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Tsinghua establishes Institute for Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era

Source: Xinhua
Editor: Zhu Lvhe

The Central Committee of the Communist Party of China (CPC) has approved the establishment of 10 research institutes to study and interpret Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era. The Institute for Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, Tsinghua University was established on January 15th.

Chen Xu, Secretary of the CPC Tsinghua Committee and Chairperson of the University Council, attended the ceremony marking the establishment of the Institute and conferred letters of appointment on the advisors of the Institute, as well as on the Director, the Vice Director, and the members of its academic committee. Deng Wei, Deputy Secretary of the CPC Tsinghua Committee and Vice Chairperson of the University Council, hosted the ceremony.

The research centers and institutes are founded by the CPC Central Committee's Party School, the Ministry of Education, the Chinese Academy of Social Sciences, the National Defense University of the People's Liberation Army, the municipalities of Beijing and Shanghai, Guangdong Province, Peking University, Tsinghua University and Renmin University of China.

With strong academic credentials, the new research centers and institutes will be able to play an important role in the study, promotion and interpretation of Xi Jinping Thought.

Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era was introduced at the 19th CPC National Congress in October 2017 and listed as a part of the guiding ideology for the CPC in its amended Constitution.

The second Belt and Road Davos Forum co-organized by Tsinghua and inaugurated in Davos

On January 24th, the second Belt and Road Davos Forum, co-organized by Tsinghua University, the International Cooperation Center of the National Development and Reform Commission, and the United Nations Conference on Trade and Development (UNCTAD), formally commenced in Davos, Switzerland, where the World Economic Forum is simultaneously being held.

Among the attendees of the forum are Qiu Yong, President of Tsinghua University, Mukhisa Kituyi, UNCTAD Secretary-General, Cao Wenlian, Director General of the International Cooperation Center of the National Development and Reform Commission, Liu Zhenmin, UN Under-Secretary-General for Economic and Social Affairs, Khawaja Muhammad Asif, Minister for Foreign Affairs of Pakistan, Damdin Tsogtbaatar, Minister of Foreign Affairs of Mongolia, Kobsak Pootrakool, Minister attached to the Prime Minister's Office of Thailand, Zhu Hexin, Vice Governor of Sichuan Province, Qi Bin, Executive Vice President of the China Investment Corporation, and Tadashi Maeda, CEO of the Japan Bank for International Cooperation, as well as other important guests from all over the world. Zhu Min, Secretary-General of the Belt and Road Davos Forum, hosted the opening ceremony of the Forum.

To mark the official opening of the forum, Qiu Yong, President of Tsinghua University, delivered an address, highlighting the theme of this year, "Interregional Cooperation for a New Globalization". Qiu noted in his address that Davos is probably the best place to meet old friends and make new acquaintances in a short time with great efficiency, and he believed that Davos is a wonderful place to share the ideas of the Belt and Road Initiative with all these friends. Everyone in the world can make a meaningful contribution to interregional cooperation and globalization through his or her own efforts. The universities can play a significant role in this regard given their comparative advantages in talent development and technological innovation.

Qiu also noted that last April, Tsinghua launched the Asian Universities Alliance (AUA) with 15 founding members - a selective group of the most prestigious universities in their respective countries. In support of the Belt and Road initiative, AUA promotes cooperation and exchange among the universities in Asia. Qiu further mentioned that he had the pleasure to meet the President of Indonesia Mr. Joko Widodo and signed an agreement with the Minister of Industry on establishing a Tsinghua Southeast Asia Center in Indonesia during the Belt and Road Summit in Beijing, in May 2017. The Center will play an important role in the Belt and Road Initiative in terms of promoting people-to-people exchange, as well as international cooperation in education between China and Southeast Asian countries. In addition, Tsinghua has also signed agreements with many Belt and Road countries on the application of its cutting-edge technologies, such as the large container inspection system and emergency management system for public safety.

Qiu also noted that for thousands of years, the Silk Road Spirit "Peace and Cooperation, Openness and

Inclusiveness, Mutual Learning and Mutual Benefit" has been passed from generation to generation. Today, with the same spirit, Tsinghua is fully committed to working closely with its international partners to explore the unlimited opportunities brought forth by the Belt and Road Initiative. Qiu Yong looked forward to meeting old friends again at the Belt and Road Davos Forum next time, and he also believed that new friends will continue to join the forum in the years to come.

Mukhisa Kituyi noted in his keynote speech that he is full of confidence in regard to the prospect of the Belt and Road Initiative, and the Belt and Road Davos Forum.

Cao Wenlian remarked in his address that the International Cooperation Center hopes to organize this important Forum well together with Tsinghua.

By means of keynote speeches, dialogues and symposia, the participating guests will conduct in-depth communication centering on two topics: "One Belt and One Road: Mutual Benefit, Win-Win and Sharing of Achievements", and "The Lancang-Mekong Cooperation: a New Era for Sino-ASEAN Cooperation."

The Belt and Road Davos Forum was established in January 2017. It was an international conference jointly initiated by Tsinghua University and the International Cooperation Center of the National Development and Reform Commission, and it takes place annually in Davos, Switzerland, alongside the World Economic Forum. Last year, the forum attracted ministers, industrial and business élites, and renowned scholars from the countries along the Belt and Road.

Tsinghua research achievements win 18 State Science and Technology Awards

18 Tsinghua research achievements were recognized at the 2017 State Science and Technology Awards ceremony on January 8th, where Tsinghua professors accepted the awards at the annual State Science and Technology Award ceremony in the Great Hall of the People in Beijing.

Of Tsinghua's awards, three were State Natural Science Awards, five were State Technological Invention Awards, and ten were State Scientific and Technological Progress Awards. Altogether 11 research achievements were completed by Tsinghua as the lead research institution in collaboration with others.

The research project entitled "Research & development of the 600MW supercritical circulating fluidized bed boiler and its manufacture, engineering demonstration", led by Professor Lv Junfu, won the first prize of the State Scientific and Technological Progress Awards.

