Office to ensure smooth progress of technology coordination; second, the construction of the IKCEST platform should demonstrate its unique features, focus on delivering professional knowledge services, choose priority areas, and start with knowledge services before moving into all-round operation; third, the issue of data security must be taken into account. The Project Management Office must lead the research efforts, formulate plans and identify the scope, level and recipient for data opening in order to meet the security requirement of data release.

Prof. Pan Yunhe gave the following sug-

gestions: first, to complete the tasks of this year, sub-centres should develop more advanced applications that tap into their own features before the end of August. For example, the sub-centre on intelligent city may run a demonstration on the global evaluation of intelligent cities. The sub-centre on engineering education may work with the Institute of Advanced Mathematics of Zhejiang University to conduct an assessment of the engineering education programs in the world; second, the IKCEST platform should make full use of the outcomes of the CKCEST platform construction. The good knowledge applications from the CKCEST platform should also be put on the IKCEST platform. As for data release, the difference between IKCEST and CKCEST must be fully appreciated, i.e. IKCEST is for the world, and the ultimate goal is to set up sub-centres all around the world centring on CKCEST; third, the experience and technology research outcomes achieved in the construction process of CKCEST could be applied directly in the top-level design of IKCEST to increase efficiency; fourth, the various sub-centres should each develop its own unique features. The sub-centre on disaster risk reduction could combine engineering with science; the sub-centre on Silk Road science and technology should be clear about its goal of training talents for Chinese enterprises to go global and serving the Belt and Road strategy of the country. The sub-centre on engineering education should conduct an evaluation of high-end education in the world and make China's voice heard in this field. The sub-centre on intelligent city should consolidate the data of the industry to enrich the content of intelligent city evaluation, and provide a list of model cities to encourage the participation of all cities and enlarge the data volume of the platform.



## IKCEST representative attended CISTRAT expert evaluation meeting

From April 24 to April 28, 2017, the International Research and Training Centre for Science and Technology Strategy (shortened as “CISTRAT”), a Category 2 Centre under the Auspices of UNESCO, received a week-long comprehensive assessment. The Chinese Academy of Science and Technology for Development is responsible for the operation and management of the CISTRAT. Appointed by UNESCO, an expert evaluation team consisting of CEO Jummai Umar-Ajijola and her assistants from The Business People, a Nigerian consultancy agency, undertook the evaluation work with the company of UNESCO Programme Specialist Yoslan Nur. The evaluation mainly included on-site visits, employee interviews, survey questionnaires, internal reports, external evaluation, multi-party discussions, and summary discussions.

On the afternoon of April 26, CISTRAT held an exchange meeting between the UNESCO expert evaluation team and collaborative organizations. Invited to the meeting were representatives from the Institute of Science and Development of the Chinese Academy of Sciences, the Tsinghua University

Science Park Development Centre, the International Knowledge Centre for Engineering Sciences and Technology under the Auspices of UNESCO (shortened as “IKCEST”, affiliated to the Chinese Academy of Engineering), International Centre on Space Technologies for Natural and Cultural Heritage under the Auspices of UNESCO (shortened as “HIST”, affiliated to the Chinese Academy of Sciences) and other collaborative organizations of CISTRAT.

The IKCEST representative spoke highly of the work CISTRAT has done over the 6 years since its establishment, pointing out that CISTRAT has actively carried out research work, boosted the influence of its research results, and provided effective training to trainees from various countries and regions. These efforts have produced considerable help to other UNESCO Category 2 Centres and gradually formed a development model of collaborative research with developed countries and results sharing with other developing countries. The IKCEST representative also made suggestions for strengthening ties and promoting cooperation.





## IKCEST Disaster Risk Reduction Knowledge Service System 2017 project launch meeting held in IGSNRR

The International Knowledge Centre for Engineering Sciences and Technology under the auspices of UNESCO (shortened as “IKCEST”) held the Disaster Risk Reduction Knowledge Service System 2017 project launch meeting in Room 2321 of the Institute of Geographic Sciences and Natural Resources Research (shortened as “IGSNRR”) of the Chinese Academy of Sciences (shortened as “CAS”) on May 5, 2017.

Presided over by Deputy Director Zhang Ming of the Foreign Cooperation Division of the IGSNRR, the meeting was attended by Sun Jiulin, CAE Member and Research Professor of the IGSNRR, Director Song Dexiong, Deputy Director Liu Chang and Project Manager Liu Hongyang of the Project Management Office of the China Knowledge Centre for Engineering Sciences and Technology (shortened as “CKCEST”), Research Professor Wang Juanle, Senior Engineer Yang Yaping and Associate Research Professor Yang Fei of the Earth Data Science and Sharing Section of the Institute of IGSNRR, Engineer-in-Chief Yang Siquan of the

National Disaster Reduction Centre, Professor Tang Hong of Beijing Normal University, Business Director Fan Xiaobing and Project Manager Luo Man of Shanghai Softline Information Technology Co. Ltd., Associate Research Professor Bu Kun of the Northeast Institute of Geography and Agroecology of CAS, as well as staff and postgraduate students engaged in this research project.

Wang Juanle introduced the task implementation of the Disaster Risk Reduction Knowledge Service System in 2017 from the 4 aspects of project background and basic situation, project objectives and main tasks, overall implementation program, and implementation plan and schedules. Bu Kun made an online demonstration of the Disaster Risk Reduction Knowledge Service System, covering platform documentation, events, data, maps, catalogues, knowledge, training, metadata, science popularization, among others.

