Tsinghua Newsletter



June 2018



Tsinghua team triumphs in the Student Cluster Competition 2018



French Prime Minister Edouard Philippe visits Tsinghua



CDEX collaboration publishes world-leading results in light WIMPs direct detection



Global Communication Office

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The ISC-HPCAIAC Student Cluster Competition announced its final results on June 27th (Central European Time), with the Tsinghua team being the First Place Winner of the contest.

The Tsinghua team achieved the highest overall score for all benchmarks.

Twelve undergraduate student teams representing twelve institutions around the globe participated in the Competition.

The ISC-HPCAIAC Student Cluster Competition aims to encourage international teams of university students to showcase their expertise in a friendly yet spirited competition that fosters critical skills, professional relationships, competitive spirit and lifelong comraderies.

The Competition was an integral part of the ISC High Performance Conference and Exhibition recently held in Frankfurt, Germany.

Each year up to twelve teams, each comprised of six students and up to two advisers, compete in this event.

French Prime Minister Edouard Philippe visits Tsinghua

On June 24th, the French Prime Minister Edouard Philippe visited Tsinghua University and gave a lecture in the Tsinghua Global Vision Lecture series.

Qiu Yong, the President of Tsinghua University, met with Monsieur Philippe before the lecture. On behalf of Tsinghua, President Qiu Yong extended his warm welcome to Monsieur Philippe and introduced the recent development of Tsinghua and its cooperation with French universities. President Qiu Yong said that Tsinghua attaches great significance to international cooperation and innovation. Both sides agreed to further promote the exchange and partnership between Tsinghua University and its French counterparts. Vice President Yang Bin attended the meeting.

Monsieur Philippe then came to the hall of the Main Building to deliver his lecture. Qiu addressed the audience, saying that the friendship between the Chinese and the



French dates back a long time and our universities have developed good cooperation. Qiu welcomed more young French talents and scholars to visit Tsinghua University and said he expected more Tsinghua students and teachers to study in France. Vice President Yang Bin hosted the lecture.

In his lecture, with its theme of innovation, Monsieur Philippe discussed the important opportunities and challenges that France and the world are facing. He listed many instances of cooperation between China and France in nuclear energy, aerospace and environmental protection, as well as in other areas. He especially emphasized the important role of universities' cooperation in the development of new technology. He also expected new cooperation in innovation between the two countries and wished the young people of both countries to be friends with, and learn from, each other so as to make a greater contribution to world peace, stability, prosperity and development.

Madame Frederique Vidal, French Minister of Higher Education, Research and Innovation, Monsieur Jean-Maurice Ripert, French Ambassador to China, and Monsieur Emmanuel Lenain, Diplomatic Adviser to the French Prime Minister, accompanied Monsieur Philippe in this visit and attended the lecture.

After the lecture, witnessed by President Qiu Yong and Prime

Minister Edouard Philippe, Vice President Yang Bin and Executive Vice-President of ESCP Europe Leon Laulusa signed a Memorandum of Understanding. The two universities will deepen their cooperation in the areas of innovation and entrepreneurship for young people.



CDEX collaboration publishes worldleading results in light WIMPs direct detection

On June 12th, CDEX (China Dark matter EXperiment) collaboration, led by Tsinghua University, published an article entitled "Limits on Light Weakly Interacting Massive Particles from the First 102.8kg×day Data of the CDEX-10 Experiment" on Physical Review Letters (Phys. Rev. Lett. 120, 241301). In this work, the most stringent limits on spin-dependent WIMP-nucleon cross sections were set for a WIMP mass of 4-5 GeV/c2 with the lowest exclusion at 8×10-42cm2 using Point Contact Germanium detectors directly immersed into liquid nitrogen.

The first results of a light weakly interacting massive particles (WIMPs) search were from the CDEX-10 experiment with a 10 kg germanium detector array immersed in liquid nitrogen at the China Jinping Underground Laboratory (CJPL) with a physics data size of 102.8 kg day. At an analysis threshold of 160 eVee, the lowest threshold and background among the various CDEX data set to date were achieved, which extends the reach of WIMP mass lower to 2 GeV/ c2. At the same time, this brings forth almost an order of magnitude



Figure 1. Configuration of CDEX-10 experimental setup and C10B detector layout inside the string.

improvement over their previous exclusion bounds, and the most stringent limits were given with the same detection technology. Especially for spin-independent cross sections, new regions for WIMP mass of 4-5 GeV/c2 are probed and excluded.