By the end of 2017, Tsinghua had won a total of 547 State Science and Technology Awards, including one State Top Scientific and Technological Award, 71 State Natural Science Awards, 150 State Technological Invention Awards, and 325 State Scientific and Technological Progress Awards.

The 18 professors are Wan Junren, Wang Mingzhi, Liu Jvde, Du Dakai, Li Qiang, Li Xueqin, Wu Qiantao, Wang Hui, Chen Lai, Hu Angang, Liu Guanzhong, Qian Yingyi, Yan Xuetong, Cui Jianyuan, Peng Lin, Han Meilin, Xie Weihe, and Xue Lan.

First group of 18 faculty members named Distinguished Professors of Arts, Humanities and Social Sciences of Tsinghua University

Tsinghua announced its first group of distinguished professors of arts, humanities and social sciences on January 21st. Qiu Yong, President of Tsinghua University, Chen Xu, Chairperson of the University Council, and Deng Wei, Vice Chairperson of the University Council, attended the ceremony where the distinguished professorship was conferred on the 18 professors.

The distinguished professorship is Tsinghua University's highest academic title of honor in the fields of arts, humanities and social sciences.

The selection for the distinguished professorship is organized once every two years.

Tsinghua President Qiu Yong leads a delegation to Switzerland to promote multidisciplinary exchange and cooperation worldwide

The Geneva Tsinghua Initiative Advisory Board on Sustainable Development held their first meeting in Davos.

On January 22nd, Tsinghua President Qiu Yong led a delegation to Davos, Switzerland, the first of their visits overseas in 2018. They attended a series of multilateral and bilateral exchanges in three days, negotiating cooperation with leaders of political, academic and business communities as well as international organizations, and opening up a new initiative for the implementation of Tsinghua's Global Strategy.

On January 23rd, Qiu Yong was invited to attend the opening ceremony of the 48th World Economic Forum Annual Meeting. The theme of this annual meeting was "Creating a Shared Future in a Fractured World", and a total of 70 heads of state and government and 45 leaders of international organizations participated in the meeting. Liu He, member of the Political Bureau of the CPC Central Committee, and Director of the Office of the Central

Leading Group for Financial and Economic Affairs, attended the meeting on behalf of China. India's Prime Minister Narendra Modi delivered the opening speech.

Qiu Yong noted in an interview with the media after the opening ceremony that the contemporary world is facing increasingly severe challenges, and to promote the construction of a community of shared future calls for all states to make concerted efforts; the significance of international cooperation has never been so prominent. Tsinghua University vigorously promotes the implementation of its Global Strategy, and strengthens its exchanges with other countries in education, science and technology, and culture, and has achieved remarkable results. Tsinghua has taken full advantage of the international platform offered by the World Economic Forum to plan and implement a series of activities including the Belt and Road Davos Forum, and the "Future of Sustainable Development" high-level roundtable, which assemble global wisdom, present Tsinghua's voice, and put across Tsinghua's contribution to the construction of a community of shared future.

In response to the 2030 UN Agenda for Sustainable Development, and in support of China's national medium and long-term development planning, Tsinghua University has been making continued efforts towards the implementation of Sustainable Development Goals (SDGs), including the establishment of a SDG comprehensive strategic partnership with the University of Geneva to jointly promote the development of SDGs. In January 2017, following the signing of a cooperation agreement for sustainable development witnessed by the heads of the two states, the two universities jointly established a sustainable development center, and conducted a series of cooperation in fields such as research, joint training, summer courses, and exchanges of teachers and students, thereby achieving a great deal. At the same time, the two universities actively organized the Geneva Tsinghua Initiative Advisory Board on Sustainable Development by leveraging their extensive cooperation with UN institutions, international organizations, and the academic community.

On the afternoon of January 24th, the inaugural meeting of the Geneva Tsinghua Initiative Advisory Board on Sustainable Development was held in Davos. Tsinghua President Qiu Yong, President of the University of Geneva Yves Flueckiger, UN Assistant Secretary-General and Director of the United Nations Institute for Training and Research Nikhil Seth, former UNESCO Director-General Irina Bokova, Dean of the School of Public Policy and Management of Tsinghua University Xue Lan, and Dean of the School of Social Sciences of the University of Geneva Bernard Debarbieux attended the meeting as advisory board members.

Qiu Yong and President Flueckiger addressed the meeting. They thanked the advisory board members for their support for the cooperation between the two universities on sustainable development and hoped all members would join hands to promote the 2030 UN Agenda for Sustainable Development. The members in the meeting focused on how the advisory committee could play a better role in the cooperation between the two universities on SDGs, and discussed the overall strategy, main direction and key projects for further cooperation.

To achieve sustainable development goals, and set up a government-industry-learning-research communication and cooperation platform, Tsinghua University, in conjunction with the International Chamber of Commerce, the United in Diversity Foundation (UID) and the Giti Group, held the "United in Diversity" Leaders Roundtable. 50 guests were invited to attend the roundtable to jointly discuss policies and actions for promoting SDGs via multilateral cooperation, including Luxembourg's Prime Minister Xavier Bettel, Indonesian President Envoy and Maritime Minister Luhut B. Pandjaitan, and the Lichtenstein Global Trust Group (LGT) CEO Prince Max von und zu Lichtenstein.

Qiu Yong met respectively with Alice Gast, President of Imperial College London (upper left), Liu Zhenmin, the United Nations Deputy Secretary-General (upper right), Zhao Houlin, Secretary-General of the international Telecommunication Union (lower left), and Kituyi, Secretary-General of the United Nations Conference on Trade and Development (lower right).

The Global University Leaders Forum is an important event during the World Economic Forum Annual Meeting. Leaders of the world's top universities and research institutions are invited to attend the forum each year.

Qiu Yong attends the "United in Diversity" Leaders Roundtable co-hosted by Tsinghua.

