



中国科学

60周年国际科学合作奖



The CAS Award for International Scientific Cooperation (2007-2016): Happy Tenth Anniversary

By XIN Ling (Staff Reporter)

Ten years ago, in 2007, the Chinese Academy of Sciences gave out its first Award for International Scientific Cooperation to two distinguished foreign scientists: circulating fluidized bed expert Lothar Reh from the Swiss Federal Institute of Technology, and agricultural economist Scott Douglas Rozelle from Stanford University. Dr. Reh's relationship with China started in the early 1970s, when he first visited the country to foster a cooperative link between the Lurgi Group and China. After that he worked with researchers from the CAS Institute of Process Engineering (IPE) for more than two decades. He not only helped with setting up the first research facilities at IPE, including the donation of a set of experimental equipment to Beijing in the name of the Swiss government, but also was instrumental in forging a strategic cooperative agreement between IPE and his institute. Dr. Rozelle's collaboration with the CAS Institute of Geographical Sciences and Natural Resources began in 1995. Together with his Chinese coworkers, Dr. Rozelle extensively studied China's agriculture and rural development, and his work on the country's agricultural economics and policies greatly enhanced the world's understanding of rural reform in China. One year later, both winners received the International S&T Cooperation Award and Friendship Award from the Chinese government at the Great Hall of the People.

Established to “honor foreign experts who have made outstanding contributions to facilitating cooperation with CAS in science and technology, and encourage more efforts in this respect that will strengthen CAS's science innovation capacity to promote its research performance, education, training, management, and reputation in the international scientific community”, the Award, after ten years, has recognized a total of 28 outstanding scientists from all over the world.

On January 16, 2017, CAS President BAI Chunli conferred the tenth International Scientific Cooperation Award on to the three awardees of this year: Dr. CHEN Deliang recommended by the CAS Institute of Tibetan Plateau Research, Dr. Earl Ward Plummer by the CAS Institute of Physics, and Dr. Shavkat Salikhov by the Xinjiang Technical Institute of Physics and Chemistry. In this issue of *BCAS*, we are privileged to have two of them – Dr. CHEN and Dr. Plummer – to share their decades-long experiences of working with CAS, and their insights on the research future in China.

Open, Fair and Well Managed Environment Key to Research Excellence in China

—— An Interview with Dr. CHEN Deliang, Winner of the
2016 CAS Award for International Scientific Cooperation



Dr. CHEN Deliang is now August Röhss Chair at the University of Gothenburg, Sweden. As an internationally renowned climatologist, he has made major achievements in the field of regional climate research in relation to atmospheric circulations, climate dynamics and climate change. He is member of the Royal Swedish Academy of Sciences, the Royal Society of Arts and Sciences in Gothenburg, and the World Academy of Sciences.

For more than ten years, Dr. CHEN has been carrying out research projects in cooperation with CAS scientists. He is also heavily involved in the Academy's overall development and strategic planning, as well as scientific assessment and counseling. He maintains long-term cooperative ties with many CAS institutes, serving as distinguished professor at the Institute of Tibetan Plateau Research, the Institute of Remote Sensing and Digital Earth, and the Institute of Earth Environment.

During his term as ICSU executive director, he contributed to making CAS home to the office of the Integrated Research on Disaster Risk (IRDR) program, ICSU's first International program office in Asia.

As a member of the executive board of the CAS-initiated international program – the Third Pole Environment, he helped complete the Assessment Report of Tibetan Plateau Eco-environment Changes. The report rendered a scientific basis and strong guidance for the Qinghai-Tibet Plateau's environmental protection and ecological progress, and served as a scientific reference for Chinese President XI Jinping's exposition on advancing Tibet's ecological civilization.

Moreover, Dr. CHEN has actively recommended CAS scientists to the International community and spared no effort in introducing and promoting their research findings and achievements. He has paid high attention to the cultivation of young scientists in China and the internationalization of the graduate education system at CAS.