Subsequently, the attending experts engaged in full and detailed exchanges on the 2017 task implementation plan of the Disaster Risk Reduc-





tion Knowledge Service System. After listening to the report on the Disaster Risk Reduction Knowledge Service System and the following discussion opinions of the experts at the meeting, Director Song Dexiong made 3 suggestions: 1. continue to focus on metadata construction and take a lead in international metadata construction; 2. strengthen cooperation with other institutions, continue to enhance the analysis of typical cases and provide experience for other countries and regions; and 3. focus on knowledge service applications, highlight features and continue to develop international disaster reduction knowledge services by centring on the cooperation proposals of UNESCO DRR. Meanwhile, Director Song Dexiong put forward 2 requirements: one is to build the general platform and the sub-platform as a whole and strengthen coordination; while the other is to have Prof. Sun as general commander and solidly implement the disaster risk reduction project in accordance with Prof. Sun's guiding opinions. Song Dexiong thanked Prof. Sun

for his support and assistance to the project and also the whole Disaster Risk Reduction Knowledge Service System team and all attending experts for their great support for the construction of the Disaster Risk Reduction Knowledge Service System.

Finally, Sun Jiulin made 3 suggestions in his summary: 1. in accordance with UNESCO DRR's points of attention, strengthen the establishment of disaster cases such as landslide, mudflow and other disaster events; 2. pay more attention to the training program, and in line with the ideas of disaster prevention for the people and comprehensive disaster mitigation, let the public learn the relevant knowledge of disaster risk reduction; and 3. ensure the integrated construction of the general platform and the sub-platform, with the general platform carrying out sound overall planning and coordination work and the sub-centre developing personalized knowledge services under the unified model required by the general platform.





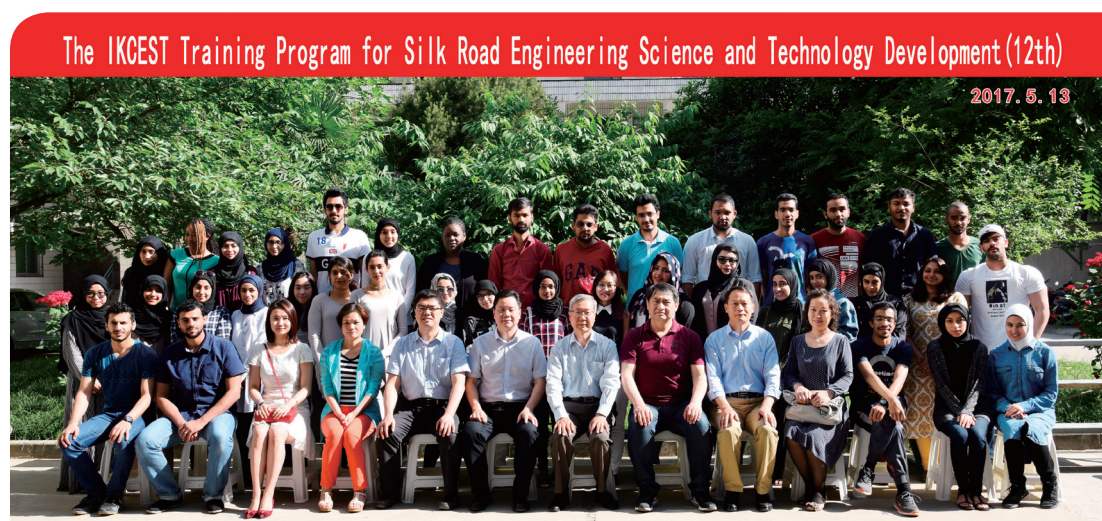
## The 5th IKCEST Training Program for Silk Road Engineering Science and Technology Development of 2017 (the 12th in total) held by the IKCEST Silk Road Training Base

From May 13 to May 21, 2017, the IKCEST Silk Road Training Base held the 5th IKCEST Training Program for Silk Road Engineering Science and Technology Development of 2017 (the 12th in total) in Xi'an Jiaotong University under the theme of "Frontier Medical Science and Technology". The training program aims to cultivate local talents from countries along the Silk Road, facilitate exchanges between China and Silk Road countries in medical science, technology and culture and promote the Chinese culture.

The just concluded session of the training program, which lasted for four days, covered the latest progress and professional knowledge of foundational and clinic medical studies, including the dietary choices of patients of blood vessel diseases, diabetes and obesity and relevant policies, senility

and brain research, the features and application of bacterial 16S rRNA gene, fetal anomaly cases in certain Belt and Road countries, the application of laparoscope and robot-assisted laparoscope minimally invasive surgery in urology, the latest progress in ligament surgery and skin diseases as well as related opportunities and challenges. The trainers were all from the medical department of the university. The well-designed training curriculum and the excellent teaching of the trainers were highly appreciated by foreign students.

The 64 trainees came from 14 countries along the Belt and Road. At the end of the training program, the organiser issued the certificate to the trainees who had completed all the courses and passed the exams.





## IKCEST and ISTIC held joint international training program

The international training program “Big Data of Developing Countries”, co-organised by the International Knowledge Centre for Engineering Sciences and Technology under the Auspices of UNESCO (shortened as “IKCEST”) and the International Science, Technology and Innovation Centre for South-South Cooperation under the Auspices of UNESCO (shortened as “ISTIC”), was successfully held in Kuala Lumpur, Malaysia from May 15 to 18, 2017.

