Shi Changxu, former vice president of NSFC wins Top Prize of National Science and Technology Award of China

Professor Shi Changxu, former vice-president of NSFC, won the Top Prize of National Science and Technology Award of China for 2011. At a ceremony at the Great Hall of the People in Beijing, he received the certificate from Chinese President Hu Jintao on January 14, 2011.

Prof. Shi Changxu was one of the founding leaders of NSFC. He served in the first term of NSFC's council and was a vice president from 1986 to 1990. Professor Shi played a key role in setting up the funding principles of NSFC, namely, "relying on experts, carrying forward democracy, selecting the best to fund and being fair and reasonable". He was also a great supporter of several important initiatives of NSFC, including 54 volumes of strategic development for 54 scientific disciplines, selection and evaluation of the State Key Labs of China (a major S&T initiative of the State Planning Commission in cooperation with the World Bank), evaluation of the National Natural Science Award, publication of the SCI reviewed journal- "Progress in Natural Sciences", and the compilation of the annual Guide to Programs of NSFC. In 1993, he suggested jointly with other four scientists to establish the Chinese Academy of Engineering, and served as a vice president.

Prof. Shi is one of the pioneers in the development of super-alloys in China. This is the first time that a material scientist awarded the highest national prize for science and technology in China. He said that winning the prize is a great honor to him as well as to material science circle in China. He regarded himself a strategic martial scientist. He has emphasized in many occasions that material research is very interdisciplinary. Materials are for people to use, so material research should be very practical and aimed at applications. If

materials can be used properly, it will benefit people greatly; otherwise, it will be a great waste.

Already 90 years old, he remains energetic. He goes to work at NSFC's office almost every week, and makes business trips from time to time. He began attending university in the US in 1948. Because of his achievements in research at MIT, he was one of 35 Chinese scientists held in the US when new China was founded. Returning to China in 1955, his research group developed the first generation of air cooled nickel-base super-alloy turbine blades in China, one of many different super-alloys that he and his researchers developed over the years. He pushed the industrialization of their research achievements and made contributions to the production of super-alloys in China. Prof. Shi also impressed people with his kindness and open minded attitude.

Prof. Shi Changxu said, "Cooperation is a key factor for success. To promote team cooperation, one must treat others equally, and let everyone contribute his or her best." He was born in a large scholarly family in north China, and he said that helped him to develop a spirit of cooperation and tolerance.

Chinese Premier Wen Jiabao (C) talks to senior Chinese scientist Shi Changxu and his wife in Beijing, Sept. 4, 2011. Wen Jiabao paid a visit to several senior Chinese scientists over the weekend.

Both China and the world materials community have greatly benefitted from his service

R.P.H. Chang

Recently we learned from our colleagues in China that Professor Shi Changxu has received the highest national scientific award from the President of China. It is a great honor to have this opportunity to celebrate with Professor Shi on such an auspicious occasion.

I came to know Professor Shi, when I first returned to China in the early eighties and we have since become good friends. Over the past few decades, I have come to learn that he is an extremely dedicated researcher with a very strong sense of how to help China develop its science and technology capabilities through materials science and engineering.

As a result of his leadership and diligence, the National Natural Science Foundation of China (NSFC) was established in the 1986 to provide sustained funding for research and the training of future generations of young scientists and engineers. The NSFC is a counterpart of the U.S. National Science Foundation, and there is now strong cooperation between these two agencies to promote active U.S.-China collaborations. Professor Shi was also instrumental in the establishment of the Chinese Materials Research Society (C-MRS) which celebrated its twentieth

anniversary this year. Today, C-MRS organizes a prestigious series of national and international conferences and plays a leading role in the International Union of Materials Research Societies (IUMRS).

Professor Shi has dedicated his career to helping China lay a firm and sustainable foundation for its science and technology research and education. Both China and the world materials community have greatly benefitted from his service.

Many thanks and hearty congratulations to you, Professor Shi!

