

# TSINGHUA 2023 ISSUE 2 NEWSLETTER



清华大学  
Tsinghua University



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# FOCUS



The event featured various exhibitions, performances, and activities organized by different departments of the University. They included concerts, track and field events, and the technological innovation exhibition held in honor of the returning alumni.

## Tsinghua celebrates 112th anniversary

Tsinghua University celebrated its 112th anniversary on April 30, hosting alumni from around the world for a weekend of reunions and many festivities.





Various exhibitions of students' extracurricular academic and technological works, oracle bone treasures displayed in the library, and photographs by faculty members and alumni also awaited them.

The celebrations also included an orchestral concert, ballroom dance, Peking Opera pieces, keyboard music, and folk art performances by Tsinghua students.

Additionally, the 66th "Ma Yuehan Cup" Students Track and Field Sports Meeting took place as part of the anniversary event.

Throughout the weekend, Tsinghua's Specimen Museum, Schwarzman College, Laboratories, and Teaching Buildings were open to the public. The University welcomed all alumni back to their alma mater.



## We advance in unity in a new era of diligent self-improvement

**Message for the 112th Anniversary of Tsinghua University**  
 By Qiu Yong, Secretary of the CPC Tsinghua University Committee  
 and Wang Xiqin, President of Tsinghua University

"Among emerald trees, the pavilion takes flight; Hues of rainbow clouds, adorn the pool so bright." In such a delightful spring, Tsinghua University will celebrate its 112th anniversary, as many alumni and friends gather together once again with great joy. On behalf of the University, we are immensely pleased to extend our warmest regards and best wishes to all our alumni at home and abroad, as well as our faculty, staff and students. We would also like to express our heartfelt gratitude to friends from all sectors of society who have shown their interest in and support for Tsinghua's development over the years.

The grand blueprints inspire the people and the clarion call of the times urges us forward. 2022 had been an extremely important and critical year in the history of both the Communist Party of China (CPC) and the country. With the success of the 20th CPC National Congress, the people have been fully mobilized to build China into a modern socialist country in all

respects and to advance the great rejuvenation of the Chinese nation. It has also pointed out the direction for Tsinghua University to pursue a new path and established guidelines for action to build a world-class university with Chinese characteristics.

An enthusiasm to study and implement the guiding principles of the 20th CPC National Congress has surged up in Tsinghua. Our faculty, staff, and students have been diligently cultivating their minds and spirit with Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era. We resolutely uphold the establishment of both Comrade Xi Jinping's core position on the Party Central Committee and in the Party as a whole and the guiding role of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era. We boost our consciousness of the need to maintain political integrity, think in big-picture terms, follow the leadership core, and keep in alignment with the central Party leadership. We stay confident

in the path, the theory, the system, and the culture of socialism with Chinese characteristics. We firmly uphold Comrade Xi Jinping's core position on the Party Central Committee and in the Party as a whole and uphold the Central Committee's authority and its centralized, unified leadership. Furthermore, we regard science and technology as the primary productive force, talent as the primary resource, and innovation as the primary driver of growth, in order to gather and inspire great confidence and power as we embark on new quests and contribute to the new era.

Planning ahead and advancing with great enthusiasm, the University has convened its 15th CPC Congress, where development and achievements over the past five years were systematically reviewed, the invaluable experience of running and governing the University in the new era comprehensively summarized, and future tasks laid out. At this new historic moment, the University shoulders paramount tasks on a challenging quest. We shall firmly remember our missions as we go ahead, reinforce the all-round leadership of the Party and promote high-quality development. Driven by innovation and inspired by reforms, we will focus on our responsibility to foster integrity and promote our students' rounded development. Moreover, we will actively support major national strategies while maintaining an open stance. Focusing on the people-centered philosophy of development, we will launch the University's 14th Five-Year Plan (2021-25), Double First-Class University Initiative and 2030 Mid-and-Long Term Strategies. We will endeavour to achieve the University's high-quality development as we advance towards joining the ranks of leading world-class universities.