When did you first start to work with scientists from CAS?

Dr. Chen: My cooperation with CAS colleagues started as early as 2001 when I was invited to a scientific conference organized by Prof. FU Congbin from the Institute of Atmospheric Physics (IAP). This visit laid the foundation for cooperation with Prof. FU and his group, focusing on regional climate studies

for China. Another Chinese scientist who introduced me to global change research in China was Prof. AN Zhisheng from the Institute of Earth Environment (IEE) in Xi'an. It started with an invitation by Prof. AN to attend an international meeting he organized in Xi'an in 2001 which gave me a chance to meet some of the most influential researchers in the world on environmental change. Prof. AN and I supported the establishment of a joint tree-ring laboratory in 2003 named the "Sino-Swedish Center for Tree-Ring Research," led by Prof. LIU Yu from IEE and Prof. Hans Linderholm from my Swedish group. The joint center has produced several excellent PhD students and postdocs who are now active, promising young researchers in Europe and China with many joint publications.

The early interactions with CAS colleagues opened a new window of opportunities in China for me. In 2002, I was appointed to the position of science director for National Climate Center by the China Meteorological Administration (CMA) which was under the leadership of Prof. QIN Dahe. That position gave me the fabulous opportunity to work with many wonderful scientists in China, and the job covered multiple aspects such as strategic planning, scientific leadership, research development, collaboration among Chinese institutions, operational services, as well as interaction with government at various levels, public and international organizations such as the UN's World Meteorological Organization. I enjoyed the work so much that my contract with CMA was renewed three times, and I stayed in that position until 2008 when I was appointed by the International Council for Science (ICSU) as its executive director.

During 2009 and 2012 I was stationed in Paris to lead ICSU which is the world's leading scientific organization with a global membership of national scientific bodies (usually national academies of Science) and international disciplinary scientific unions (mainly natural sciences). It is well-known for its sponsorship of all four well-established international global change research programs (IGBP, WCRP, IHDP, and DIVERSITAS) and the new global initiative in earth system science for sustainability: Future Earth. In that position I had many opportunities to work with Chinese scientific leaders including those from CAS and leading scientists to promote science's international development. China has been an active and engaged ICSU member. I was extremely proud to witness an increasing visibility,



Signing of the Letter of Cooperation for IRDR in Beijing, 2010.

engagement, and leadership by my Chinese colleagues on the world science stage. To name a few such examples, I would like to mention the leading role played by CAS scientists in international research programs CODATA (Prof. GUO Huadong) and SCOPE (Prof. LU Yonglong), as well as the establishment of the first ever ICSU global research program office in Asia (IRDR office) which was hosted by the Institute of Remote Sensing and Digital Earth led by Prof. GUO, and another ICSU program office for urban health hosted by the Institute of Urban Environment led by Prof. ZHU Yongguan. Further, the active participation in and leadership of the creation/development of Future Earth provided by Chinese colleagues such as profs. QIN Dahe, YAO Tandong, FU Congbin and WU Guoxiong are also worth mentioning.

In 2012, I left ICSU and returned to my university professor position. Since then, I have developed a strong interest in environmental changes in Tibet. Thus, my scientific exchange and cooperation with colleagues in China has been focused on climate changes and the impact on Tibet's hydrological cycle. Currently, I am leading and involved in several research projects supported by Swedish and Chinese funding agencies for this region.

Which part of the collaboration are you most proud of?

Dr. Chen: There are many achievements we made together through the past years; therefore it

is not easy to pick only one. If I had to, I would say that I am extremely proud of being part of the CAS led international research program on the Third Pole Environment (TPE), and to have contributed to its sustained high quality activity which resulted in high impact research, close international cooperation, and long-term effects on sustainable development of the region which has had a strong impact on its surroundings and beyond.