The training program, available to engineers, scientists and technicians with professional background from developing nations, aims to analyse the basic knowledge about big data and its practical applications in different sectors and promote IKCEST’s construction philosophy and experience, so as to help developing countries improve their strength in engineering science and technology. Some 30 people from 13 countries, including Malaysia, Pakistan, South Africa, Uzbekistan and Uganda, took part in the training program.

The training program was composed of special lectures and technical visit. The special lectures were given by professors from Zhejiang University, Tongji University and Xi’an Jiaotong

University, who introduced the general conditions about the construction and operation of IKCEST, and talked about big data infrastructure, in-depth search, cross-media computing, massive visual-data analysis as well as big data applications in the areas of healthcare and intelligent city. The trainees later made a technical visit to the Malaysian Institute of Microelectronic System (shortened as “MIMOS”), where they learned more about data retrieval, data analysis and tool application, Internet of things, as well as the practical application of big data analysis.

The training program has elevated IKCEST’s international influence and laid a foundation for its future partnership with overseas institutions to adopt big data technologies to resolve practical issues. Several trainees said the training is very practical, fruitful and enlightening, and helpful for them to do a better job in the future. They hope to join in more activities to be organised by IKCEST and explore the possibility of building partnership with IKCEST.

Dato’ Dr. Sharifah Maimunah Syed Zin, Director of ISTIC and Member of the Academy of







Sciences Malaysia, and Song Dexiong, Executive Deputy Director of IKCEST, spoke at the opening ceremony of the training program. Dato' Dr. Sam-sudin Tugiman also attended the closing ceremony, and presented certificates of training to the trainees along with Song Dexiong.


IKCEST and ISTIC signed a memorandum of understanding on May 15, 2017. The international

training program is their first cooperation under the MoU. The two sides will pursue more cooperation in the future, such as establishing a mechanism to organise training programs on a regular basis, and making joint contributions to achieving the United Nations' Sustainable Development Goals and 2030 Agenda.





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联合国教科文组织国际工程科技知识中心

In collaboration with:



**TRAINING WORKSHOP ON  
BIG DATA**  
FOR DEVELOPING COUNTRIES  
15-18 May 2017, Kuala Lumpur, Malaysia



## UNESCO Beijing Office Director and ICEE Council and Advisory Committee members visited IKCEST

On May 21, 2017, the Secretariat of the International Knowledge Centre for Engineering Sciences and Technology (shortened as “IKCEST”) received Director Marielza Oliveira of the UNESCO Beijing Office and all council and advisory committee members of the International Centre for Engineering Education (shortened as “ICEE”). Members of the ICEE council and advisory committee consist of internationally renowned experts and scholars, including Zhou Ji, President and Member of the Chinese Academy of Engineering, Qiu Yong, President of Tsinghua University and Member of the Chinese Academy of Sciences, Wu Qidi, Director of the ICEE and former Vice Minister of Education of China, Tian Hongqi, Vice President and Member of the Chinese Academy of Engineering, C. D. Mote, President of the National Academy of Engineering of the United States, Koizumi Hideaki, Executive Vice President of the Engineering Academy of Japan, Foreign Member of the Chinese Academy of Engineering and a Nobel laureate, Yashin Brimohan, Vice President of the World Federation of

Engineering Organizations (shortened as “WFEO”), and Funso A. Falade, President of the African Engineering Education Association (shortened as “AEEA”).

The IKCEST Secretariat showed the visitors the promotional videos of both the Chinese Academy of Engineering and IKCEST. Subsequently, the IKCEST Secretariat demonstrated the newly reformatted IKCEST general platform and the Engineering Education Knowledge Service System which had been just put online. Through real-time explanation and online presentation, the host introduced to the visitors the various sections of the system including Knowledge Service, Databases, Cutting-Edge Technology, Related News, MOOC Courses and Academic Journals, winning praise from the guests. The IKCEST Secretariat expressed the hope that all the guests should continue to follow up with the IKCEST general platform and the knowledge service system and make valuable suggestions for their continuous improvement in the future.





## IKCEST platform 2017 edition officially launched

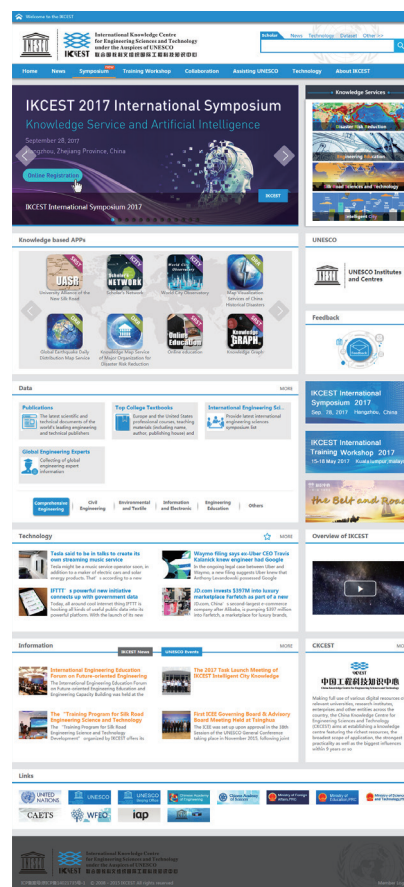
On May 30, 2017, the International Knowledge Centre for Engineering Sciences and Technology (shortened as “IKCEST”) platform (2.0 version) ([www.ikcest.org](http://www.ikcest.org)) officially launched and was open to engineering science and technology personnel in developing countries.