Tsinghua has implemented the fundamental task of fostering virtue through education and fostered students who have all-around moral, intellectual, physical, and aesthetical grounding with a hard-working spirit. The University has been extensively promoting Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era through textbook preparation, classroom teaching, and ideological education, while formulating the comprehensive reform plan for ideological and political education so that the cornerstone of ideological and political education of the new era may be laid. The 26th Symposium on Education was held to further intensify educational reforms on the theme of "perfecting the educational-evaluation system, optimising development and organizational models and enhancing the capabilities to cultivate

high-end talent". Meanwhile, we have established Weixian College and launched a Marxism program and the "Outstanding Physician-Scientist Class" for undergraduate admission. We have also established the National Graduate College for Engineers while enhancing the scale and quality of the recruitment of students for specialized postgraduate degrees. We have driven the reform of specialized postgraduate degrees and explored new talent-cultivation models with industry leaders. As we strive to train all-around talent as the builders and successors of socialism, we have formulated plans for the introduction of physical education, aesthetic education and labour education while vigorously promoting their importance in Tsinghua. Yang Qian, an Olympic gold medallist and an undergraduate student of Tsinghua, was honoured with a China Youth May Fourth Medal last year, while Liu Dibo, a volunteer at the Beijing 2022 Winter Olympics and a Ph.D. student at Tsinghua, was named the "Most Beautiful College Student" of 2022. Moreover, for the first time, Tsinghua Student Sports Teams were champions in both men's and women's basketball games in the Chinese University Basketball Association (CUBA) league. These young men and women are shining bright in the new era. On the eve of the 100th anniversary of the founding of the Communist Youth League of China, students from Tsinghua are calling for "everyone to contribute to national rejuvenation, starting from me, starting from now," as they set their minds on serving the Party and the people.

Advancing resolutely with great confidence, we improve through reform and innovation. The University has been targeting global science frontiers, serving the main economic battlefield, striving to fulfil the significant needs of the country and benefiting people's lives and health as we actively become part of the country's new system for mobilizing the resources nationwide and continue to improve the University's innovation system. Focusing on interdisciplinarity, we have established programs in key fields such as integrated circuits, advanced materials, carbon peaking and carbon neutrality. With the objective of training compassionate, top-notch physician-scientists and academic doctors, we have re-established the frameworks and functions of our medical programs to develop a new system for medical education at Tsinghua. Meanwhile, we are advancing the construction of disciplines such as Chinese Paleography, History and Party Building of the Communist Party of China, and Discipline Inspection and Supervision. The Institute for Discipline Inspection

and Supervision, Tsinghua University (THUDIS) has been established to accomplish the academic mission of building China's independent knowledge system. Furthermore, we have implemented a comprehensive reform of our State Key Laboratories. Our State Key Laboratory of Tribology in Advanced Equipment and State Key Laboratory of Power System Operation and Control have been selected as the first batch of State Key Laboratories. Three of our laboratories have undergone restructuring, including the State Key Laboratory of Intelligent Green Vehicle and Mobility, while the building of the State Key Laboratory of Internet Architecture has been newly approved. The University boasts numerous significant achievements in academic research, and the number of its projects supported by both the National Key R&D Program of China and the National Natural Science Foundation of China has reached a record high. The Tsinghua team has made the transistor with the smallest gate length for the first time and was selected as one of the top ten domestic science and technology news stories in 2022, and Volume 12 of *the Warring States Bamboo Strips Collected by Tsinghua University* was published. Following the formulation and implementation of the "Opinions on Furthering the Core Strategy of Building an Influential University Based on Talent in the New Era", we will step up our training and recruitment of talents with a strategic mindset. We will also promote the reform of the personnel systems for our research series and professional researchers and encourage our faculty to engage in organised scientific research. We are intensifying the reform of our pilot teaching and research institutes and have formulated detailed plans for the creation of a digital campus. Seizing the opportunities of launching special investment projects, the New Civil Engineering Building, General Experiment Building and North Gymnasium have been constructed. We are also improving our resource allocation and service standards to build Tsinghua into a place where global talents have a greater sense of belonging.