On January 24th, Qiu Yong and leaders from 35 universities and research institutions in 13 countries, including the Presidents of the University of Cambridge, Oxford University, Princeton University, Yale University, the Massachusetts Institute of Technology, as well as leaders of research institutes such as the U.S. National Institute of Health, and the European Center for Nuclear Research (CERN), were invited to attend the Global University Leaders Forum. The theme of this year's forum was "Universities and Social Inclusion in the Fourth Industrial Revolution". Participants in the forum held closed-door discussions on this theme and three sub-themes. Qiu Yong noted in his speech in the forum that a university should become a development partner and innovation pacesetter of the community where it is located, and it should be a visionary leader actively contributing to the community. Qiu further shared Tsinghua's practical experiences and suggestions in relation to this idea with the other guests in the forum.

The President of the World Bank Jim Yong Kim and U.S. Secretary of Labor R. Alexander Acosta were invited to attend the forum as special guests. The forum was chaired by Alice Gast, Chairperson of this forum and President of Imperial College London.

Before the start of the forum, Qiu Yong held a separate talk with President Gast, who introduced the overall situation of the Global University Leaders Forum, thanked Tsinghua University for its support of the forum, introduced the latest developments at Imperial College, and looked forward to working with Tsinghua University in more fields. Qiu Yong noted that Imperial College and Tsinghua University are strategic partners, the two universities have developed an overall pattern of comprehensive cooperation, and major cooperation projects take place very smoothly, laying a good foundation for the continued exploration of deeper and more innovative cooperation patterns. The two parties also discussed the key exchange and cooperation arrangements for 2018.

"Global Competence" is one of the goals of talent training at Tsinghua University, including international vision, cross-cultural awareness and re-understanding of the Chinese cultural tradition in a global context. In line with this goal, Tsinghua University is expanding its cooperation with international organizations to build a platform for students to improve their comprehensive quality, international vision, scientific spirit and creative ability. During his visit to Davos, Qiu Yong met with a number of leaders of international organizations, including Liu Zhenmin, the United Nations Deputy Secretary-General, Zhao Houlin, Secretary-General of the international Telecommunication Union (lower left), and Mukhisa Kituyi, Secretary-General of the United Nations Conference on Trade and Development, and held in-depth discussions on Tsinghua University's exchanges and cooperation with the relevant United Nations agencies.

During his visit to Davos, Qiu Yong met with some Tsinghua alumni representatives in Switzerland. He briefed them on the important results achieved in 2017 and the key work for 2018, asked them about their work and study, and encouraged them to offer ideas for the development of Tsinghua and contribute to the implementation of Tsinghua's Global Strategy.

Qiu Yong took a group photo with Tsinghua alumni representatives.

Tsinghua University New Year Gala

The President of Tsinghua University Qiu Yong and the Chairperson of the University Council Chen Xu both delivered their New Year congratulatory messages.

Qiu Yong reviewed the accomplishments and progress Tsinghua has achieved in 2017: the establishment of the "Open Office Hour"; the setting up of the "Tsinghua New Century Teaching Achievement Award" and the "Annual Teaching Excellence Award", which aim to encourage education with warmth; eight members of faculty elected to the Chinese Academy of Sciences and the Chinese Academy of Engineering; a research group led by Tsinghua being awarded the ACM Gordon Bell Prize – the highest award worldwide in the field of high-performance computing; the establishment of two interdisciplinary research laboratories – the Tsinghua Laboratory of Brain and Intelligence, and the Future Laboratory; the founding of the Asian Universities Alliance; and the establishment of the China-Italy Design Innovation Hub – Tsinghua's first physical presence in Europe for teaching and research. After the Tsinghua Men's Basketball Team became champions for the first time in the League of the Chinese Universities' Basketball Association (CUBA) last year, the Tsinghua Women's Basketball Team also achieved the championship for the first time this year. Qiu said "my first wish for the coming year is that both the Men's and the Women's Basketball Teams would top the League next time! We believe that in 2018 we will witness more surprises."

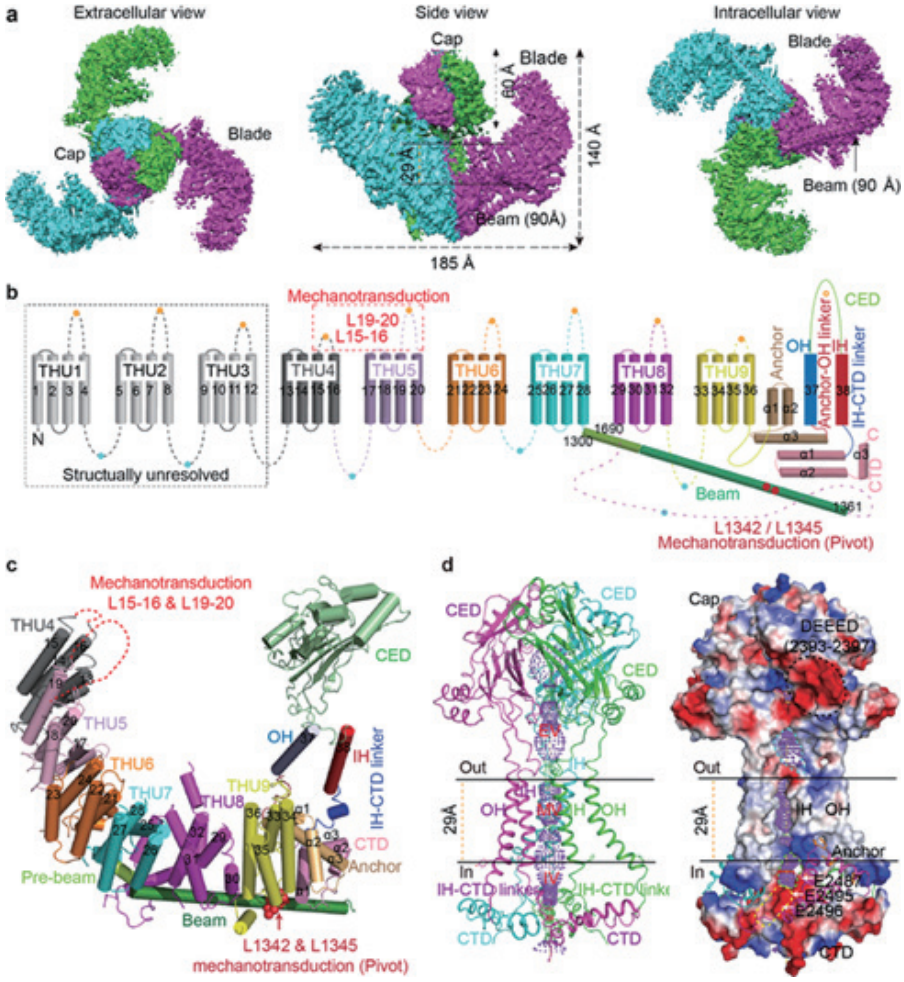
Chen Xu also extended her New Year wishes to the attendees of the Gala. She said "at such a joyous moment, I and all the members of the university leadership would like to extend our best wishes to all the students and faculty, and to all the alumni, as well as to all the friends, domestic and worldwide, who care about and support Tsinghua's development. Happy New Year to you all! All the best of luck in the coming year!" Chen Xu also quoted a sentence from Chinese President Xi Jinping's New Year address -- "Happiness is achieved through hard work", and noted that the accomplishments that Tsinghua has achieved in 2017 are the results of collective endeavor, and that looking forward, the tasks of 2018 require that we exert all our energy to the utmost.