My involvement in the TPE program was built on my cooperation with the Institute of Tibetan Plateau Research (ITP) of CAS, led by Prof. YAO. This cooperation included the exchange of postdocs/PhD students, joint research, workshops and senior researcher visits, as well as joint grant applications in China and Sweden. We also join forces in our effort in the TPE programs and associated international workshops and conferences. From this year, we have added a new educational component to the TPE program by engaging some 20 European undergraduate and graduate students who study in Sweden in the program. We plan to do this annually. The partnership has resulted in synergies in several ways. It provides the students and junior staff members from both sides the possibility of obtaining more and complementary guidance, mentoring, supervision, as well as access to an additional research environment and culture. At the same time, it enhances the intellectual and technical capacities for those involved, which has resulted in an



On a field excursion in Tibet in 2011.

added value in terms of funding, knowledge production, intellectual capacity, access to new methodology and data, outreach, and impact.

The TPE program is one of the few international research programs initiated and led by CAS scientists; one that has achieved great success whilst also encountered several challenges. The success is mainly due to the brave investment and strategic guidance provided by the CAS leadership, as well as dedicated works of many CAS colleagues, particularly those from ITP. The international partnerships including the China-Sweden cooperation have also played an important role, because some of the challenges and difficulties that the TPE faced cannot be sufficiently handled by our Chinese colleagues alone. To reach the highest international level in science, and to help the Chinese and beyond deal with environmental issues for sustainability, the program needs to tap into the experience and expertise of its international partners. Sweden has a long tradition in leading international sustainability and earth system research in general and research on Tibet in particular which can be demonstrated by the first International Environmental Conference in 1972 initiated and organized by Sweden, as well as the pioneer research in Tibet by Swedish scientists such as Sven Hedin. I



Dr. CHEN and his Swedish postdoc in China, 2003.

believe my international network and experience can be useful too.

Besides work, is there any other reason that has attracted you to work with scientists from China?

Dr. Chen: Yes. There are more reasons why I have been keen on cooperation with Chinese colleagues. To start with, I was raised and received my undergraduate education in China. Chinese culture is part of my



Dr. CHEN at his Swedish home, 2006 with visitors from China and other parts of the world.

life and my soul. The scientific cooperation in China has provided me with an excellent opportunity to continue developing my Chinese ties. Secondly, I have always had a strong desire and motivation to make a personal contribution to the development of scientific research in China. I clearly see this as my unique role and I take it seriously as my mission. Thirdly, and most importantly, I have been amazed by the fast and sometimes unbelievable changes (often positive) that have happened and are happening in China. Who would not want to be a part of this exciting historical moment in the science history?

How do you see China's challenges to achieve research excellence?

Dr. Chen: Earth Sciences in general and my own field climatology in particular have had fantastic developments over recent years. Looking ahead, I can still see several challenges and obstacles that we need to work on: 1) providing ALL researchers with a creative and stimulating working environment; 2) fostering a healthy scientific culture which is characterized as being free, open, honest, innovative, fair, objective, and respectful; and, 3) strengthening the administration and management system to better serve the fast development

in research activities.

The first point is about creating an environment where not only the best or most successful researchers have possibilities to conduct research, but also those who are not currently playing a leading role, but are empowered and keen to contribute to the development. There must be a place for anybody who has the potential and desire to develop her/his capacity to grow. The system has been good in taking care of champions who have been successful, but the whole environment as a system, to which even the champions are dependent, must too be properly managed; fostering creativity, long-term thinking, and sustainability are crucial.

Scientific culture in a country can be influenced by the country's culture, although there should be a kind of universality in modern science which is dominated by the West. China is a relatively new member of this club as modern science was introduced later. However, the country has rapidly progressed, especially true over recent decades. Having said this, China and its Chinese scientists – including myself – do have much more to learn in order to overcome our weaknesses and get more out of our strengths. As a concrete example, we have not had a strong cultural tradition to openly and freely conduct scientific debate with discussion and evidence. Our society



Visiting an ITP field station in Tibet with his PhD students in 2016.

needs to become more tolerant and patient with different development paths of and views in research.