* Professor, Northwestern University,USA. Department of Materials Science & Engineering General Secretary, IUMRS

Shi Changxu – a great teacher and mentor for materials scientists

Gaoqing Max Lu

I have met Professor Shi Changxu only a few times at meetings in China. One encounter that I can never forget is a meeting held in Beijing late December 2002. I was invited to participate in the inaugural meeting of the Centre for Interfacial Materials of the Institute of Metal Research, Chinese Academy of Sciences, under the CAS program of "Outstanding Overseas Chinese Scientists". Professor Shi was the Chair of the Experts Panel at the meeting. Of course the meeting went very well, and the centre was supported generously by the Chinese Academy of Sciences which has led to a range of outstanding research outcomes including a large number of high quality publications and patents in the subsequent years. Following the meeting, Professor Shi invited a few of us to visit his home, before hosting a dinner for us. I was struck with disbelief that he and his wife lived in a very modest and small apartment in Zhongguanchun area, without any trace of luxuries inside. The very ordinary furniture and shelves after shelves of books, manifested to me that Professor Shi is a true scholar that cared little about material things in life. He then invited us to dinner at a restaurant "Guolin Jia Change Cai (Guolin's home dishes)", and told us that he was now 'rich' because he often received honorarium for his contributions to scientific meetings and expert consultation processes. As it turned out he often gave his colleagues and students "treats" following a payment of an honorarium. This encounter with Professor Shi left with me a deeper impression and heartfelt respect for him, as humble and respected individual on top of his great scientific achievements being one of the pioneers in China in the areas of high-temperature alloys. As we all know, he received numerous awards and honours, among which the National Science and Technology Award – highest honour in China, bestowed by the Chinese President Hu Jintao on 14 January 2011. Besides his leadership role in materials science in China for more than half a century since his return from the US in early 1950's, Professor Shi has been an exemplary teacher and mentor for generations of materials scientists in China. Among his former students and junior colleagues ever mentored, there are numerous leading scientists and academicians of both the Chinese Academy of Sciences and National Academy of Engineering. He was instrumental in establishing the National Academy of Engineering and served as its Vice President for many years. Professor Shi has been a devoted leader and tireless advocate for the National Natural Science Foundation where he serves as Director-General and Vice-President. He has been very active in promoting the career development for young scientists and until recently has kept giving lectures and talks to graduate students around the country, not only about science but also about the meaning of life, one's responsibilities to the country and the world.

On the occasion of Professor Shi's 91st birthday, I would like to take this opportunity to express my great admiration, respect and gratitude to him, for what he has done for Chinese science and technology, and for generations of materials scientists around the world. I give my best wishes to Professor Shi for many happy and healthy returns in the years to come.

* Vice President, the University of Queensland, Australia

A bright example for all of us – Professor Shi Changxu

Wei Gao

Professor Shi Changxu received the Top Scientists Award of China in early 2011. This is a very important event. As a materials scientist originally from China, I am very happy to hear this news. I see this award as a great encouragement, not only for people working in the field of Materials Science and Engineering, but also for all scientists and technologists in China.

Professor Shi is one of the most famous materials scientists in the world, and has also made great contributions to the strategic development of science and engineering in China. I had the opportunity to listen to him speak a long time ago in Beijing. The talk was about the development of super-alloys in China. Although it has been many years, I still remember I was deeply impressed and encouraged by his work on developing new alloys and alloy steels for turbine blades and other aerospace applications. I have also done some work on super-alloys, intermetallics and their high temperature oxidation since then, and often use Professor Shi's early work as references.

Introduced by Professor Zu Guang'an, I had an opportunity to meet Professor Shi in his office last year. I was late for the appointment due to an unexpected flight delay, but Professor Shi waited for me for more than two hours. He talked to me for more than an hour and a half, asking me about my recent research on metallic and electronic materials. I shared with him our recent work on ultra-ductile magnesium alloys and nano-dispersed composite coatings. He asked me in great detail about the alloys' compositions, and pointed out that poor ductility and corrosion resistance are two weaknesses of magnesium alloys that need to be improved to widen their industrial applications. I was again highly impressed by his very sharp comments, and was greatly encouraged by his advice.