Prof. Bailong Xiao's and Xueming Li's groups demystify a force-transduction protein machinery

On January 22nd, 2018, the research groups led by Prof. Bailong Xiao (School of Pharmaceutical Sciences) and Prof. Xueming Li (School of Life Sciences) at Tsinghua University solved the structure of the biological force sensor - the mechanosensitive Piezo1 channel - and proposed a sophisticated lever-like mechanotransduction mechanism for explaining its extraordinary ability to convert mechanical force into cation conduction. The findings, described in a paper entitled "Structure and mechanogating mechanism of the Piezo1 channel", were published online in the journal Nature.

As our skin touches when we shake hands, hug or kiss, the gentle force effectively excites our sensory neurons to elicit a pleasant touch sensation. Or as our blood flows through our vessels, the cells that constitute these vessels respond to the stress of the blood flow to ensure normal circulation. All these essential biological functions rely on the evolutionarily conserved Piezo family of proteins, including Piezo1 and Piezo2, which were originally identified by Dr. Ardem Patapoutian's lab at the Scripps Research Institute in 2010. In humans, mutations of Piezo1 or Piezo2 genes have also been linked to genetic diseases, stressing their functional importance.

Piezo proteins are large and complex transmembrane proteins that do not possess notable sequence homology with any known class of ion channels. How do Piezo proteins function exactly at the molecular level to serve as effective force-transduction molecules?



a, The three-bladed, propeller-like cryo-EM structure of the Piezo1 ion channel.
b, 9 repetitive THUs and the 38-TM topology model.
c. A cartoon model showing one subunit with featured structural domains labeled.
d. The ion-conducting pore module shown in a Ribbon diagram or with surface electrostatic potential.
The functionally identified regions and residues critical for mechanical activation of Piezo1 are shown in figs. b and c.

Dr. Bailong Xiao began to address this question when he was still a postdoctoral fellow in Dr. Patapoutian's lab. Together with his collaborators, they demonstrated that purified Piezo proteins are able to conduct cations by themselves, thus for the first time establishing them as the long-sought-after mammalian mechanosensitive cation channels. This groundbreaking work was published in Nature in 2012, and Dr. Bailong Xiao was co-first

author. Notably, the Web of Science has listed this paper as a highly cited article.

But fundamental questions remained unanswered, among them: how do these proteins organize three-dimensionally into mechanosensitive channels? How do they conduct ions in response to force stimulation?

After setting up his own lab at Tsinghua University in 2013, Dr. Bailong Xiao continued his effort to tackle these questions, and made significant breakthroughs.

In a paper the group published in Nature in 2015, along with collaborators at the university, they reported resolving a medium-resolution cryo-electron microscopy (cryo-EM) structure of the full-length mouse Piezo1. Remarkably, they found that Piezo1 trimerizes to form a three-bladed, propeller-like structure with a central ion-conducting pore. However, the resolution of this structure is not high enough to allow them to assign specific amino-acid residues into the structure.

In a paper published in Neuron in 2016, his group functionally identified the bona-fide ion-conducting pore and key pore-property-determining residues. They proposed that Piezo1 might employ a separate pore module for ion conduction and mechanotransduction module for force sensing and transduction.

In a paper published in Nature Communications in 2017, his group identified Piezo1 interacting proteins - the Sarco/Endoplasmic Reticulum Ca2+ ATPase (SERCA). Interestingly, they found that SERCA binds right to a short linker that connects the mechanotransduction module and the pore module, which might prevent the functional coupling of the two modules and therefore inhibit the mechanical activation of Piezo1.

In this new study, they have made a major breakthrough in pushing the three-bladed, propeller-like Piezo1 structure into a much higher resolution (Fig. 1a), allowing them to see more structural features and assign amino-acids into key domains. Dr. Bailong Xiao believes that the new structure clearly helps to reveal some unique features that might be critical for Piezo1 to function as a sophisticated mechanotransduction channel.

Firstly, despite the lack of sequence repetition, they identified 9 repetitive units constituted of 4 TMs each (Figs. b, c), and named this structural unit as THU (Transmembrane Helical Unit). Together with the last two TMs, which are termed outer helix (OH) and inner helix (IH), Piezo1 possesses an unprecedented 38-TM topology with a total of 114 TMs in the trimeric channel complex.