After over 2 years’ construction, the IKCEST platform currently brings together more than 400,000 data entries on specialized textbooks, journals, papers, science and technology information, more than 1,500 open source software projects, nearly 70 engineering sciences and technology data sets, and over 800,000 entries of information on Members and experts. It has more than 10 characteristic knowledge applications. Meanwhile, 4 specialized knowledge service systems on intelligent city, disaster risk reduction, silk road science and technology, and engineering education have been launched, and the Belt and Road country database, engineering education MOOCs, global disaster meta database, global city information bank and other feature products have been put online. With data resources covering nearly 80 countries in the world, the IKCEST platform can provide users with various knowledge services, including online education, visualized data query, knowledge spectrum and information sharing.

On the occasions of the IKCEST platform 2017 edition came online, the IKCEST Secretariat received a visiting delegation of the UNESCO Beijing Office and the International Centre for Engineering Education (shortened as “ICEE”) and introduced to the visitors the new IKCEST platform, winning the affirmation and attention of all Chinese and foreign Members. At the UNESCO Asia/Pacific Workshop

on Promoting the Fulfilment of Sustainable Development Goals through Science and Technology held from June 7 to 9, the IKCEST Secretariat introduced the founding philosophy of the IKCEST platform and demonstrated the new functions of the platform, winning unanimous praise from the participants.

In the future, IKCEST will steadily push forward its platform construction and continue to improve platform functions and data resources according to users’ needs, develop knowledge applications and enhance its service capabilities.





## Training Program for Silk Road Engineering Science and Technology Development held by IKCEST Silk Road Training Base in Xinjiang University

From June 1 to June 3, 2017, the Training Program for Silk Road Engineering Science and Technology Development, sponsored by the International Knowledge Centre for Engineering Sciences and Technology under the Auspices of UNESCO (shortened as "IKCEST") and co-organised by Xi'an Jiaotong University and Xinjiang University, was held in Xinjiang University. The training course attracted 58 graduate students and Ph.D. students from the School of International Cultural Exchange of Xinjiang University who came from Russia, Britain, Kazakhstan, and Uzbekistan, Kyrgyzstan and other countries along the Belt and Road.

The Program aims to broaden the vision of participants through a series of special training, promote Chinese and foreign exchanges in culture, education, science and technology, provide high-end talent support for the economic and social development of countries along the Silk Road, and contribute to the open cooperation in higher education and the integrated development of civilisation between China and countries along the Silk Road. This was the first time for the Program to be held outside of Shaanxi Province. Choosing Xinjiang University as the partner was based on both the long-term partnership of counterpart assistance between Xi'an Jiaotong University and Xinjiang University and the special position and important role of Xinjiang University in the Western China Development and the construction of the Silk Road Economic Belt.

Nana, a Kazakhstani student who is on a Master's program of the international Chinese language education at Xinjiang University, spoke as a student representative of the participants. She said that as a beneficiary of the Belt and Road Initiative, she hoped that after returning home she could encourage more Kazakhstani people to come to China and learn Chinese and the Chinese culture and spirit, and do her best to be a messenger of peace for China-Kazakhstan friendship.

The three-day training course invited a senior team of professors doing Belt and Road strategy research at the IKCEST Silk Road Training Base to give lectures on the history and economic analysis of the Belt and Road Initiative, studies of Chinese ancient civilization, relations between China and Russia and Central Asia, rapid manufacturing technology and its applications, and brief history of exchanges between China and foreign countries. Meanwhile, online and offline exchanges and interaction were held to help participants deepen





their understanding of Chinese culture, history and thought through continuous and comprehensive learning, and grasp the latest development in international relations and engineering technology.

After the training, Xinjiang University expressed the hope of forging more in-depth cooper-

ation with the IKCEST Silk Road Training Base and Xi'an Jiaotong University in the "Belt and Road" field so as to work together and make contributions to "Belt and Road" talent training and to economic and social development along the Silk Road and in Europe, Asia and Africa.





## IKCEST Intelligent City Knowledge Service System 2017 project launch meeting held in Shanghai

The 2017 project launch meeting of IKCEST Intelligent City Knowledge Service System (shortened as "ICKSS") was held on June 2 in Tongji University, Shanghai. Attending the meeting were Prof. Pan Yunhe, former Executive Vice President of CAE, Prof. Wu Zhiqiang, Vice President of Tongji University, Prof. Otthein Herzog, Member of German National Academy of Science and Engineering, Prof. Cao Buyang of the Software School of Tongji University, Sheng Xuefeng, President of Shanghai Pudong Smart City Research Institute, Prof. Niu Xinyi of Tongji University, Song Dexiong, Executive Deputy Director of IKCEST, Zhang Song, Deputy Director of CAE Office of Presidents, Liu Chang, Director of Division of International Cooperation of IKCEST, Zhang Ye, Project Manager of IKCEST, Wang Xuanyan, Head of IKCEST Platform Development Team, Cao Xuejun, Liu Wei, Shen Ying, Luo Man, platform experts from IKCEST as well as members of ICKSS and expert from Esri.

Prof. Wu Zhiqiang gave a brief account of the status quo, future construction emphasis and general framework of ICKSS. He elaborated on the three modules of ICKSS - Intelligent City Intelligence Quotient (shortened as "ICIQ"), Intelligent City Education Knowledge (shortened as "ICEK"), Intelligent City Planning Desk (shortened as "ICPD"). Building the three modules is the top priority for the ICKSS construction at different stages, which could expand and deepen its functions and services in a stepwise manner. He also introduced ICIQ's assessment framework and testing approaches, and gave online demonstrations about the world's intelligent cities and the "City Tree" technology.