Unity is strength as we fight the pandemic as one and collaborate to advance forward with great courage. The pandemic control and prevention over the past three years have been anything but ordinary, and the University has always put the health and safety of our faculty, staff and students above everything else. We remain vigilant in pandemic control and prevention, diligent in teaching and scientific research and relentless in reform and development. We regard teaching and talent cultivation as our sacred duty, learning and development as the necessary

responsibility of students and the health and safety of elderly comrades as the most important task of pandemic control and prevention. During the pandemic, particularly in 2022, our faculty, staff and students formed a succession of pandemic-fighting teams, which overcame challenges together with all Chinese people, and clinched decisive victory in pandemic control and prevention. The COVID-19 pandemic has profoundly changed the world and shown that we are a human community with a shared future. Tsinghua has always focused on major issues and joint challenges facing human beings. We have launched the Climate x Campaign, organized by the Global Alliance of Universities on Climate. We have also successfully staged the 10th World Peace Forum, the 2nd World Health Forum, the Global MOOC and Online Education Conference 2022 and the plenary sessions of the World Digital Education Conference, and co-organized the "2022 Harmony and Cooperation Civilization Forum" with the International Confucian Association. We continue to implement the 2030 Global Strategy, which has seen the opening of the Tsinghua Southeast Asia Center in Bali, Indonesia, and the University's first overseas social-practice base for students in Milan, Italy. We have proactively assumed the paramount responsibility of introducing and representing China globally. We promote academic exchanges, ideological interactions and cultural communication as we contribute our wisdom and strength to the building of a future world that is more peaceful, prosperous and tolerant.

The enormity of a task lends it greatness and glory. It is a shared dream of generations of our faculty, staff and students at Tsinghua to build a world-class university rooted in China. This historic moment is the most ideal time for Tsinghua to rapidly develop and achieve greatness. Let us rally more closely around the CPC Central Committee with Comrade Xi Jinping at its core and usher in a new era of diligent self-improvement as we advance in unity. We shall create the high-quality development of Tsinghua as a world-class university with Chinese characteristics as we advance the rejuvenation of the Chinese nation on all fronts through a Chinese path to modernization.

In this beautiful season of vibrant scenery and fine weather, we once again warmly invite our alumni to come back home and celebrate our shared festival!

## Tsinghua establishes National Graduate College for Engineers

Tsinghua University held the inaugural meeting of the National Graduate College for Engineers on April 27.

Huai Jinpeng, secretary of the CPC Leading Group of the Ministry of Education and Minister of Education, and Zhang Yuzhuo, Party secretary of the CPC Committee of the State-owned Assets Supervision and Administration Commission of the State Council (SASAC) and chairman of SASAC, delivered speeches at the meeting. Yu Jianfeng, secretary of the Leading Party Group of China National Nuclear Corporation (CNNC) and chairman of CNNC; Yuan Jie, secretary of the Leading Party Group of China Aerospace Science and Industry Corporation Limited (CASIC) and chairman of CASIC; and Zou Lei, secretary of the Party Leadership Group of China Datang Corporation Limited (CDT) and chairman of CDT delivered speeches as representatives of the governing units of the National Graduate College for Engineers. Qiu Yong, secretary of the CPC Tsinghua University

Committee, also delivered remarks. Tsinghua President Wang Xiqin delivered a welcoming speech. In attendance were: Yang Bin, vice-president of Tsinghua; Guo Yong, deputy secretary of the CPC Tsinghua University Committee; and, Nie Jianguo, director of the Academic Committee of Tsinghua University. Jiang Peixue, vice-president of Tsinghua and dean of the National Graduate College for Engineers, chaired the assembly.

Huai Jinpeng, Zhang Yuzhuo, Yu Jianfeng, Yuan Jie, Zou Lei, Qiu Yong, Wang Xiqin, and Jiang Peixue unveiled the newly established National Graduate College for Engineers at the meeting.