Secondly, they found that the peripheral 9 THUs in each subunit are organized into a highly curved blade structure (Figs. a-c), which means that Piezo1 might be able to curve its residing membrane. Furthermore, they observed that an intracellular helical layer exists immediately underneath the membrane (Fig. c), which might help to stabilize the curved TM blade in the membrane.

Thirdly, three 90 ampere-long intracellular beam-like structures connect the three peripheral blades to the pore via the interfaces of the C-terminal domain, anchor-resembling domain and outer helix (Figs. a-c). They hypothesize that Piezo1 might employ the beam to form a lever-like apparatus for transducing force from the peripheral blade to the central ion-conducting pore.

They also observed unique features of the central ion-conducting pore, which is likely in a closed conformation (Fig. d). Three IH enclose a hydrophobic transmembrane pore, which is not completely sealed from the membrane. This feature raises an intriguing possibility that membrane lipids may affect the ion permeation and gating of Piezo1. Interestingly, both the extracellular vestibule (EV) and intracellular vestibule (IV) have large fenestration sites immediately above and below the membrane, respectively. Considering their previously identified key pore-property-determining residues, they propose that cations might enter through the extracellular fenestration sites and exit through the three intracellular fenestration sites and the connecting side portals.

To gain further understanding of how the central pore is effectively gated by the peripheral blade and beam structures, they first analyzed Piezo1 structures in distinct motion states, and revealed long-distance mechanical motions that are potentially associated with the mechanogating process. Notably, the beam displays uneven movement with large motion at the distal beam with subtle movement at the proximal end. As a whole, the motion feature of the peripheral blade and the beam is reminiscent of a lever apparatus.

Then they carried out extensive mutagenesis, biochemical and electrophysiological studies to identify key domains and residues critical for the mechanical activation of Piezo1. In line with their hypothesis, they found that deletions of extracellular loops in the distal THUs or mutations of two residues (L1342/L2345) at the proximal end of the beam severely affected the mechanical activation of Piezo1.

On the basis of these structural and functional characterizations, they proposed that Piezo1 might employ its characteristically curved blades and the long beams with the L1342/L2345 as a pivot to form a

lever-like apparatus. Such a lever-like mechanotransduction mechanism might enable Piezo channels to effectively convert a large conformational change of the distal blades to a relatively slight opening of the central pore, allowing cation-selective permeation. Three sets of such lever-like apparatus are further assembled into a gigantic propeller-like machinery, which might confer a coordinated mechanosensitivity.

Dr. Bailong Xiao believes that this study provides a fundamental understanding of how Piezo proteins are elegantly designed to fulfill their designated function as specialized mechanotranduction channels for effectively transducing mechanical force into a biological signal, and also paves the way for targeting Piezo1-based human diseases, such as the dehydrated hereditary stomatocytosis and congenital lymphedema.

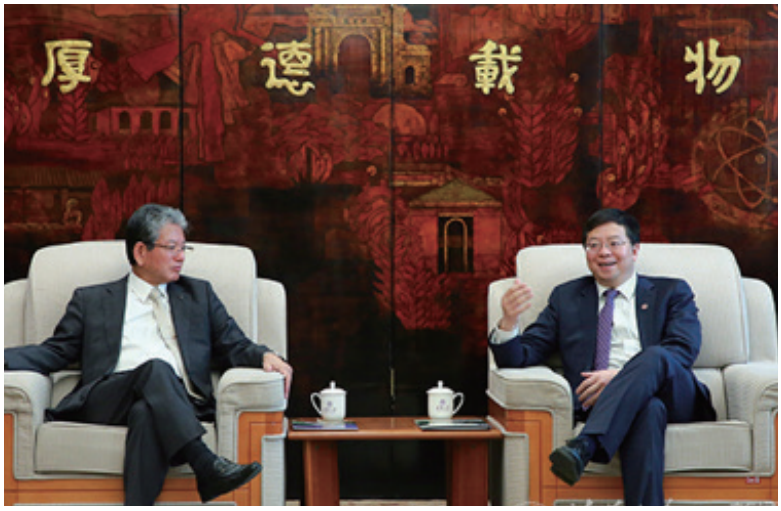
In this study, Drs. Bailong Xiao and Xueming Li are the co-corresponding authors; Qiancheng Zhao, Heng Zhou, Shaopeng Chi and Yanfeng Wang are co-first authors; Jianhua Wang, Jie Geng, Kun Wu, Wenhao Liu and Tingxin Zhang, Dr. Meng-Qiu Dong and Dr. Jiawei Wang are co-authors. This work was supported by grants from the National Natural Science Foundation of China and the National Key R&D Program of China.

Link:
https://www.nature.com/articles/nature25743

Tsinghua University leaders welcome Chinese New Year with students staying on campus

On the Chinese New Year's Eve, Qiu Yong, President of Tsinghua University, Chen Xu, Chairperson of the University Council, and other University leaders, made dumplings and greeted the new year with students staying on campus.

The University leaders extend their warmest regards and best wishes to all the members of the Tsinghua community.



Tsinghua-Tohoku University Joint Multidisciplinary Workshop held

On Dec 21st, 2017, President Qiu Yong of Tsinghua met with a delegation from Tohoku University, Japan. The delegation included President Susumu Satomi, Vice President Toshiya Ueki, Professor Hideo Ohno, Professor Motoko Kotani and representatives from various Tohoku schools and departments.

President Qiu welcomed the delegation's visit to Tsinghua, and expressed the hope of continued success in the collaboration between the two universities. Tsinghua and Tohoku have an extensive history of cooperation, one which dates back to 1998, the year of the first cooperative agreement signed between the two schools.

During the meeting, the two universities conveyed the hope of strengthened cooperation, joint training of postgraduate students and cooperative research, and exchanged views on pathways to greater cooperation. Vice President Xue Qikun attended the meeting, along with representatives from Tsinghua's Department of Physics, School of Materials Science and Engineering, the Office of Scientific R&D, and the Office of International Cooperation and Exchange.