I left China in 1985 and spent many years in the UK, US and now in New Zealand, leading a reasonably large research group. I have many research collaborations with friends in China, and have supervised many Chinese students in recent years. I was also awarded "Distinguished Chinese Materials Scientist" by the University of Science and Technology Beijing (sponsored by China Natural Science Foundation among others) in 2009. In my research group, I emphasise the importance of collaboration and group effort, and often use Professor Shi's words to encourage my team and myself: "Cooperation is a key factor for success. To promote team cooperation, one must treat others equally, and let everyone contribute his or her best." Professor Shi and his numerous achievements will always be my best example of the value of this approach, and I will continue to follow his lead, in order to make the best contribution I can to materials science in China, New Zealand and the whole world.

* Professor and Fellow of Royal Society NZ，The University of Auckland, New Zealand

Professor Shi Changxu — The Giant Materials Scientist of China

Wuzong Zhou

Earlier this year, I learnt from Xinhua News that Professor Shi Changxu had been awarded the 'State Science and Technology Top Award' in China. It was not only a tremendous honour to Professor Shi, but also a great moment for the entire Chinese Materials Science Community.

Since 1992, I have had opportunities to attend meetings and other activities of the National Natural Science Foundation Committee (NNSFC). I met Professor Shi several times at these events. At first glance, his bronze-coloured face and shining head gave me an impression of an old fisherman. He was smiling to everyone, relatively quiet, but seemed to enjoy chatting to the young scientists. Shortly after listening to his passionate speech at one of these meetings, and learning his history from my friends, I realised he was the Giant Materials Scientist of China.

I do not think that I am in the position to evaluate Professor Shi's achievements. His great success in materials science, and in particular his pioneering research and development of high temperature super-alloys, has bestowed him with many top honours including the most recent 'State Science and Technology Top Award'. His enormous contributions to the management of Chinese science and technology have secured a very high, and well deserved, reputation from the scientific community. In our many enjoyable discussions about research, editing scientific journals and writing scientific papers, I felt we could learn a lot from Professor Shi.

He loves China, not just by simply saying he does but with actions by making all possible effort to help the country to develop. He returned to China in 1950's and the extremely difficult conditions, at that time, did not stop him from achieving world class results and recognition. He assesses scientists, including himself, based on their real contribution to science and technology. In front of him, we must feel a great shame if we are spending more time on applications for grants than on the research we are looking to advance.

Professor Shi always tries his best to help young scientists. In July 2004, I presented a series of lectures in a summer school for Scientific Writing organised by NSFC. He gladly accepted to deliver the opening speech to support this activity. He explained to the 150 young scientists coming from different areas of China that we must always try to do first class research. He imparted, however, that this was not enough, as we also must write high quality papers for publication. We may not be able to come close to his incredible achievements, but we can all follow his example and strive to contribute our best to science and technology.

Finally, I would like to take this opportunity to express my best wishes to Professor Shi Changxu, on his 91st birthday.

* Professor in Chemistry, University of St Andrews.

Congratulations to Academician Changxu Shi on the Occasion of His Winning the 2010 Chinese Science & Technology Grand Prize

Ju Li[1,2], Kai Chen[2], Zhiwei Shan[2], Guanjun Qiao[2], Jun Sun[2], Evan Ma[2,3]

On behalf of friends and colleagues at MIT and Johns Hopkins University, as well as students and faculty at the Center for Advancing Materials Performance from the Nanoscale (CAMP-Nano) at Xi'an Jiaotong University, we would like to express our hearty congratulations to Academician Shi on the occasion of his winning the highest science and technology award of China. This very well deserved "Life Achievement Award" recognizes the brilliant scientific career of Dr. Shi. The entire disciplines of materials science and nanosciences in China should also feel much gratified by this prize, for it was Dr. Shi who had vigorously planned and promoted these fields in their early formative years.