The creation of the National Graduate College for Engineers is Tsinghua's bid to implement the guiding principles of the 20th CPC National Congress and General Secretary Xi Jinping's series of important speeches and instructions on higher education



and talent work. It also serves the country's major strategic needs to better combine science and technology as the primary productive force, talent as the primary resource, and innovation as the primary driver of growth. The establishment of the college aims to promote the deep integration of enterprises with vocational schools and universities, cultivate high-level engineering talents with solid and broad basic theories, systematic and in-depth expertise, ability to solve complex engineering technical problems and carry out engineering and technological innovation, as well as engineering ethics and broad international vision.

Qiu said that General Secretary Xi Jinping has regarded outstanding engineers as an important part of the country's four types of strategic talents at the central conference on talent-related work. The establishment of the college is a major measure for the university to study and implement the guiding principles of the 20th CPC National Congress and the spirit of General Secretary Xi Jinping's important speech, and to promote development through hard work and responsibility during the period of thematic education campaign on studying and implementing Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era. Qiu said he hopes that the college will carry forward the fine traditions of Tsinghua's engineering education, innovate the education model, explore and form a world-class engineer training system with Chinese characteristics, cultivate a large number of top-notch innovative talents, and make new and greater contributions in accelerating to build a leading country in education, science and technology, and talent.



Yu said that CNNC will work together with Tsinghua to create benchmark projects and role model projects in implementing the workforce development strategy, and provide strong talent support for the development and construction of the country's nuclear industry.



Yuan said that CASIC will cooperate sincerely with Tsinghua to carry out high-quality special pilot work for the reform of master's and doctoral students training in engineering, cultivate talent for the Party and the country, and jointly explore a new way to cultivate outstanding world-class engineers with Chinese characteristics.



Zou said that CDT will comprehensively deepen the strategic cooperation with Tsinghua, jointly build technology platforms and cultivate scientific and technological talents, and continue to make greater contributions as a China's state-owned enterprise for the country to move faster to build world hubs for talent and innovation.



During the meeting, Zhou Jie, dean of the Graduate School of Tsinghua University and executive dean of the National Graduate College for Engineers, reported on the work of the college.



Nie, as a representative of the Tsinghua faculty, said in his speech that teachers should combine their engineering technology research to cultivate excellent engineering talents and contribute to the expansion of a large number of outstanding engineers that the country urgently needs.



Liu Gongyan, a 2022 master's student of the college, talked about his decision to join the special training for master's and doctoral talents in engineering. Liu also said that he would work hard with his classmates to grow into a new generation that is capable of shouldering the responsibility of national rejuvenation.



Representatives of 33 governing units, representatives of the graduate schools and the National Graduate College for Engineers of 11 universities including Peking University, heads of Tsinghua's functional departments, schools, and state key laboratories also attended the meeting.

## Tsinghua holds commencement ceremony for undergraduate students

The Tsinghua University Commencement Ceremony 2023 for Undergraduate Students was held on the morning of June 24.

Leaders of the University, Qiu Yong, Wang Xiqin, Yang Bin, Guo Yong, Zheng Li, Xiang Botao, Zhao Gang, Peng Gang, Zeng Rong, Jiang Peixue, Xu Qinghong, Wang Hongwei, Li Luming and Vice Provost and Director of Academic Affairs Office Liu Yi attended the ceremony. Peng Gang presided over the ceremony.

During the ceremony, 3,618 undergraduates were awarded bachelor's degrees. A further 81 undergraduate students received second bachelor's degrees, and 292 undergraduate students were awarded minor bachelor's degrees.

Secretary of the CPC Tsinghua University Committee Qiu Yong announced the decision to commend the outstanding classes and excellent graduates, and expressed his expectations and well-wishes to the students. "Dear students, today you are about to turn over a new page in your life, embarking on a new journey of glorious and dreamful youth," Qiu Yong said.



He added that he hopes that the undergraduates will have lofty aspirations, love the country and contribute to it, pursue excellence, firmly listen to and follow the Party, firmly serve the motherland and the people, and strive to grow into talents who can be relied upon and take on heavy responsibilities.