The CDEX-10 detector array will be installed in a new large LN2

cryotank with a volume of about 1700 m3 at Hall-C of CJPL-II by the end of 2018, where shielding from ambient radioactivity is provided by the 6 m-thick LN2. By then, the CDEX-10 experiment will run in this cryotank toward a future ton-scale experiment (CDEX-1T) searching for dark matter and neutrino-less double beta decay.

Professor Qian Yue, Associate Professor Hao Ma and postdoc Litao Yang are the co-corresponding authors of this paper. Hao Jiang and Liping Jia, doctoral students in the Department of Engineering Physics, are the co-first authors. This work was supported by the National Key Research and Development Program of China, the National Natural Science Foundation of China, and the Dark Matter Experimental Platform of Tsinghua University.

The link to the article: https://link.aps.org/doi/10.1103/ PhysRevLett.120.241301



Figure 2. Exclusion plots of (a) SI x-N coupling and (b) SD x-neutron coupling at 90% C.L., superimposed with results from other benchmark direct search experiments.



Figure 3. Conceptual configuration of a future CDEX-1T experiment at CJPL Phase-II.

The Third Annual Symposium of the Harry Susilo Institute for Ethics in the Global Economy held at Tsinghua

From June 9th to 10th, 2018, the third Annual Symposium of the Harry Susilo Institute for Ethics in the Global Economy, co-organized by the Tsinghua University School of Economics and Management (Tsinghua SEM), Boston University Questrom School of Business and the Harry Susilo Institute for Ethics in the Global Economy was held at Tsinghua SEM. With the theme "Sustainability and Responsibility: Navigating Creative Routes", the symposium saw more than 200 business managers and college



scholars from all over the world jointly discussing the responsibilities of companies and entrepreneurs in a highly connected world, and how to respond to future challenges and build a better tomorrow for sustainable development.

Tsinghua Vice President Yang Bin, Prof. Kenneth Freeman, Allen Questrom Professor and Dean in Management, Boston University Questrom School of Business, and Mr. Harry Susilo, Founder and Co-Chairman of the Harry Susilo Institute for Ethics in the Global Economy and the Founder of the Sekar Group, attended the forum. The President of Boston University Prof. Robert Brown and his wife Dr. Beverly Brown were also present at the symposium.

In his speech, Prof. Yang Bin noted that it was of great significance that the symposium focused on the frontiers and new challenges



of ethics in business. He hoped that the urgent business ethics issues faced by Chinese companies in a globally interconnected world could be better resolved through discussions at the symposium.

Prof. Kenneth Freeman and Ms. Finna Huang, President Commissioner of the Sekar Group, also delivered welcoming speeches.

Mr. Harry Susilo gave a presentation titled "Ties and Ethics in Family Business" in the plenary session to share his story and experience of starting a business.

Mr. Jonathan Woetzel, Director of Mckinsey Global Institute, Dr. Nalin Kulatilaka, Professor in Boston University Questrom School of Business and co-director of Harry Susilo Institute for Ethics in the Global Economy, as well as Ms. Li Yinuo, Director of China Program in Bill & Melinda Gates Foundation, gave keynote speeches titled "How the Lion and Dragon Dance: Chinese Investment in Africa", "Investing for Social Impact" and "How to Think and Act in a Highly Connected World: Responsibility, Conflicts and Choices", respectively.

In addition, Mr. Wei Lihua, Founder and the President of Jun-LeBao, made a keynote speech on "Rising up from the Ruins of the Melamine Crisis." Mr. Mu Rongjun, Co-Founder and senior VP of Meituan gave a keynote speech on "Internet and Social Enterprise."

Besides the keynote speeches, the forum also held two panel discussions on "Entrepreneurship: Passion and Responsibility" and "Corporate Responsibility: Challenges and Prospects".

On the following day, the academic part of the conference was held at Tsinghua SEM, at which nearly 40 university scholars from around the world were present. The scholars made presentations and engaged in discussions on topics including sustainable development, ethics, values, and ethical training in a cross-cultural context.