Regarding the administration and management of the research system, I believe we have done a great deal in the development of researchers and research infrastructures by enhanced international exchanges and equipment investments. However, we have not paid enough attention to the administration and management of research that is supposed to support and sometimes also steer science's development. If you just look at how many scientists have had the opportunity to work in and learn from world leading organizations, and how much administrative staff have been trained in a similar way, you should not be surprised how much remains to be done in terms of streamlining the administrative and management system.

What is your plan for future collaboration?

Dr. Chen: Together with my colleagues at ITP, we have started to develop the TPE program for a new phase. In terms of my research, I will continue working on our joint research on climate and water resources with a focus on Tibet. For the TPE program, I am working with Prof. YAO to bring it to a new level of internationalization, impacting the scientific community and society.

From next year onwards, I will be able to devote more time on Chinese and international cooperation due to the fact that our youngest son is leaving home and I will be discharged from some leadership responsibilities in Sweden. I have started to think about how to best take advantage of this window of opportunity in my life. I am extremely motivated to step up my activity in



At the 3rd TPE Workshop in Iceland in 2011.

China, although I do not yet know exactly how this will be realized. I am pretty open to different options. The most important thing for me is that I can make a greater contribution in a role that is needed in China which fits me at the same time. In any case, I am looking forward to the future developments for both China and myself.

What are your suggestions for young scientists in China?

Dr. Chen: To young scientists I would say that you presently have fantastic opportunities and many choices. The most important thing is to use every opportunity to explore the world by keeping your eyes and mind open. This will enable you to identify what you truly want and enjoy doing. Our culture – and your surroundings – creates many pressures and expectations, but these must not be the driving forces for your own choice of career development. You need to define your own goals, development paths, and strategies, supported and motivated by a critical, honest analysis of the world and yourself. If you choose to do research along a certain path, you need to be interested and dedicated. Maybe

there are some other constraints or practical hindrance that cannot be overcome.

I want to stress three things here. The first is the need to develop sensitivity to local culture (for your life and research) including languages. As a researcher, the whole world is your stage and this stage has many fascinating cultures. Even within China or your own field of science, you will encounter some difference in cultures. Local language is most likely the best entry point to a culture. To understand and appreciate others' culture will not only make your work and life more joyful, but can also greatly improve the appreciation and understanding of your own; every culture has both its limitations and utilities. The second point is about becoming independent and always ready to take initiatives. I know this is easier said than done. However, you must be aware that this is one of the most important success factors for your career. The third and final point is team work skills and spirit. While independence and critical thinking will help you keep your integrity and develop your innovation capacity, team work is often the factor which helps you achieve great success.

“Plan a Future of Science That Is Best for China”

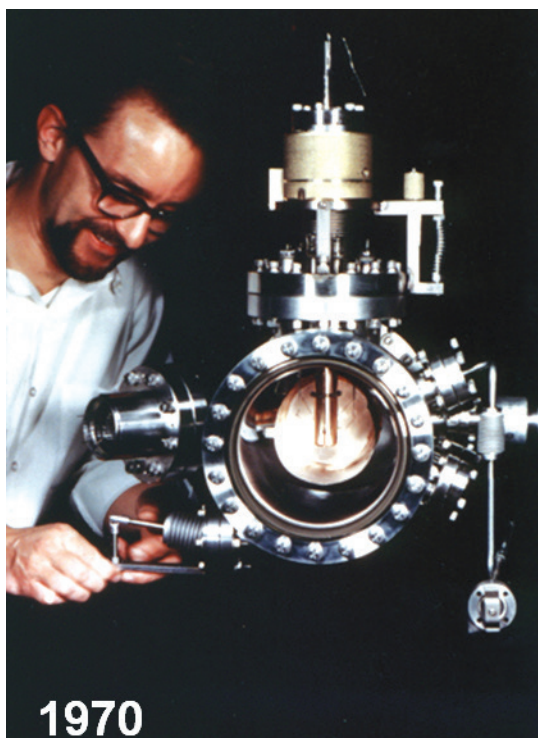
— An Interview with Dr. Earl Ward Plummer, Winner of the
2016 CAS Award for International Scientific Cooperation

Ward Plummer in his office at University of Tennessee, 2001.