Following the meeting, the two schools held a joint workshop in the reception hall of the Main Building. Tsinghua University Vice President Xue Qikun, Tohoku President Satomi, Vice President Ueki, faculty and students from the two schools attended the workshop.

Professor Xue Qikun, Vice President of Tsinghua University expressed the hope that the joint workshop will lead to more in-depth academic exchanges, exploration and debate, and achieve influential results.

Professor Susumu Satomi, President of Tohoku University conveyed the deep friendship between the two schools, which facilitates academic exchanges and mutual understanding. It is hoped that more students from Tsinghua University will study at Tohoku, and further strengthen the exchanges and cooperation between the two universities.

The Tsinghua-Tohoku Joint Workshop on Materials and Spintronic Sciences consisted of two keynote speeches and twelve thematic presentations. Professor Hideo Ohno, Director of Tohoku's Research Institute of Electrical Communication, and Professor He Ke from Tsinghua's Department of Physics presented keynote speeches entitled "Spintronics for information Processing - from low-power integrated circuits to artificial intelligence" and "Manipulating magnetism and chiral edge state of quantum anomalous Hall system", respectively.

Wang Yayu, Dean of Tsinghua's Department of Physics and Lin Yuanhua, Director of School of Materials Science and Engineering, introduced their research progress and exchanged in-depth discussions on frontier topics such as the Hall effect, advanced materials research, semiconductor nanostructures and topological insulators. The workshop was chaired by Tsinghua University Department of Physics, School of Materials Science and Engineering, Department of Chemistry, the Office of Scientific R&D, and the Office of International Cooperation and Exchange.

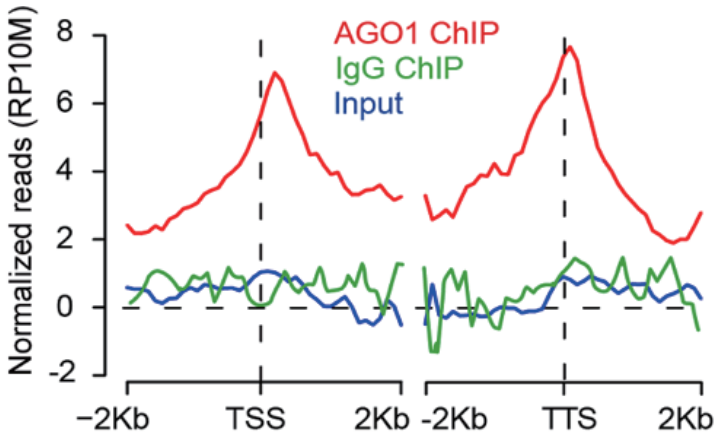
Yijun Qi's group reports a new role for Argonuate protein in promoting gene transcription

On December 29th, 2017, Prof. Yijun Qi's group from the School of Life Sciences at Tsinghua University published a research article in Molecular Cell, reporting a new role for Arabidopsis Argonuate1 in promoting gene transcription in response to hormones and stresses.

The Argonaute (AGO) family proteins are known as core effectors of RNA interference (RNAi) pathways in eukaryotes. AGO proteins associate with different classes of small RNAs (sRNAs) that are processed from double-stranded or stem-loop structured precursor RNAs by Dicer or Dicer-like (DCL) proteins. Guided by sRNAs, AGO proteins bind target sequences through base-pairing, which causes the cleavage of target RNAs and/or the recruitment of cofactors to mediate post-transcriptional or transcriptional gene silencing (PTGS or TGS).

Arabidopsis AGO1 is the founding member of the AGO family. AGO1 predominantly binds microRNAs (miRNAs) and post-transcriptionally represses target genes via mRNA cleavage and/or translational repression in the cytoplasm. However, it has been previously shown that AGO1 is also localized in the nucleus, suggesting a nuclear role for AGO1.

In this study, Qi and colleagues investigated the role of nuclear AGO1 in gene regulation on a genome-wide scale. They found that AGO1 binds to the chromatin of genic regions and positively regulates target gene transcription. They demonstrated that AGO1 binding to chromatin requires sRNAs and the SWI/SNF chromatin remodeling complexes. Unexpectedly, and perhaps more importantly, they found that AGO1 binding to its target genes is responsive to plant hormones, biotic and abiotic stresses. These findings reveal an unsuspected role for AGO1 in promoting gene transcription in response to plant hormones and stresses.



Deputy Director-General of UNESCO visits Tsinghua University

On January 15th, Getachew Engida, Deputy Director-General of the United Nations Educational, Scientific and Cultural Organization (UNESCO), visited Tsinghua University. Vice President and Provost of Tsinghua University Yang Bin met with the guest. The two parties conducted discussions on deepening their strategic partnership.

On behalf of Tsinghua University, Yang Bin welcomed Mr. Getachew Engida and his delegation and introduced the history and the Global Strategy of Tsinghua University. Yang Bin noted that UNESCO has made great contributions to the development of education, science and culture globally. Tsinghua University attaches importance to its cooperation with the African countries and hopes to explore with UNESCO and expand higher education cooperation between China and Africa through such approaches as degree programs, short-term exchanges and co-construction of research centers.

Getachew Engida indicated that under China's Belt and Road

Initiative, the Sino-African cooperation has further broadened and deepened on the basis of the principles of mutual benefit and win-win. Mr. Engida expects that the African young talents will have an enhanced training of their leadership skills and the social and economic developments of Africa will be promoted through the cooperation of Tsinghua University and UNESCO with the member states of the African Union.