Xuerui Yang's group elucidates the tumor-promoting function of lncRNA NEAT1 in prostate cancer cells



The long noncoding RNA nuclear-enriched abundant transcript 1 (NEAT1) has been shown to regulate multiple cancer-related cellular activities including cell proliferation, apoptosis, and migration. However, the detailed mechanisms have not been fully elucidated. Xuerui Yang's group in the School of Life Sciences at Tsinghua University has been using an integrative strategy to solve this problem. Their efforts led to the discovery of a transcriptional regulation circuit from CDC5L to AGRN, which is regulated by NEAT1 and responsible for the tumor-promoting function of NEAT1 in prostate cancer cells. These findings have been recently published in Cancer Research, in an article entitled "Oncogenic properties of NEAT1 in prostate cancer cells depend on the CDC5L-AGRN transcriptional regulation circuit".

NEAT1 is an essential component of the paraspeckle, which is a nuclear speckle near the cell nucleolus. Substantial abnormalities of NEAT1 have been observed frequently in various cancer-related contexts. However, the exact role of NEAT1 in tumorigenesis was still debated. A team led by Dr. Xuerui Yang confirmed that NEAT1 is essential for the proliferation and tumorigenesis of the castration-resistant prostate cancer (CRPC) cell lines. They showed that knocking down NEAT1 resulted in significant DNA damage and suppression of cell proliferation and tumor growth.

Mechanistic investigations for many lncRNAs has been challenging and the studies remain limited, partly due to lack of prior knowledge and difficulties in generating plausible hypotheses to start with. Therefore, comprehensive functional surveys of the lncRNAs with existing data would be of high value for honing in on specific lncRNAs, generating testable hypotheses, and guiding the mechanistic studies. In Xuerui Yang's lab, to elucidate the machinery responsible for the essential function of NEAT1 in prostate cancer cells, they applied an integrative data-mining strategy to identify potential transcription factors whose transcriptional activity depends on the level of NEAT1. This analysis based on transcriptome profiling data from about 500 prostate tumors in The Cancer Genome Atlas (TCGA) yielded a series of known transcription factors and other DNA binding proteins, including CDC5L, which has been shown to bind directly to NEAT1.

Guided by the data-mining results, experimental studies in Xuerui Yang's lab confirmed the regulation of CDC5L by NEAT1 and identified the target gene of CDC5L, AGRN, which was modulated by NEAT1. Finally, the team proved that this transcriptional regulatory circuit, NEAT1-CDC5L-AGRN, is essential for proper tumor cell growth, and repression of the pathway causes DNA damage and potent arrest of the cell cycle and proliferation.

In summary, Xuerui Yang's group has revealed, for the first time, a specific transcriptional regulation circuit modulated by lncRNA NEAT1, which in turn facilitates DNA integrity and promotes proliferation of prostate cancer cells. The success of this research project is a demonstration of the unique advantage of combining sophisticated data-mining and detailed experimental investigation in generating a plausible hypothesis and uncovering detailed mechanisms.

PhD student Xin Li in Xuerui Yang's lab is the first author of the paper. The study was supported by the national key research and development program, Precision Medicine Project, the National Natural Science Foundation of China, the Tsinghua University Initiative Scientific Research Program, the Tsinghua-Peking Joint Center for Life Sciences, and the 1000 talent program (Youth Category). The study also received support from the Platforms of Genome Sequencing, High-Performance Computing, shRNA Library, and Cell Imaging & Function of the National Protein Science Facility (Beijing), the Lab Animal Center at Tsinghua University, and the Flow Cytometry Core Facility of the Center of Biomedical Analysis at Tsinghua University.

Tsinghua Reconfigurable Computing Team proposes a new approach to Memory Optimization for Al Chips, significantly improving their energy efficiency

The 45th International Symposium on Computer Architecture (ISCA) was held in Los Angeles, California, from June 2nd to June 6th. Fengbin Tu, PhD student at the Institute of Microelectronics from Tsinghua University, gave an oral presentation titled "RANA: Towards Efficient Neural Acceleration with Refresh-Optimized Embedded DRAM" on June 4th. His approach to this work can significantly improve the energy efficiency of Artificial Intelligence (AI) Chips.