The participants discussed the ongoing ICKSS construction and its key technological achievements and offered suggestions as follows: ICKSS should build a self-growth mechanism and improve its ability to collect and process data for the sake of future development; add visualised operations to facilitate data presentations for different countries and regions and optimise user experience; adopt different mediums like VR and AR to enhance interactions; encourage participating cities to share data so as to improve data accuracy; leverage social media data to monitor issues of public interest so as to make better urban planning.

In his speech, Song Dexiong mentioned that ICKSS aimed to provide intelligent-city-related knowledge service, and that aim was consistent with the UNESCO's Sustainable Development Goals. Therefore, analytic efforts should be increased to grasp the users' practical demands and a system that could satisfy their needs should be built. The platform should also offer some intelligent-city cases, and leverage the platform to lift users' interest in urban planning and the intelligent-city concept. A ranking list of intelligent cities could be released at the IKCEST platform or with UNESCO-backed institutions to make the list more influential. He promised that IKCEST would offer full support to the construction of ICKSS.

Finally, Prof. Pan Yunhe made concluding remarks and put forward four suggestions:

1. Assessment of world cities: There is still room to improve accuracy of the assessment. Statistical data provided by the cities on the list may not be very accurate, and their rankings might change sharply every month. The source of data



should be diversified to rule out subjective data. Data purchase might be a good option so as to compare the data with those provided by the cities to improve data accuracy; indicators that measure a city's intelligence should also be reclassified and consolidated to make sure they can verify each other.

2. Practical analysis of the existing data: The "City Tree" is a great attempt to make analysis from the perspective of time sequence. Cross-analysis could also be made to study the relations between a city's size, population and economic strength; the

analysis should be based on the application chain of the project plan and construction and powered by big data, so as to create new means of service.

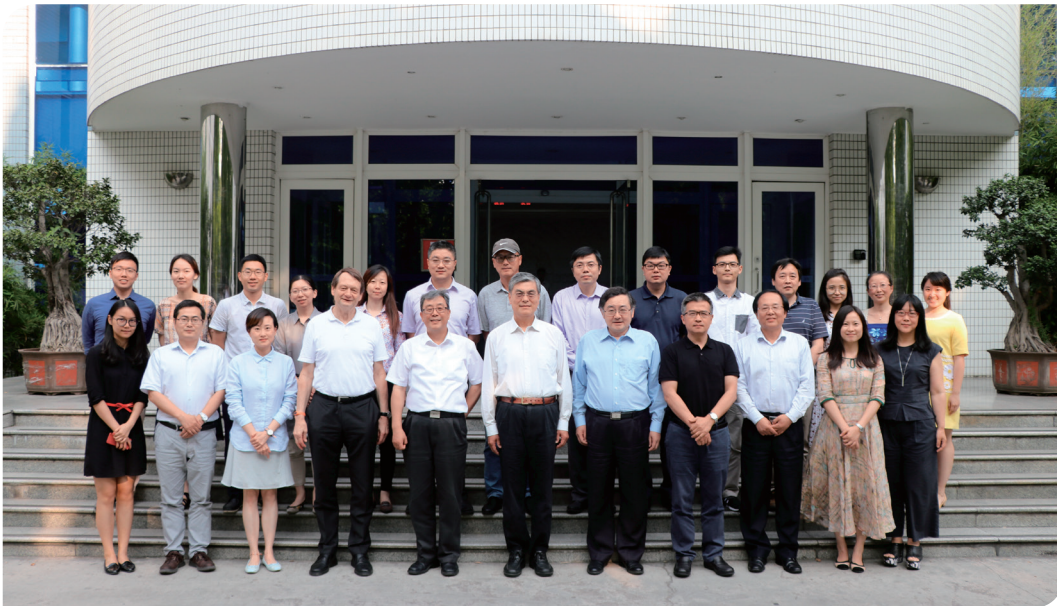
Submit intelligent-city cases to the UNESCO: The cases should cover four points. The first is a city's IQ evaluation that requires more stable data. The second is to select excellent intelligent cities, and the selection should take into account texts, data, photos and video chips provided by the candidate cities. The third is practical analysis and cross-field analysis. The fourth is to gather and study data about characteristic towns worldwide.





City development model: Big data, Internet and artificial intelligence have enabled people to get a full picture of how a city is run. That makes it fairly important to gather data, use computer technology to consolidate and analyse data and present it in an appropriate manner. ICKSS is hoped to make creative contributions to developing an innovative interactive interface so that people can get a deeper understanding of the law behind the running of an intelligent city. That kind of understanding is essential to create a new pattern of city planning. CAE holds high expectations on ICKSS construction, and there are three reasons behind

the high expectations. First, intelligent city is a hot topic worldwide. Second, Tongji University is the first and most competent university in China in the field of city planning. Third, ICKSS can change not only how a city is planned, but how it's managed and developed. The system can generate enormous social benefits and is very significant to third-world countries. It is hoped that the team should work together to move the project forward, and collect and analyse data from different sources. The team can also partner with other data providers to increase data supply and make delicate analysis and application of the data.





