

Spare No Efforts to Achieve Leapfrog Development via Reform and Development

The 2012 annual conference of CAS took place from January 16 to 18 in Beijing. At the opening session, which was chaired by CAS Vice President SHI Erwei, CAS President BAI Chunli delivered a report entitled Opening up New Prospects for “Innovation 2020” by Producing Outstanding Achievements, Talents and Ideas. It was attended by more than 400 people, including present and former CAS leaders, directors of the CAS Academic Divisions, executives of CAS institutions, bureaus and enterprises, and leaders from various government departments.

One major task of the conference was to implement the CAS development strategy of “building the academy in a democratic, open-minded way and through human resource development” so as to turn out more innovative findings, professionals and thoughts. On the basis of a review of CAS’s performance in 2011, the participants

made great efforts to implement the “135” Planning, which requires each CAS institute to specify one orientation, prepare for three breakthroughs and select five fields for future development. They also spelled out the priorities for 2012 so as to open a new stage of leapfrog development in major areas for the program Innovation 2020.

Prof. Bai said that CAS achieved three major administrative accomplishments over the past year. The first one includes the further clarification of CAS’s strategic position, the presentation of a strategy to build the academy in a democratic, open-minded way and through human resource development, and a decision on its integrated strategic mission of producing outstanding research results, talents and ideas. The second is the formulation of the “135” Planning and clarification of major tasks and directions of CAS. The third is the initiation of dramatic reforms according to the “135” Planning and the implementation

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By courtesy of Li Hu



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of specific measures to address urgent and key issues concerning S&T workers.

The CAS President emphasized that the integration of producing outstanding research results, talents and ideas is an essential prerequisite for CAS to construct “the three bases” (namely, bases for carrying out world-class scientific research, for training high-caliber professionals, and for promoting China’s high-tech industries), and to achieve “the four first-class attainments” (i.e., in scientific research, benefits, management and talents). As the foundation of the academy’s existence, development and prosperity, they combine to constitute CAS’s major innovative contributions to the nation, cast its leading and backbone role in the national innovation system, and embody its characteristics and advantages. To accomplish the three-in-one objective, he pointed out that CAS should: focus on its strategic priorities and achieve major innovative breakthroughs; continuously produce first-class S&T workers during the innovation activities; accelerate the pace of building a top-level think tank in science; and develop a dynamic, inclusive, harmonious, and open atmosphere for innovative activities.

CAS scored fruitful S&T achievements in 2011 in various aspects, observed Prof. Bai. In regard to undertaking national major S&T tasks, CAS successively completed its work for China’s first space docking mission between the unmanned spacecraft *Shenzhou-8* and the prototype space lab *Tiangong-1*. CAS researchers did a great job in conducting in-orbit tests of payloads on board the spacecraft, and studies in space materials, space environment and physical exploration. They also performed 17 life science experiments using facilities

developed jointly with their German colleagues. As a main contractor for China’s manned diving submersible, *Jiaolong*, CAS developed key technologies in its control and communication systems (P.242 No.4 2011, *BCAS*). The automatic cruise control system developed by CAS enables the submersible to keep a constant heading and remain stationary in a designed position, and its high-speed digital hydro-acoustic communication system is highly advanced by international standards. CAS researchers have made key breakthroughs and found systematic solutions in such fields as sustainable energy and resources, advanced materials and green intelligent manufacturing, information networks, generally applicable health assurance technology, ecological protection and control, and capacity expansion for space, deep-sea and ocean exploration. The successful demo engineering operation of the world’s first kV-level superconducting substation is an example. Some important achievements have also been scored in basic and interdisciplinary studies, such as the dynamic assembly of molecular machinery and its motion control.

The President stressed that Innovation 2020 has been making steady and satisfactory progress in various aspects, including launching the Strategic Priority Research Program, undertaking national Key S&T tasks, upgrading capacity of research teams, continuously optimizing S&T deployment and infrastructure for research and education, and forging close partnerships with government departments, local governments, enterprises and universities. The CAS Member election in 2011 went smoothly, and some advisory reports from CAS Academic Divisions played an important role in serving decision-makers. Taking the opportunity of the 90th anniversary of the CPC in 2011, CAS strengthened its institution building and the development of its innovation culture. The whole academy moved forward in an enthusiastic and energetic mood and with good momentum. The initiation of Innovation 2020 has further boosted CAS capacity in indigenous innovation and leading development, laying a solid basis for a new phase of leapfrog growth.

Prof. Bai asserted that both the internal and external environments for the development of China and CAS are unprecedentedly different in the new era. Profound changes have taken place in the world political and economic order, economic development mode, social governance structure and global security. There are promising signs of dramatic breakthroughs in some important S&T fields.



In a critical period of accelerated transformation of its economic development mode, China is facing such arduous tasks as promoting industrial upgrading, cultivating strategic emerging industries, independently developing key technologies to get rid of control by other countries, casting off the bottleneck restraint of limited natural resources, effectively coping with natural disasters and public security accidents, improving people's livelihood, safeguarding national security, and promoting stable, rapid socioeconomic growth. All these pose urgent demands for science and technology.