Earl Ward Plummer is a professor at the Department of Physics and Astronomy, Louisiana State University. As an eminent scientist in condensed matter physics, he has developed advanced high-resolution observation methods by focusing on investigations of the phenomena associated with the unique environment at a surface or interface. His research findings in tunneling spectroscopy of single atoms at the surface, photoelectron spectroscopy and low-dimensional electron systems enjoy extremely high International visibility. To date, he has published more than 400 scientific articles and been quoted by other scholars over 17,000 times. He has been elected to the US National Academy of Sciences and is a fellow of the American Academy of Arts and Sciences.

Dr. Plummer's cooperation with CAS started more than 15 years ago. He was the chief scientific adviser when the International Center for Quantum Structures was founded at the CAS Institute of Physics (IOP). He also served as foreign adviser at the High Magnetic Field Laboratory under the Hefei Institutes of Physical Science, was leader of the International expert panel for evaluating the Institute of Physics' 13th Five-Year Plan (2016-2020), and sat on the judging panel for many important awards. Thanks to his active coordination and strong support, the International Center for Quantum Structures has brought together a good number of top young Chinese scientists, many of whom have become leading figures in the academic community, thus laying a solid foundation for advancing China's research capabilities in condensed matter physics.

Over the years, he has promoted substantive cooperation in science and technology as well as talent cultivation between CAS and Louisiana State University. He led an International research team based at IOP and received a great deal of financial support from Chinese government and CAS for this purpose. His team published a total of some 30 articles in top International journals, including *Science*, *PNAS* and *PRL*, and helped nurture many young researchers. With his help, IOP worked with his University to push ahead with dual degree programs. He mentored scores of Chinese graduate and postdoctoral students. In recent years, he made annual visits to China, collaboration with scientist at IOP, giving lectures and workshops and participating in talent cultivation. He made remarkable contributions to CAS's endeavor to build a talent pool of professionals with international vision.



Ward Plummer at the former US National Bureau of Standards, now NIST, in 1970. He and coworkers were using a field emission instrument to collect data and study the surface states of Tungsten. (Photo courtesy Ward Plummer)

Dr. Plummer has also actively promoted cooperation with CAS on many important international occasions. He once delivered a special report on his cooperation experience with China at a high-level forum on France-US cooperation on science and technology. This year, he accompanied US energy officials on a visit to China, and introduced collaboration with CAS in detail. This contribution played a positive role in consolidating and deepening the strategic cooperation between CAS and the US Department of Energy.

How did your cooperation with China start in the first place?

Dr. Plummer: My collaboration with Chinese scholars began very early in my career. In 1975 I hosted my first Chinese graduate student, who has recently been elected to the us National Academy of Sciences. During subsequent years, more than 40% of my Ph.D. students and postdoctoral fellows have been of Asian ancestry. Half of these collaborators have returned to Asia, primarily China, but also to Korea, Japan, and

Indonesia. This exchange of scientists coming to the US and returning to China has created life-long partnerships especially with IOP in Beijing. My connection with and fostering of scientific leaders in China has assured a constant stream of very talented scholars working in my laboratory and allowing me and my students to benefit for the expertise at IOP.

Formally, my collaboration with scientists associated with CAS began in October of 2000, with the opening of the International Center for Quantum Structure (ICQS) at IOP in Beijing. Here you can see a picture of the Center's opening ceremony that shows me seated with Dr. BAI Chunli, who would become the President of CAS in 2011. Standing is a distinguished set of Chinese scholars, five of them would subsequently be elected to the CAS, and four would serve as presidents of top universities, one as vice president. Three have been attracted back to China through the "Thousand Talents Program" and one received the 2016 "Award of Future Science." Especially important to my involvement are long-time friends and colleagues Prof. ZHANG Zhenyu (3rd from right), then at Oak Ridge National Laboratory, now at University of Science and Technology of China and Prof. WANG Enge (5th from right), then director of IOP and founder of ICQS.