ISCA is the top conference for computer architecture. Altogether, 378 papers were submitted this year, and only 64 of them were accepted, an acceptance rate of 16.9%. Fengbin Tu et al.'s work is the only paper first-authored by a Chinese research team (the Tsinghua Reconfigurable Computing Team) in ISCA 2018. Shouyi Yin, Associate Professor at the Institute of Microelectronics, is the corresponding author, and Fengbin Tu is the first author. The paper is also co-authored by Prof. Shaojun



Fengbin Tu, PhD student at the Institute of Microelectronics, gave an oral presentation at ISCA 2018.

Link to the paper:

http://cancerres.aacrjournals.org/ content/early/2018/06/05/0008-5472.CAN-18-0688 Wei, Prof. Leibo Liu and Weiwei Wu (Master's student) at the Institute of Microelectronics, Tsinghua University.

The growing size of deep neural networks (DNNs) requires large amounts of on-chip storage. In many DNN accelerators, their limited on-chip memory capacity causes massive off-chip memory access and leads to very high system energy consumption. So memory optimization is an important problem in AI chip design. Tsinghua Reconfigurable Computing Team proposed a Retention-Aware Neural Acceleration (RANA) framework for DNN accelerators to save total system energy consumption with refresh-optimized embedded DRAM (eDRAM). The RANA framework includes three levels of techniques: a retention-aware training method, a hybrid computation pattern and a refresh-optimized eDRAM controller. At the training level, DNN's error resilience is exploited in training to improve eDRAM's tolerable retention time. At the scheduling level, RANA assigns to each DNN layer a computation pattern that consumes the lowest energy. At the architecture level, a refresh-optimized eDRAM controller is proposed to alleviate unnecessary refresh operations. Owing to the RANA framework, 99.7% eDRAM refresh operations can be removed with negligible performance and accuracy loss. Compared with the conventional SRAM-based DNN accelerator, an eDRAM-based DNN accelerator strengthened by RANA can save 41.7% off-chip memory

access and 66.2% system energy consumption, with the same area cost. The proposed framework significantly improves the energy efficiency of AI Chips.

The Tsinghua Reconfigurable Computing Team has designed a series of reconfigurable architecture based AI Chips (Thinker I, Thinker II, Thinker S) in recent years, which have attracted many researchers and engineers from all over the world. Their work was presented at ISCA 2018, and significantly improves the energy efficiency of AI Chips through memory optimization and software-hardware co-design techniques, which promotes a new way for AI Chips' architectural development.



RANA: Retention-aware neural acceleration framework.

Tsinghua confers Honorary Professorship on Tel Aviv University President Joseph Klafter

The President of Tel Aviv University (TAU), Professor Joseph Klafter, was awarded the title of Honorary Professor of Tsinghua on June 7th at a conferring ceremony held in Schwarzman College.

A well-known figure in the field of chemical physics, Professor Klafter has been instrumental in building a relationship between Tel Aviv University and Tsinghua University for close to a decade.

"This ceremony is also a symbol of the enduring friendship and an even closer partnership between our two universities," said President of Tsinghua University, Qiu Yong, who presented the certificate to Klafter. "So now President Klafter and I both belong to Tsinghua community and TAU community. We will continue to serve as bridges between our two universities."

Last year in May, President Qiu Yong was awarded an honorary doctorate from Tel Aviv University while on an official visit there.

In Professor Klafter's acceptance speech, he called for further collaboration in the areas of smart cities, renewable energy, green chemistry, food security and quantum communication. He reiterated that Tel Aviv University's partnership with Tsinghua is also a demonstration of its commitment to Israel-China relations.

"The Chinese journey has been very fascinating for me. As Confucius said, wherever you go, go with all your heart. This I think, was my journey. So thank you very much for this honor," Professor Klafter said.



Also present was the Israeli ambassador to China His Excellency Zvi Heifetz. The ambassador said that Professor Klafter was a man of exceptional quality using the Yiddish word "Mensch", which means a person of noble character and of integrity.

During Professor Klafter's tenure as president of the university, Tsinghua and Tel Aviv University have established numerous collaborations over the years, including the XIN Center, an interdisciplinary innovation platform for technology transfer and training, and the 7 + 7 Research University Alliance where seven Chinese universities and seven Israeli universities will cooperate in research and exchanges.