Wang Xiqin, Tsinghua President and Chairman of the Academic Degrees Evaluation Committee, delivered a speech titled "Being Sensitive to Emotions and Making Good Use of Reason". On behalf of the university, he extended his warm congratulations to the graduates who have successfully completed their studies at the undergraduate level, and their families and friends. He also expressed sincere gratitude to the teachers for their dedicated guidance and mentorship.

Wang Xiqin said that the college years of the graduating class of 2023 were quite special. Everyone experienced important milestones such as the 70th anniversary of the founding of the People's Republic of China and the 100th anniversary of the Communist Party of China. The unprecedented great changes and a once-in-a-century pandemic intertwined and overlapped, and new technologies such as artificial intelligence and quantum information accelerated breakthroughs, making the world full of uncertainty. The world calls for reason and order. Combining the dialectical relationship between emotions and rationality, Wang hopes that students will learn to be sensitive to emotions, make good use of reason, and handle their relationships with themselves, others and nature.

Wang also noted that logic is the foundation of clarity. Rationality based on logic is the filter, stabilizer, and transformer of emotions, which enables people to discover positive factors in negative emotions and transform them into the driving force for recovery, ultimately reaching a state of clarity. He hopes that students can master the thinking method of seeking truth from facts, use rationality to balance emotions,

reconcile with emotions, analyze themselves more thoroughly, understand themselves more clearly, accurately grasp their own strengths, recognize their own shortcomings with composure, avoid feelings of inferiority and anxiety, and steer clear of arrogance and paranoia, always maintaining a strong will and a high spirit.

Wang Xiqin emphasized that benefiting others is the source of happiness. To dissolve the negative emotions caused by excessive focus on personal interests, one must step out of the "benefiting self" mindset and make good use of the great wisdom of "benefiting others". Furthermore, one must unify personal interests with the fundamental interests of the broadest people and pursue greater happiness. He inspired the graduates with the life story of Zhao Jiahe, the "charcoal professor" at Tsinghua University, urging them to uphold the supremacy of the people, hold "the top priorities of the country" in their hearts, take one step forward in the face of responsibility, step back in the face of interests, and shine with youth in the cause of serving the country and the people.

Wang Xiqin said that life is the mother of meaning. Life is a miracle of nature and life itself has meaning. Despite the development of human science and technology, we have yet to discover any extraterrestrial life. Cherishing and caring for the earth, respecting and treating life is the rational choice of humanity. He hopes that the graduates will uphold the supremacy of life, revere the greatness of life, respect the laws of nature, establish a sense of community of life for humanity and nature, expand the scope of life and achieve greater meaning in life.

"You are the first batch of Tsinghua undergraduates after the 20th National Congress of the Communist Party of China, born at the right time and bearing heavy responsibilities," he said. Wang expressed his hope that the undergraduates would be sensitive to emotions, make good use of rationality, and devote themselves to the active pursuit of building a socialist modern country with firm confidence, full enthusiasm, and a proactive attitude, and achieve a wonderful life in the magnificent journey of advancing the great rejuvenation of the Chinese nation on all fronts through a Chinese path to modernization.



Alumna Wang Jin, who graduated from the Tsinghua School of Materials Science and Engineering and chief scientist of ENER Flow company, said that one must remember where they came from in order to know where they are going. She hoped that everyone would remember the University motto of "Self-discipline and Social Commitment," integrate oneself into the greater good of the country, and take on the responsibility of building a strong nation and national rejuvenation."

Zheng Mingyu from Tsinghua Qiuzhen College, as the representative of undergraduate graduates, gave a speech titled "Surging Forward Like a River". He expressed that his understanding of the beauty of mathematics deepened during his time as a Tsinghua student. The beauty of mathematics contains the pursuit of serving the country with science and technology and the expectation of national rejuvenation, as well as the romance of pursuing world-class success and the longing to lead the world trend. "After four years at Tsinghua, we have definitely become the freshwater of the river, surging and tumbling on our own life paths, becoming the splendid waves in the tide of the national rejuvenation era!" said Zheng Mingyu.