## IKCEST Silk Road Training Base held thematic lecture for Silk Road robot competition participants

On the afternoon of June 4, the finals of the 2017 Silk Road Robot Creativity Competition were held at Xi'an Jiaotong University. Sponsored by the Chinese Association of Automation and the University Alliance of the Silk Road (shortened as "UASR"), the event was jointly organised by the Secretariat of the UASR, Xi'an Jiaotong University, the Science and Technology Department of Shaanxi Province, the International Knowledge Centre for Engineering Sciences and Technology under the auspices of the UNESCO (shortened as "IKCEST").

On the morning of June 5, the IKCEST Silk Road Training Base organised for the contestants a lecture on An Introduction to Brain-Machine Interface in close relation to the theme of the competition, attracting 20 participants from well-known universities in Russia, India, the United States, Egypt and other countries. This lecture aimed to give participants a glimpse of the different human-computer

er interaction knowledge field in association with the competition.

The thematic lecture was given by Professor Chen Badong of the Institute of Artificial Intelligence and Robotics, in a bid to meet the training needs of the contestants. In recent years, Professor Chen has devoted himself to researches on signal processing, machine learning, artificial intelligence, brain-computer interface, brain-like computing and accomplished rich achievements. In his lecture, Professor Chen introduced the principles, history and current situation of brain-computer interface in layman's terms. From simple examples, he introduced the principles and application of invasive and non-invasive brain-computer interface, as well as the characteristics and acquisition methods of different kinds of brain signals. Professor Chen focused on the application of scalp EEG, fMRI and ECoG in the field of rehabilitation of the disabled.





In addition, he also explained common brain signal encoding and decoding methods, such as skill training classification models and regression models for machine learning and pattern recognition. In the lecture, he also demonstrated some of the results of brain-computer interface research by researchers both at home and abroad, including wheelchair and manipulator control through EEG, spelling with SSVEP and visual information reproduction using fMRI.

After the lecture, the participants were still in high spirits and asked Professor Chen various questions. All the participants said that the lectures were lively and interesting and thanked IKCEST for

providing them with a valuable training opportunity. They hoped to have more opportunities to participate in similar lectures.







## IKCEST representative attended UNESCO Regional Workshop on Accelerating Science and Technology to Foster the Implementation of the Sustainable Development Goals in Asia and the Pacific in East Timor

At the invitation of the UNESCO Office in Jakarta, Liu Chang from the Secretariat of the International Knowledge Centre for Engineering Sciences and Technology under the Auspices of UNESCO (shortened as “IKCEST”) attended on behalf of IKCEST the Regional Workshop on Accelerating Science and Technology to Foster the Implementation of the Sustainable Development Goals in Asia and the Pacific held in Dili, capital of East Timor from June 6 to 7, 2017.

The workshop was initiated by the UNESCO Office in Jakarta with a view to promoting UNESCO member states to cope with challenges in science, engineering, technology and innovation which they come across in the process of implementing the Sustainable Development Goals (“SDGs”). The meeting was committed to bringing together a number of agencies in the UNESCO system in the Asia/Pacific Region to discuss and formulate knowledge sharing-related policies so as to promote the implementation of SDGs in each member state and explore effective and inclusive mechanisms in which science, engineering, technology and innovation serve to foster the implementation of SDGs.

At the workshop, the IKCEST representative made a thematic introduction to how UNESCO Category 2 Centres can effectively support the implementation of the SDGs of the United Nations through science, technology, engineering and inno-

vation and demonstrated on the spot the functions of the newly launched IKCEST Platform 2.0.

In the thematic introduction, the IKCEST representative firstly presented an overview of IKCEST, including its philosophy, main functions, establishment process and development status. In particular, the IKCEST representative made a special introduction to the important position of the Chinese Academy of Engineering, the supporting institution of IKCEST, as China's highest honorary consultancy-oriented academic institution, as well as its important mission to represent China in undertaking international exchanges and cooperation in the field of engineering sciences and technology.

The IKCEST representative introduced the major business sections of IKCEST and their progress, including provision of online data and knowledge services, building of international academic platforms, provision of international science and technology training, and undertaking of international exchanges and cooperation. Taking the example of IKCEST's active response to the UNESCO Disaster Reduction Section's call for cooperation and their joint establishment of a global disaster reduction meta dataset, the IKCEST representative elaborated on the special contributions which IKCEST has made towards fostering the implementation of SDGs.

The IKCEST representative also introduced the several major events which IKCEST is to implement



by the end of 2017, such as the IKCEST 2017 International Workshop on Knowledge Services and Artificial Intelligence to be held at the end of September, and cordially invited interested institutions and individuals to register for such events.

The IKCEST representative introduced and demonstrated online the functions of the newly upgraded IKCEST Platform 2.0, including the main functions of the master platform and four sub-platforms, and encouraged participants to make trial uses, feed back their use experience and put forward their specific data or knowledge service needs.

In addition, the IKCEST representative also combed IKCEST's practices in supporting the implementation of the SDGs of the United Nations in various different ways to support the practice of the United Nations sustainable development goals, and expounded on IKCEST's worthy attempts and practical experiences in implementing SDG 4 (Quality Education), SDG 5 (Gender Equality), SDG 9 (Industry, Innovation And Infrastructure), SDG 10 (Reduced Inequalities), SDG 11 (Sustainable Cities and Communities) and SDG 17 (Partnerships for

the Goals).

Through lectures and participation in group discussions, the IKCEST vividly showed the important role which science, engineering, technology and innovation play in the process of implementing the SDGs of the United Nations by summing up the various supportive ways which IKCEST has adopted, thus providing a valuable reference for relevant institutions in other Asia/Pacific countries within the framework of UNESCO.