Professor He Kebin named "Green China Person of the Year" 2016-2017

Professor He Kebin, Dean of the School of Environment at Tsinghua University, was named the "Green China Person of the Year" 2016-2017. This award, whose winners were announced on the World Environment Day (June 5th), recognized Prof. He's academic contribution to China's environmental protection. Prof. He has devoted himself to research on complex air pollution problems, especially on PM2.5, for many years. He promoted the development and application of dynamic regional air quality management, which includes the high-resolution emission inventories, multi-dimensional source apportionments for complex pollution, and multi-pollutants collaborative control technologies. Prof. He led the establishment of an online platform for the Multi-scale Emission Inventory in China (MEIC) and has made great contributions to the promotion of China's air quality management performance in the fields of precise source-tracing and quantitative assessment.

In 2017, Prof. He was appointed the deputy director of the National Air Pollution Control and Prevention Center. He is taking the lead to guide the "2+26" cities on emission inventory development. In addition, he is also the leader in proposing strategies on air pollution controls from major sectors, including metallurgy, building materials, coal, diesel engines, VOCs and related fields. All the above work has contributed to the mitigation of heavy air pollution during autumn and winter. With these efforts, it was observed that the reduction of PM2.5 concentrations in Beijing, Tianjin and the neighboring regions has reached more than 35% in the past 5 years. In addition, Prof. He acted as a core expert in air quality control for a series of national events including the G20 Hangzhou Summit in 2006 and the BRICS Summit held in Xiamen in 2017.

The "Green China Person of the Year" is the highest award in the field of environmental protection given by the Chinese government. It was launched in 2005 to honor the green heroes who have made special contributions in environmental protection. Professor Zhang Xiaojian, Professor Hao Jiming, and the Student Green Association of Tsinghua, all from the School of Environment, were recognized with the honor in 2007, 2008 and 2009 respectively.



Dr. Barry Bozeman, the famous American public management scholar, is made Distinguished Visiting Professor of Tsinghua



On May 25th, Barry Lynn Bozeman, Regent Professor at Arizona State University, Fellow of the National Academy of Public Administration and Fellow of the American Association for the Advancement of Science, was invited by Tsinghua University to be a Distinguished Visiting Professor. Vice President and Provost Yang Bin of Tsinghua University delivered the letter of appointment to Dr. Bozeman.

At the ceremony, Vice President Yang introduced Professor Barry Lynn Bozeman's distinguished career in public administration teaching and research. He welcomed Professor Bozeman joining Tsinghua and expected him to play an important role in helping advance public management and policy teaching and research in Tsinghua.

In his acceptance speech, Professor Barry Bozeman happily accepted the appointment and said that he felt very honored to be a member of this university and use it as a platform to exchange ideas and research achievements with the best and brightest people in his field from around the world.

Professor Bozeman is a wellknown public administration scholar, an internationally renowned researcher in organizational theory,





science and technology organization management and technology transfer. He is particularly known for his contribution in Public Value Mapping, and his famous book "All Organizations Are Public", which argues that it is more important for a modern government to prevent public value failure rather than merely prevent market failure.

In his keynote speech following the ceremony, Professor Bozeman shared with the audience his most recent research in empirical public identification and mapping, and demonstrated how they are relevant to public policy making and implementation.

Dr. Yong Tang from Western Illinois University Gives Lecture at Tsinghua University



Dr. Yong Tang giving a lecture

Yong Tang, Associate Professor and Director of the Western Illinois University (WIU) Journalism Program, gave a lecture in the School of Journalism and Communication, Tsinghua University, on June 5th 2018, talking about concepts and practices in American journalism and mass communication. The lecture was hosted by the Center for Journalism and Journalism Education Studies of Tsinghua University and chaired by Professor Junchao Wang.

Dr. Tang introduced the differences between Chinese and American journalism and mass communication; the survival strategies of doctoral candidacy; the knowhow to publish papers in America as well as the prosperity and decline of American journalism. Then Dr. Tang took questions from students concerning their career choice and the selection of the topic for their dissertation.