How did the partnership benefit both sides?

Dr. Plummer: When ICQS began in 2000, a distinguished set of international researchers were invited to come to China once a year (me included), to advise and to collaborate. Of the four from the US, three have been elected to the National Academy of Sciences and on to the National Academy of Engineering.

In the beginning, the benefit was primarily for the Chinese, but as time went by we truly benefited. I had a constant flow of high quality students and postdocs from China. Recently, I have really benefitted from the collaboration. I have been a PI or Co-PI on two funded proposals, and we have been able to build equipment in China that I do have access to in the US.

The two proposals are: (1) emergent functionality in novel architectures of complex materials: engineering at the atomic scale, led by ZHANG Jiandi (LSU) and I, supported by IOP from 2011 to 2014, and (2) the control of growth of oxide artificial low dimensional structures and their quantum phenomena, also led by



Ward Plummer (back row, yellow shirt) at the Tantalus Light Source in Wisconsin in late 1970s. The person in front was Plummer's postdoc Wolfgang Eberhart who went back to Germany and became the director of BESSY I and BESSY II. The person on the left is Brian Tonner, Plummer's student and now working at the University of Central Florida. (Photo courtesy Ward Plummer)



Opening ceremony of the International Center for Quantum Structure (ICQS) at the Institute of Physics on October 30, 2000.

me and ZHANG, with support from the Key External Cooperation Program of the Bureau of International Cooperation, CAS between 2014 and 2016.

In fact, ICQS was such a success that the idea was cloned later by Peking University (International Center for Quantum Material), and USTC (International Center for Quantum Design). The collaborations have also been expanded to include other universities in the US.

How do you see China's progress in science and its challenges ahead?

Dr. Plummer: China has made tremendous progress in science during the last couple decades. This progress is easy to quantify in the number of invited talks at international meeting, and the number of papers published in high profile journals. China has been very successful in attracting distinguished scientists back to China, leading major programs. At the same



The 6th Joint ICQS Annual Workshop in June 2016.

time the country has built major user facilities, such as synchrotrons, neutron sources, and high magnetic field laboratories. The plans for new campuses, institutes, and universities are breath taking.

However, when you are growing so fast, there are always growing pains. China has to plan its scientific future based on an evaluation of what is best for China, not copying a format adapted by US or Europe. For example, there is much discussion in China about “National Laboratories,” but in my view it is essential to understand the strengths and weakness of the national laboratories in both the US and Europe. In many aspects, this is a question of top down or bottom up organization of science. I would argue that most of the great discoveries are done by individuals not institutions, so if you build BIG centers in China, it is imperative to protect the individuality of the scientists. During my scientific career the best example of this philosophy was Bell Laboratories, a collection of very talented individuals, who when something exciting happened worked together. The role of the leadership seemed to be to hire the very best and reward them for working together.

In the US, in my view, the most successful national laboratories are the ones who are intimately coupled to a university. In this way the national laboratory and the university benefit from each other. What is happening in China at the present time is that the CAS is creating its own universities to couple with its national laboratories, for example the University of CAS. This means the traditional universities are competing with the national laboratories for students, not working together. Will the hierarchical structure of the Max Planck Institutes in Europe serve the Chinese research endeavor?

China has tremendous talent in the young scientists. Learn how to take full advantage of this talent. Expand programs that fund earlier career research awards, and set up prestigious awards for young scientists.

What are your suggestions for young researchers in China?

Dr. Plummer: Take full advantage of the globalization of science. It is always wise to spend some time in other countries, to see and understand different approaches to science.