Following the conclusion of the ceremony, University leaders proceeded to the Gymnasium to continue with the degree-awarding ceremony. The graduation ceremony was broadcast live in both Chinese and English on the "Rain Classroom" platform, enabling graduates who were not physically present on campus and their family members to attend online.





## Tsinghua holds commencement ceremony for graduate students



The Commencement Ceremony 2023 for Graduate Students of Tsinghua University was held on June 25. Leaders of the University, Qiu Yong, Wang Xiqin, Yang Bin, Guo Yong, Zheng Li, Xiang Botao, Zhao Gang, Peng Gang, Zeng Rong, Jiang Peixue, Xu Qinghong, Wang Hongwei, Li Luming, Wang Chen, president of Chinese Academy of Medical Sciences & Peking Union Medical College, Huang Yidong, vice chairman of the Academic Committee of Tsinghua, and Liang Junjian, director of Graduate Affairs Office of the CPC Tsinghua University Committee attended the ceremony. Peng Gang presided over the ceremony.

Secretary of the CPC Tsinghua University Committee Qiu Yong announced the decision to commend outstanding doctoral and master's graduates, and expressed congratulations to the graduates who have been recognized. He hoped the graduates maintain firm ideals and convictions, adopt a strong and pragmatic work ethic, be determined to innovate and create, adhere to the notion that, "it starts with me, it starts from now", and strive to shine and make a difference wherever the Party and the people need them.

Wang Xiqin, Tsinghua president and chairman of the Academic Degrees Evaluation Committee, delivered a speech titled, "With Long-term Aspirations and a Firm Grasp of a Visionary Blueprint". On behalf of the University, he warmly congratulated the students on the successful completion of their studies at the graduate level and embarking on a new chapter in their lives. He expressed heartfelt gratitude to the tutors and family members who have worked diligently to cultivate, care and support the graduates, and all the students, faculty, and staff who have devoted themselves to supporting and guiding the

graduates. After reflecting upon the exceptional past few years, Wang remarked, "You are the inaugural cohort of graduates from Tsinghua University who have dispersed throughout the country after the 20th National Congress of the Communist Party of China. You will represent the vanguard for China to realize its Second Centenary Goal." He hopes that they would integrate their personal aspirations into the grand blueprint of the cause of socialism with Chinese characteristics, and aspire to become more proud, confident, and assured in their identity as Chinese people. He also encouraged them to utilize their youthfulness to create a youthful country, a youthful nation, and a youthful future.

"Nation and country should be put at the top priorities in life for it is the mark of core aspiration," Wang stated, emphasizing that one's aspirations determine the height and direction of their life. Liang Qichao, one of the "Four Tutors" at the Tsinghua Academy of Chinese Learning, carried a lifelong dedication to the country and faced numerous setbacks. However, his aspirations remained unwavering. At the age of 29, he pioneered the concept of the "Chinese nation", which became the driving force behind the rejuvenation of the Chinese people. Tsinghua people should uphold the spirit of "patriotism, dedication, and pursuit of excellence," align their thoughts with the aspirations of the nation and the needs of the people, and take it upon themselves to contribute to the great rejuvenation of the Chinese nation. He encourages them to strive for outstanding achievements that serve the country and benefit the people.

"Guiding principles should serve as the curbs along our life's path, for they shape our strength

of character," Wang pointed out. The countless hardships and tribulations that the Chinese nation has experienced throughout its over 5,000 years of history have further strengthened the indomitable spirit of the Chinese people. Drawing on the example of Tsinghua alumnus and recipient of the August 1st Medal, Academician Ma Weiming, who has led a team in producing revolutionary original achievements and spearheading groundbreaking technological advancements, he expressed, "One should not be arrogant, but one must possess a resolute spirit." He hopes that Tsinghua people should hold principles as their curbs, staying true to their original aspirations and essence. By maintaining their mettle regardless of the hardships and dangers they face, they can turn every "impossible" into a "definite possibility," using their tenacity and hard work to open new horizons for their professional development.