As a famous metallurgist and materials scientist, Shi is broadly regarded as "the father of superalloys in China" for his seminal contributions to the development of high-temperature alloys and applications such as directionally solidified, hollow-cast single crystalline blades of turbine engines. Furthermore, as a master organizer, strategist and communicator, Dr. Shi has played a key role in the founding of the National Natural Science Foundation of China and the Chinese Academy of Engineering, and in devising key R&D programs such as 863 and 973. Dr. Shi is also well known as a leader in fostering the burgeoning fields of materials science and engineering and nanoscience and nanotechnology in China, by interacting, planning, educating and practicing. His work ethics and boundless energy are legendary among Chinese scientists. Dr. Shi's work has not only profoundly influenced the development of science in China, but also left lasting footprints in the materials technology of China.

Being an alumnus of the National Northwestern Institute of Technology (predecessor of the present-day Northwestern Polytechnical University), Mr. Shi has deep connections to the historical city of Xi'an. As a close friend of Academician Huijiu Zhou and the honorary director of the Academic Committee of the State Key Laboratory for Mechanical Behavior of Materials at Xi'an Jiaotong University, Dr. Shi has provided guidance for the construction and development of the Key Lab for decades. The Lab has won quite a few state-level awards in science and technology in recent years and made significant progress in basic research and applications. The recent establishment of the Center for Advancing Materials Performance from the Nanoscale (CAMP-Nano), in a sense, followed Dr. Shi's vision of developing nanoscience and nanotechnology in China that is fully integrated with the international community. The students, scientists and educators at CAMP-Nano, inspired by Dr. Shi's vision, are trying to make the best science and technology of the world arise again from the ground of the ancient capital of China.

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Materials – the foundation for technology revolutions

Zhong Lin Wang

It is my greatest honor to learn that Professor SHI Changxu was a recipient of the China's National Top Award in Science and Technology in 2010 owing to his pioneer and strategic contributions to the development of materials in China and world. This award represents the strongest endorsement of not only the society to the contribution made by Professor Shi in materials, but also the materials' community to the social progress and advances in technology.

Materials have had played vital roles in the development of human civilization. It is generally believed that *who controls materials controls the technology*! Tracking back to the history of human civilization, a few key materials systems have been the foundations for the advances of our society. Iron was the main material used for making tools thousands of years ago, which replaced the tools made using rocks. Iron was the major material used for steam engine, which drove the first industrial revolution of replacing human labors by machines.

The development of aluminum alloy and other high temperature alloys speed up the aerospace industry and automobile industry, which have been the most powerful means of transportation now and future. Lately, carbon fiber based composite materials are being used for aircrafts, with much enhanced mechanical strength and low weight. The invention of plastics and polymer based materials in the last century has revolutionized many aspects of our life, such as building materials, packaging and decoration materials, daily tools and more.

Silicon has been the dominant material for the development of information technology and modern semiconductor industry, and it is the material for the second industrial revolution. Computers, cell phones, high performance chips and many more are based on silicon microelectronics. The invention of optical fiber made long distance communication possible. Light emission diodes based on GaN are replacing the electric bulbs that were first invented by Edison in 1879 and have been used ever since.

Looking forward, what is likely to be the next material that will stimulate the third industrial revolution? Carbon nanotubes, graphene, ZnO? probably none of them. Although the answer is unclear and remained to be investigated, it is likely that the next major technological advance is not based on a single material but an integration/collection of multiple types of materials. The functionality required for any near future technology is far superior and complex that a single material is unable to fulfill the needs. This means that our study has to focus on materials systems and integrations. The diversity and complexity involved in this exploration will be rather challenging, which makes the materials research rather exciting.

Different from the traditional materials research, the near future materials research will be multidisciplinary and cross-field, involving various aspects of science and engineering, such as chemistry, physics, materials science, electrical/optical engineering and even biology. The future materials research will be different from our traditional study in approach and methodology. But one thing is unambiguous, materials will be the foundation of our next major technology.

Congratulation to Professor Shi!

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