Dr. Tang was awarded two doctoral degrees from the Communication University of China and Pennsylvania State

University successively. He was also an award-winning professional journalist with China's politically influential newspaper People's Daily for nearly 15 years. From 2004 to 2007, he worked in the Washington D.C. Bureau of the People's Daily as a correspondent and interviewed many high-profile newsmakers such as former President Jimmy Carter and former Secretary of State Colin Powell. He then joined WIU in 2011, teaching conceptual and skill courses. Dr. Tang's major areas of research include the First Amendment, freedom of information, media law and policy, the Chinese press and related topics. Until now, Dr. Tang has presented and published more than 20 scholarly papers at world renowned conferences such as AEJMC, ICA and NCA, and peer-reviewed journals such as the Journal of Media Law and Ethics, Journal of Information Policy and the Chinese Journal of Communication. Dr. Tang's lecture is the first of the lecture series hosted by the Center for Journalism and Journalism Education Studies of Tsinghua University.



Group picture with Tsinghua students

Tsinghua University students get rare insight into the reform and opening-up process



To mark the 40th anniversary of China's reform and opening-up, Tsinghua University has sent three groups comprising an equal number of domestic and overseas students to follow the path of the milestone event in May.

This time, the activity has not only shown students the development of high-tech and innovative industries in Shenzhen, one of the earliest special economic zones in China, but also got them closer to the poverty alleviation projects in Lankao county, Henan province. "We were given a first-hand experience to see photos and hear stories of the actual reform period, where special economic zones were set up in order to filter out which strategies worked well and which ones did not. It was great to put more details to the stories I have heard or studied back at the Tsinghua Beijing campus," says Stacey-Ann Pearson, a Jamaican student from the Schwarzman College of Tsinghua.

During the trip in Shenzhen, the team visited smartphone manufacturer Huawei, Internet giant Tencent, battery technology pioneer BYD and unmanned aerial vehicles producer DJI.

Caner Ipek, a German student from the Department of Industrial

Engineering at Tsinghua University says that after the visits he began to understand why Shenzhen enjoys popularity among those enterprises.

"Even though I have lived in China for more than a year now, I have not managed to decrypt the society yet. But I aim to solve this puzzle step by step." Caner says.

Duan Renzhi, 24, a postgraduate student from the Department of Electronic Engineering, says that he had a good time with his French buddy during the whole trip.

"To mix Chinese and foreign students and split us into small groups made it easier for us to discuss about a wide range of topics, which more or less broadened my horizon," says Duan. And he also managed to talk to the senior engineer in BYD during their visit to the company and was impressed by the business atmosphere in Shenzhen.

"The favorable policies and people's respect for entrepreneurs there really appeal to me. I would like to run a startup in the city after my graduation," says Duan.

South-South cooperation program begins in Beijing at Tsinghua University on May 21st



The third South-South Education Program for Economics and Finance kicked off in Beijing recently. The program attracted 26 leaders from 23 developing countries and the United Nations.

The program is co-founded by the Finance Center for South-South Cooperation, South-South Education Foundation, and the PBC School of Finance of Tsinghua University (PBCSF). Started in 2016, the program has covered 50 leaders from 39 developing countries and regions.

The program aims to facilitate the exchange of experiences between the member states under the South-South cooperation framework.

This year's program ran from May 18th to 27th. Participants listened to lectures from Chinese financial experts on the development of China's economy and finance. The financial leaders also had a chance to visit the Forbidden City and the Asian Infrastructure Investment Bank (AIIB).

UN former Under-Secretary-General Wu Hongbo appointed Adjunct Professor and Co-Director of the Institute for Sustainable Development Goals of Tsinghua University



On May 24th, Wu Hongbo, former United Nations Under-Secretary-General for Economic and Social Affairs, was appointed Adjunct Professor of Tsinghua University as well as the Co-Director of the Institute for Sustainable Development Goals of Tsinghua University (TUSDG). The ceremony was held at the School of Public Policy & Management (SPPM). Yang Bin, Vice-President and Provost of Tsinghua, and also Chairman of the TUSDG, awarded the letter of appointment to Mr. Wu.

Mr. Wu Hongbo later delivered a speech entitled "A Community of Shared Future for Mankind and Sustainable Development" during the "Meet SDGs" High-End Forum No.3. During his speech, Wu illustrated the concept -- "Creating a Community of Shared Future for Mankind". Through a review of the current international trends, he analyzed the importance and feasibility of this idea as well as its connection with the United Nations Sustainable Development Goals (SDGs).

He also noted that China should be more active in its endeavors to facilitate collaboration, to achieve a win-win development, and to realize the "Community of Shared Future" by contributing Chinese wisdom and plans to the ultimate accomplishment of the SDGs.