"The journey of life should be built upon confidence, for it provides us with a solid foundation," emphasized Wang. The splendid Chinese civilization serves as a powerful source of confidence for realizing the Chinese Dream of the great rejuvenation of the Chinese nation. Collectives are an important source of confidence and strength for individuals, while personal confidence also stems from honing practical skills through rooted practice. Tsinghua people should draw wisdom and strength from the profound cultural heritage of the Chinese nation. Through the joint efforts and companionship of mentors, friends, and peers, they should ignite the spirit of striving. By engaging in true learning and practical work, they can cultivate their own expertise. In doing so, their lives will blossom like magnificent flowers within the great cause of building China into a modern socialist country in all respects.

"Youth with lofty ideals and unwavering beliefs provide an unstoppable driving force for a country and a nation." Wang hopes that students will uphold the University motto of "Self-discipline and Social Commitment" and embody the University spirit of "Actions Speak Louder Than Words". With long-term aspirations and a firm grasp of a visionary blueprint, they should contribute to the historic process of advancing the great rejuvenation of the Chinese nation on all fronts through a Chinese path to modernization. In doing so, they will write a magnificent chapter that is worthy of the motherland, the times and the youth.

Alumnus Yang Chunbao who graduated from the Tsinghua Department of Precision Instrument and chief scientist of BeiDou Navigation Satellite System reflected on his 18 years of work, continuously



pursuing excellence and making relentless efforts to achieve self-reliance and technological advancement. He advised students to actively adapt to different roles and strive for personal growth and excellence in their future work endeavors. He also encouraged them to abandon narrow-minded tactics and embrace broader wisdom on their life journey.



Lu Zhi from the Tsinghua Department of Automation, as the representative of graduate students, said that Tsinghua people aspire to conduct the most original and interdisciplinary research, and strive to overcome critical challenges that hinder national progress, be patriotic and dedicated, and set examples for others. He emphasized that in the journey of life, there will be bright and sunny days as well as moments of adversity. However, by following the guiding light, one can remain undeterred by temporary obstacles and march forward with unwavering determination.



The commencement ceremony was livestreamed in both Chinese and English on "Rain Classroom", allowing graduating students and their families who were not able to join the ceremony in person to attend online.



# GLOBAL ENGAGEMENT

## International Communication Association China Chapter established at Tsinghua University



On March 28th, 2023, the International Communication Association (ICA) China Chapter was established at Tsinghua University.

ICA President Noshir S. Contractor stated that the association has been committed to internationalization since the 1970s. Today, the association has over 6,800 members in 87 countries. Contractor emphasized that the establishment of the ICA China Chapter will contribute to advancing

academic research and global collaborations in communication.

Zhou Qing'an, the Dean of the School of Journalism and Communication of Tsinghua University, highlighted that the establishment of the ICA China Chapter can help promote Chinese universities' collaboration and interaction with the international academic community and contribute to the development of communication research worldwide.





Chen Changfeng, Professor at the School of Journalism and Communication of Tsinghua University and the President of the Asian-Pacific Communication Alliance (APCA), emphasized that the founding members of the ICA China Chapter from the top universities in China will successfully lead the future development of journalism and communication research in China. She hopes that ICA's new local chapter mechanism can contribute to collaborations

with regional associations such as the APCA and enhance regional academic exchanges.

Noshir S. Contractor, the President of the ICA, and Zhu Mengxiao, the 2023 Chair of the ICA China Chapter, jointly signed the certificate of the establishment of the ICA China Chapter, announcing its official establishment.

The ICA China Chapter is the third local chapter of the International Communication Association (ICA) in the world. The founding universities of the ICA China Chapter include Tsinghua University, Peking University, Renmin University of China, Zhejiang University, Fudan University, Shanghai Jiao Tong University, and the University of Science and Technology of China. The Chapter aims to contribute to the internationalization of the academic community of communication studies and provide a platform for Chinese communication scholars to participate in international academic exchanges.