By participating in the workshop, introducing IKCEST's approach to and experience in supporting the implementation of SDGs and expressing a willingness to help other developing countries in the Asia/Pacific Region to implement SDGs through knowledge services, the IKCEST representative boosted IKCEST's reputation, participation and voice in the UNESCO system in the Asia/Pacific Region and established a channel of cooperation with relevant institutions and organizations in the region. This will contribute to the promotion and use of the IKCEST platform and the building of information and knowledge sharing platforms of UNESCO Category 2 Centres.







## » CKCEST News

The China Knowledge Centre for Engineering Sciences and Technology (shortened as “CKCEST”) is a significant part of and vital support for the International Knowledge Centre for Engineering Sciences and Technology (shortened as “IKCEST”).

### Joint Research Centre for Knowledge and Intelligence inaugurated at Tsinghua University

On May 22, 2017, the inauguration ceremony for the Joint Research Centre for Knowledge and Intelligence, co-established by the Department of Computer Science and Technology, Tsinghua University and the Chinese Academy of Engineering (CAE), took place at the FIT Building of Tsinghua University. The ceremony was attended by Zhou Ji, President of CAE, Chen Zuoning, Vice President of CAE, You Zheng, Vice President of Tsinghua University and Member of CAE, and Wu Jianping, Dean of the Department of Computer Science and Technology, Tsinghua University, and moderated by Zhu Wenwu, Vice Dean of the Department of Computer Science and Technology, Tsinghua University.

In his address to the ceremony, Zhou Ji stated that big data intelligence is one of the important directions of China’s artificial intelligence strategy and that the new joint research centre should strive to make breakthroughs in key technologies including S&T big data, artificial intelligence and core key technologies to seize the commanding height of S&T information technology.

Wu Jianping, on behalf of the Department of Computer Science and Technology, Tsinghua University, and Song Dexiong, Director of the Project Management Office of the China Knowledge Centre for Engineering Sciences and Technology (shortened as “CKCEST”), on behalf of CKCEST, signed the co-operation agreement on the Joint Research Centre for Knowledge and Intelligence. After the signing of the agreement, You Zheng presented letters of appointment to Zhou Ji and Chen Zuoning as the co-chairs of the steering committee of the joint centre.

Chen Zuoning made a closing speech, in which she encouraged the joint research centre to leverage the strengths of the Department of Computer Science and Technology, Tsinghua University, and CKCEST to achieve thorough fusion of S&T big data and high-performance computing, build a world-class S&T information service platform, and create cutting-edge technologies and industrial applications.

### ISTIC delegation visited CKCEST for exchange on Knowledge Organization System development

On April 5, 2017, a delegation from the Institute of Scientific and Technical Information of China (shortened as “ISTIC”), led by the institute’s director Dai Guoqiang, visited CKCEST for exchange on knowledge



organization system development. The two sides discussed the project's relevant work and the application of the List of Chinese Subject Terms at the CKCEST. Dai Guoqiang introduced the creation of CKCEST's knowledge organization system, progress of its maintenance and management platform, and subsequent plans, as well as the preparation and applications of the List of Chinese Subject Terms. Song Dexiong, Director of the Project Management Office of CKCEST, expressed thanks to ISTIC for its early support of CKCEST and hoped that ISTIC should continue to offer support for CKCEST's classification system and subject term list development, accelerate the application of the list at the centre, and enhance the centre's platform.

## Meeting held in Beijing to launch sub-centre evaluation task

On April 19, 2017, the 2017 CKCEST sub-centre evaluation task launch meeting was held in Conference Room 220 of the Chinese Academy of Engineering (shortened as "CAE"). During the meeting, Song Dexiong, Director of the Project Management Office of CKCEST, put forward requirements for the sub-centre evaluation work. Efforts should be made to provide training for the centres subject to the evaluation on the basis of the improved indicator system, to create a detailed evaluation implementation plan, and to advance the evaluation work in an efficient way.

## Meeting held in Beijing to launch data standard normalization task

On April 20, 2017, the 2017 CKCEST metadata standard normalization task launch meeting was held at Agricultural Information Institute of the Chinese Academy of Agricultural Sciences. The attendees had in-depth discussions on topics including the implementation of the existing 15 categories of metadata and the creation of metadata standards for new resource types. Song Dexiong, Director of CKCEST Project Management Office, emphasized the great significance of well-defined metadata standards for building the centre's comprehensive authoritativeness in the area of engineering S&T and achieving one-stop search of resources. He required pushing ahead with the training and implementation regarding the existing metadata standards and the creation of metadata standards for new resource types.

## CKCEST sub-centre launch training meeting held in Beijing

On April 20, 2017, the CKCEST sub-centre launch training meeting was held in Beijing. Attendees were personnel from relevant organizations including the Sub-Centre for Geographical Resources and Ecology, Sub-Centre for Geographic Information, Sub-Centre for Metallurgical Engineering, Sub-Centre for Forestry, Sub-Centre for Meteorology, Library of CAE Members' Works, Inspur Group and the CKCEST Project Management Office. At the meeting, which was moderated by Gao Xiang, Deputy Director of CKCEST Project Management Office, the platform implementation group of Inspur Group introduced the overall situation of the CKCEST Application System Platform and its launch, provided a detailed explanation on the standards of resource aggregation and linkage to sub-centres, and answered questions from other attendees. The





Project Management Office made deployments for the work in the next stage and required the sub-centres to ensure launch by May 30.