Quantum simulation of a quantum field theory in a trapped ion system realized by Prof. Kihwan Kim's group

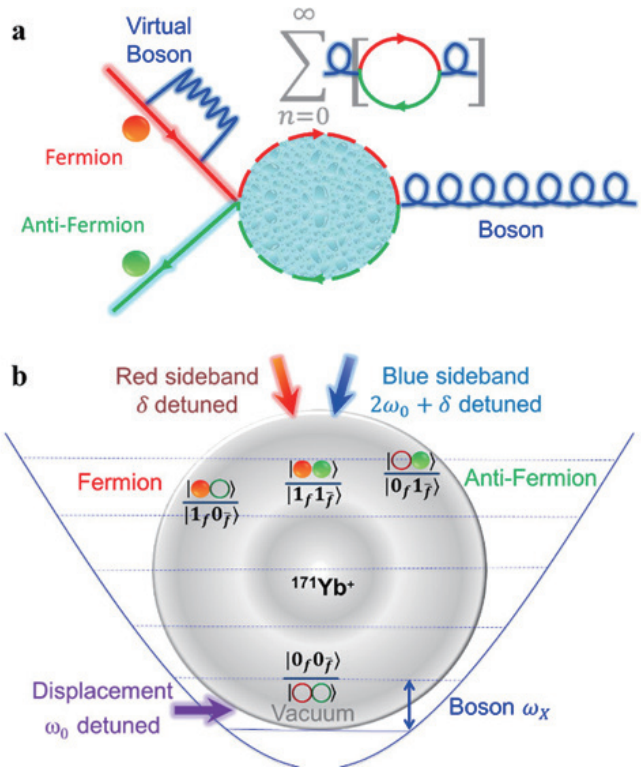


Figure 1 Fermion-antifermion scattering process and its mapping to a 171Yb+ ion system. (a) Diagram of the interactions between a fermion, an antifermion, and bosons. (b) Diagram of the encoding and operation to implement the interaction Hamiltonian with a 171Yb+ trapped ion.

Prof. Kihwan Kim's trapped ion group at the Center of Quantum Information at the Institute for Interdisciplinary Information Sciences has realized the quantum simulation of a fundamental model in quantum field theory in a trapped ion system. The work was published in Nature Communications on January 15th, 2018, and is entitled "Experimental quantum simulation of fermion-antifermion scattering via boson exchange in a trapped ion."

The field of quantum simulations with controllable quantum systems is rapidly developing and the time when a quantum simulator can outperform classical computational capacities does not look that far away. Such a quantum simulation device is expected to execute complicated computational tasks, such as involved computations in the frames of quantum field theory or quantum chemistry. Quantum field theories are among the most successful descriptions of the physical world, from elementary particles to condensed matter systems. One of the most prominent approaches to analyze the theories is to perturbatively expand the Dyson series using Feynman diagrams. However,

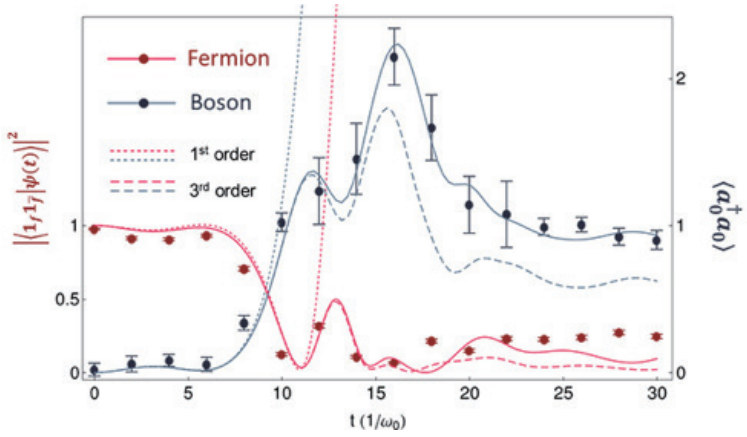


Figure 2 Trapped-ion simulation results of quantum field theories. Fermion and antifermion annihilation process in the strong coupling, where both the self-interaction and pair production processes strongly influence the dynamics.

certain regimes of theories cannot be studied in perturbation theory, where couplings are much stronger than the system energies, for example. A quantum simulator, on the other hand, can be a powerful tool to simulate quantum field theories much more efficiently than classical computers.

In this paper, Prof. Kihwan Kim's group demonstrate experimentally how a trapped ion system can simulate phenomena in quantum field theories, such as particle creation and annihilation or self-interaction processes. In their experiment, they performed a proof-of-principle quantum simulation of a fermion-antifermion scattering process mediated by bosonic modes. For the simulation, they exploited the vibrational modes of the ion to encode the simulated bosonic modes, while they mapped the fermionic ones onto four of the electronic levels of the ion. This is the first time that a trapped ion system has been used to simultaneously simulate bosons and fermions by profiting from the different degrees of freedom of the ion. Moreover, their approach was not restricted to perturbative regimes, as is the case in the standard classical or quantum computational approaches; instead they were able to observe the exact dynamics of the scattering process in highly non-perturbative regimes, something that would be cumbersome to compute even with dozens of qubits in a digital quantum computer. It is believed that their experiment opens the door to the digital-analog scalable quantum simulation of quantum field theories in perturbative and non-perturbative regimes.

The corresponding authors are an assistant research scientist, Jing-Ning Zhang, and tenured associate professor, Kihwan Kim. The equally contributing first authors are Zhang Xiang and Zhang Kuan, a Ph.D. candidate in IIIS, who carried out the experiments with Yangchao Shen and Shuaining Zhang. Zhang Xiang graduated from IIIS and is currently working principally in Renmin University. The assistant research scientist Jing-Ning Zhang, Prof. Man-Hong Yung from the Southern University of Science and Technology, and the team of Prof. Enrique Solano in the University of the Basque Country, Dr. Julen Pedernales, Dr. Jorge Casanova, and Dr. Lucas Lamata, provided the theoretical support. The research was funded by the National Basic Research Program of China, and the National Natural Science Foundation of China.

The full paper is available at:
https://www.nature.com/articles/s41467-017-02507-y

2017 Tsinghua Top Ten News

2017 was a year of great accomplishments and growth for Tsinghua. At the beginning of 2018, we have compiled a list of top ten news stories of 2017.