Prof. Bai stated that CAS has to solve some underlying problems in order to live up to the expectations of the country and people, to catch up with the advancements of similar organizations both at home and abroad, and to address the new challenges of the new S&T revolution. These problems include: a lack of original innovations, breakthroughs and systems integration in key S&T fields; a weak capacity in creating systematic scientific understandings, new scientific thoughts or systematic solutions; a shortage of S&T leaders and backbone researchers and a somewhat unbalanced research team; an inefficient mechanism for technology transfer and a loose link between research and economic and education activities; a not fully rational mechanism for resource allocation, evaluation and motivation; and much room for improvement in maintaining a system and cultural environment where researchers devote themselves wholeheartedly to research.

Over the next five years, Prof. Bai urged, CAS should, in line with the "135" Planning, launch and implement major S&T activities, renovate its system, mechanism and management, build up its research forces, and quicken the steps to produce outstanding results, talents and ideas. Regarding major research activities, CAS will identify priorities in such fields as basic science, strategic high-technology, life science and biotechnology, science and technology for resources and environment, and science and technology for national defense. Major S&T initiatives will be launched by focusing on 15 key S&T tasks, such as future advanced nuclear fission power and quantum communications and computing, and several military research projects. To reform the organization mode of S&T activities in line with strategic priorities, CAS will establish an S&T project system made up of three inter-connected components, namely, strategic priority research

"135" Planning

While making plans for the next five years, each CAS research institute is required to specify one orientation, prime three major breakthroughs and select five key fields for future development. The goals are to crystallize research objectives, clarify priorities, optimize layout, collectively build the S&T strength of the whole Academy, attach importance to unique advantages and key competitiveness, discourage petty in-house competition and avoid duplication in S&T deployment.

The core value of the "135" Planning is:

1. Regarding positioning, each research institute is required to make clear its major research fields, unique advantages and core competitiveness, have a better understanding of its position in its research fields both at home and abroad, and avoid wasteful competition with other CAS institutes;
2. Regarding major breakthroughs, the expected major S&T achievements of basic, strategic and forward-looking importance in the next five years will be clarified in line with each institute's fundamental conditions and advantages, and from the six aspects of major S&T issues, namely, opening up new research directions, key and core technologies, systematic solutions, major social benefits and social impact.
3. Regarding cultivating directors for future development, importance will be given to those directions that embody the unique features of each institute, with potential to gain the upper hand in competition and make major breakthroughs.

projects, major projects at the academy level and research projects of research institutes. CAS will renew its efforts to implement the S&T projects at the academy level and make its project system dovetail with various national S&T programs. To promote the "135" Planning in an all-round way, CAS institutes will be required to set up a mechanism linking the implementation of the planning with resource allocation, organization and management, making sure all research projects, teams, platforms and management tools are working towards major breakthroughs and research directions designated by the plan. To set up a system of resource allocation geared to major research outputs,

CAS will adhere to the principle of “increasing the gross amount, regulating structure, strengthening infrastructure and promoting outputs.” Efforts will be made to reform the mode of resource allocation, gradually put in place a new output-oriented system of resource allocation, improve the operation and safeguard system and the system of finance and management, and integrate resources for innovation. To build an evaluation system geared up for major research outputs at the institute level, CAS will give full play to the guiding, diagnostic and measurement role of assessment. Such an evaluation system will comprise “two links and one base,” including expert assessment and diagnosis according to the “135” Planning, accomplishment checkup of “major breakthroughs” and annual monitoring of key indicators.

Prof. Bai mapped out CAS’s major tasks in 2012, including:

Step up the pace of launching Strategic Priority Research Projects. While ensuring the smooth development of the existing ones, new projects will be selected in line with national needs, major innovation objectives and by linking with national programs.

Spare no efforts to accomplish S&T tasks commissioned by the government. Key S&T issues will be further crystallized in light of societal and economic progress, giving importance to agricultural science and technology,

energy saving and consumption reduction, ecological and environmental protection, and science and technology for people’s livelihood.

Speed up the development of a first-class research team. A good job will be done in human resources planning and promoting the training of S&T workers for western China, talents with high skills, high-level management professionals and young talents.

Enhance the development of the Academic Divisions and a national think tank in science. Efforts will be made to further improve a mechanism linking the CAS headquarters and Academic Divisions, and to build up organizations for strategic studies and advisory services, and expand the impact of Academic Divisions.

Cultivate a cultural atmosphere and system conducive to innovation. We will train, guide and encourage S&T workers with a core value system of socialism, promote the good performance of researchers who conduct studies in a diligent way without minding solitude, and actively respond to issues of public concern.

Make energetic efforts to promote innovations that enhance the synergy between S&T and the economy, regional development and education.

Strengthen international cooperation, raise high the spirit of the 18th Congress of the CPC and strengthen Party building at the Academy.