## Meeting held to kick off resource plan preparation

On April 26, 2017, a meeting was held at the Chinese Academy of Engineering to kick off the sub-task of CKCEST 2017 resource plan preparation. At the meeting, experts and representatives from CKCEST sub-centres and Inspur had in-depth discussions on relevant issues. Song Dexiong, Director of CKCEST Project Management Office, stated that the resource plan should analyse users' needs and CKCEST's current status of resource development on the basis of the Top-level Design Upgrade Plan of CKCEST to create a feasible framework of the centre's resource development roadmap.

## CKCEST information push service training workshop held in Tianjin

On May 13, 2017, an information push service training workshop sponsored by CKCEST Project Management Office and hosted by CKCEST Sub-Centre for Oceanology was held in Tianjin. Attended the meeting were personnel from 18 CKCEST sub-centres. Song Dexiong, Director of CKCEST Project Management Office, gave a full acknowledgement to the progress of the information push service work and asked the participants to continue with their work. The training mainly provided explanations on the information push workflow and the use of system tools, and the CKCEST Sub-Centre for Information shared experience in information push service. At the close of the training, Pan Gang, Deputy Director of CKCEST Project Management Office, summarized the content of the training and gave specific requirements on the subsequent work. By June this year, the number of CAE Members using the information push service would reach 84, with the number of service strategy consulting projects reaching 15. By improving the competence of the personnel, the training will lay a solid foundation for the efficient delivery of the service.

## CKCEST expert database development debriefing held

On May 20, 2017, the "Science and Arts: Exhibition of Calligraphy Works by CAE Members in Celebration of the 120th Anniversary of Zhejiang Sci-Tech University & CKCEST Expert Database Debriefing" was held at Zhejiang Sci-Tech University. Attendees were CAE Member Pan Yunhe and Prof. Ching Hsianghoo Steve from City University of Hong Kong. The meeting was chaired by Chen Wenhua, Deputy President of Zhejiang Sci-Tech University. At the meeting, the CKCEST Project Management Office gathered opinions from the attending experts about database's subsequent development. The CKCEST Expert Database has aggregated information about more than 5.7 million Chinese scholars, including 160 million entries of journals, patents, S&T results and S&T awards. The system will be officially launched during the CAE New Member Election Conference.

The calligraphy exhibition featured 68 works by more than 10 CAE Members, in addition to the display of more than 800 digitalized paintings by CAE Members, which attracted a lot of student visitors.



## »» Top News for Big Data Era

### Artificial intelligence written into Government Work Report for first time

“We will accelerate the development of emerging industries. We will fully implement our plan for developing strategic emerging industries. We will accelerate R&D on and commercialization of new materials, new energy, artificial intelligence, integrated circuits, bio-pharmacy, 5G mobile communications, and other technologies, and develop industrial clusters in these fields.” In the Report on the Work of the Government delivered by Premier Li Keqiang at the 5th Session of the 12th National People’s Congress on March 5, 2017, artificial intelligence was written into the government work report for the first time, reflecting the rapid development of artificial intelligence technology and its great implications for social and economic development.

Summarized from the Government Work Report

### NDRC released list of major projects promoting big data development

Recently the National Development and Reform Commission (shortened as “NDRC”) released a list of 38 major projects in promotion of big data development, including the CKCEST project which is committed to promoting the open sharing and circulation of digital resources, strengthening the application of data resources in various fields, promoting the transformation and upgrade of industries, developing new sectors, and establishing a comprehensive public data sharing system and platform.

Excerpted from [ndrc.gov.cn](http://ndrc.gov.cn)

### Switzerland launched National Research Programme for Big Data

The Swiss National Research Programme “Big Data” (NRP 75) was officially launched in 2017, consisting of 36 projects with a planned overall funding of CHF 250 million and a research period of four years from 2017 to 2020.





According to the program's contents and goals, it mainly consists of three modules:

Computing and information technology: basic research on data analytics, big data infrastructure architecture, database and computing centre;

Big data-related societal and regulatory challenges: prediction of social and economic development, protection of personal privacy and spaces, and social ethics and legal issues and measures;

Applications: basic research on big data applications in fields including transportation, health, disaster and social risk control, and energy transformation.

The Swiss National Research Programme is administered by the federal government of Switzerland to carry out basic research and provide policy advice in important research areas of national importance.

Excerpted from [www.most.gov.cn](http://www.most.gov.cn)

## State Council General Office issued Implementation Plan for Integration and Sharing of Government Information Systems

On May 18, 2017, the General Office of the State Council issued the Implementation Plan for Integration and Sharing of Government Information Systems. The plan, geared to meet the most urgent needs of public governance and public service and bring convenience and benefits to enterprises and citizens in the handling of relevant public service matters, outlines a series of measures to accelerate integration and sharing of government information systems, and the main tasks and implementation roadmaps to promote interconnection of information systems of State Council departments and local governments. The plan requires completion of integration of internal government information systems of State Council departments before the end of December 2017, and achievement of access to the integrated government information systems via the national data sharing and exchange platform and basic interconnection of information systems of State Council departments and local governments before the end of June 2018.

Excerpted from [www.gov.cn](http://www.gov.cn)



# »» Terms on Big Data

## Knowledge Computing

Knowledge Computing: Knowledge Computing refers to the general designation of the calculation model methods used during the knowledge expression, storage and management process. The basis of knowledge computing is the knowledge base that supports query, analysis and computing, generally constructed from the methods extracted from big data. Supporting knowledge computing is one of the advanced functions of the professional knowledge centers.





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