1. Tsinghua Research Achievements Win 22 State Science and Technology Awards

22 Tsinghua research achievements recently were recognized at the 2016 State Science and Technology Awards. Tsinghua professors accepted the awards on January 9th at the annual State Science and Technology Award Ceremony in the Great Hall of the People in Beijing.

Of Tsinghua's awards, four were State Natural Science Awards, two were State Technological Invention Awards, and sixteen were State Scientific and Technological Progress Awards. Altogether eight research achievements were completed by Tsinghua as the lead research institution in collaboration with others.

2. Tsinghua University and the Politecnico di Milano collaborate in the establishment of the Sino-Italian Design Innovation Hub

On February 22nd, under the oversight of Chinese President Xi Jinping and Italian President Sergio Mattarella, the President of Tsinghua University Qiu Yong and the President of the Politecnico di Milano Ferruccio Resta signed the agreement, in the Great Hall of the People, for collaboration to establish the Sino-Italian Design Innovation Hub in Milan. It will be the first education and research base set up by Tsinghua University in Europe, indicating the comprehensive implementation of Tsinghua University's global strategy.

3. The Suanbiao in Tsinghua Bamboo Slips: the World's Oldest Decimal Multiplication Table Recognized by Guinness World Records

The Suanbiao, a bamboo-slip manuscript of twenty-one bamboo slips in the Tsinghua collection, is a decimal multiplication table for numbers up to 99.5 when it is reconstructed in the correct order. It was awarded a Guinness World Records certificate for being "the oldest decimal multiplication table" in the world on April 23rd, 2017.

4. Liu Yandong opens the Asian Universities Alliance Founding Assembly and the first AUA Summit - Integrate Asian Wisdom, Shape a Better Future

The Asian Universities Alliance Founding Assembly and the first AUA Summit were held in Beijing on April 29th. Vice-Premier Liu Yandong attended the summit and delivered the keynote speech.

The AUA is a university alliance jointly established by 15 representative universities from Asian countries on the basis of the developing trend of higher education in Asia and following a proposal by Tsinghua University.

At the AUA Board Meeting held on April 28th, 2017, Tsinghua University was elected the founding President of AUA.

5. Tsinghua President Qiu Yong Addresses the Commencement of the Inaugural Class of Schwarzman Scholars - Encouraging the Schwarzman Scholars to be a sailor of the world

Tsinghua University President Qiu Yong attended and addressed the commencement of the inaugural class of Schwarzman Scholars, held at Schwarzman College on July 1st.

A landmark scholarship for the defining challenge of our time, "Schwarzman Scholars at Tsinghua University" is a Master's degree program designed to prepare the next generation of global leaders.

6. Tsinghua founds the Department of the History of Science and begins construction of the Science Museum

The founding ceremony for the Department of the History of Science, Tsinghua University, was held at Tsinghua on June 30th.

The Department will carry out academic research focusing on four aspects: the history of Western science and technology, the history of modern science and technology in China, the philosophy of science and technology, and scientific communication and science museum studies.

7. Global Innovation Exchange (GIX) Opening Celebration- The GIX Building in Seattle Opens

The GIX (Global Innovation eXchange institute) celebration to mark the opening of the GIX building and to welcome the first two cohorts of GIX graduate students was held on September 14th at the GIX building in Bellevue Spring District, Washington State, the United States.

The Global Innovation Exchange (GIX) is a collaboration between universities and industry partners from around the world, focused on developing leaders in innovation. The first two academic partners are Tsinghua University and the University of Washington with foundational support from Microsoft.

8. 2017 ACM Gordon Bell Prize awarded to Chinese team led by Tsinghua on Nonlinear Earthquake Simulation employing the

world's fastest supercomputer

ACM named a 12-member Chinese team, five of whom are from Tsinghua University, as the recipients of the 2017 ACM Gordon Bell Prize, for their research project, "18.9-Pflops Nonlinear Earthquake Simulation on Sunway TaihuLight: Enabling Depiction of 18-Hz and 8-Meter Scenarios." Using the Sunway TaihuLight, which is ranked as the world's fastest supercomputer, the team developed software that was able to efficiently process 18.9 Pflops (or 18.9 quadrillion calculations per second) of data and create 3D visualizations relating to a devastating earthquake that occurred in Tangshan, China, in 1976. This is the second time that the prize has been given to a Chinese research team.

The ACM Gordon Bell Prize tracks the progress of parallel computing and rewards innovation in applying high performance computing to challenges in science, engineering, and large- scale data analytics.

9. Four Tsinghua professors elected to the Chinese Academy of Engineering and four professors to the Chinese Academy of Sciences

On November 27th, the Chinese Academy of Engineering announced its 2017 list of newly elected academicians, which includes four Tsinghua professors and seven alumni.

The four professors are Professor Dai Qionghai from the Department of Automation, Professor Zhou Ji from the School of Materials Science and Engineering, Professor Zhang Jianmin from the School of Civil Engineering, and Professor Dong Jiahong from the Beijing Tsinghua Changgung Hospital.

On the following day, November 28th, a list of new members was announced by the Chinese Academy of Sciences, which also included four Tsinghua professors and four alumni.

The four professors are C.N.Yang Professor Wang Xiaoyun from the Institute for Advanced Study, Professor Chen Yeguang from the School of Life Sciences, Professor Ouyang Minggao from the Department of Automotive Engineering, and Professor Duan Wenhui from the Department of Physics.

10. The Tsinghua Laboratory of Brain and Intelligence and the Future Laboratory unveiled

On December 15th, the

Tsinghua Laboratory of Brain and Intelligence (THBI) and the Future Laboratory, Tsinghua University (THFL), were officially unveiled.

As a new measure to fully implement the national strategy of innovation-driven development, and to deepen the comprehensive reforms, including the reforms of the systems and mechanisms of scientific research carried out by Tsinghua, these two new interdisciplinary research institutes will target the forefront of science and technology, further promoting interdisciplinary research.