## Malaysian PM delivers speech at Tsinghua University



Qiu Yong (R), chairman of Tsinghua University Council, holds a meeting with Malaysia's Prime Minister Datuk Seri Anwar Ibrahim.

Malaysia's Prime Minister Datuk Seri Anwar Ibrahim visited Tsinghua University on March 31. He was warmly welcomed by Qiu Yong, secretary of the CPC Tsinghua University Committee and chairman of Tsinghua University Council. Anwar addressed the Tsinghua audience with a keynote speech themed "The Asian Century: Peace and Prosperity Connecting the Continent and Beyond".

Qiu, on behalf of Tsinghua University, warmly welcomed Anwar and provided a comprehensive overview of Tsinghua's history and development, discipline construction, talent cultivation philosophy, global strategies, as well as the progress made in innovative international cooperation initiatives such as the Tsinghua Southeast Asia Center and Asian Universities Alliance. Qiu also reflected on the fruitful cooperation between Tsinghua University and Malaysia, emphasizing the university's strong commitment to international collaboration and its aspirations to attract more outstanding young talents and top scholars from around the world. Additionally, he expressed Tsinghua's desire to further deepen cooperation and exchanges with Malaysian universities and research institutions in various fields.

Anwar expressed his recognition of Tsinghua University's distinguished reputation of excellence in the world. Given Malaysia's strong emphasis on university education, he expressed a keen interest in further promoting cooperation between Malaysian universities, research institutions, and Tsinghua University in areas such as education, technological innovation, and other related fields.

Zeng Rong and Wang Hongwei, vice presidents of Tsinghua University, together with Li Jinliang, dean of Tsinghua's Office of International Affairs, Kehkooi Kee, a Malaysian professor at Tsinghua's School of Medicine, and Chinese Ambassador to Malaysia Ouyang Yujing attended the meeting.

Following the meeting, Anwar delivered a keynote speech hosted by Wang.

During his opening remarks, Qiu highlighted that Anwar is the first foreign Head of Government to visit Tsinghua University since the COVID-19 pandemic. He also emphasized that this year marks the 10th anniversary of the establishment of the China-Malaysia comprehensive strategic partnership. Malaysia is one of the first countries to respond to



Qiu Yong, secretary of the CPC Tsinghua University Committee and chairman of Tsinghua University Council, makes a welcome speech.

the "Belt and Road Initiative" and has a long history of keeping frequent cultural and people-to-people exchanges with China.

Qiu Yong also said that Tsinghua University has maintained long-term friendships with Malaysian universities and institutions. The University of Malaya, the Prime Minister's Alma Mater, is one of the founding members of the Asian Universities Alliance initiated by Tsinghua University, and has been actively participating in various activities. A large number of outstanding Malaysian students studying in Tsinghua are the envoy for friendship between our two countries.

Qiu said that Tsinghua formulated and implemented the Global Strategy 2030, in which Tsinghua put great emphasis on global engagement. By actively promoting the plan for greater connectivity with neighboring countries, the university will enhance exchanges and cooperation with our partners in Malaysia in areas of education, research, personnel training, innovation and so on. Moreover, Tsinghua will actively build joint programs that accelerate exchanges and mutual learning among the young generations.

Qiu believes that with the support of Anwar, Tsinghua University, together with our Malaysian partners, will continue to promote educational collaborations, consolidate the foundation of cultural exchanges, facilitate the smooth advancement of the "Belt and Road Initiative", and make further contributions to building a community with a shared future for mankind.

In his speech, Anwar praised Tsinghua as one of the most prestigious higher education institutes in the world in research in science and technology, as well as its programs in humanities, environment, climate, public administration, and civilization.



Malaysia's Prime Minister Datuk Seri Anwar Ibrahim speaks at Tsinghua University.

"I am proud as an Asian and as a friend of China to believe in good neighborhood, to believe in the Asian century, to believe in working together with various initiatives such as the Belt and Road Initiative, and also beyond just economic fundamentals but also civilization to associate it with a university that has proven that we in China and in Asia can excel if we are focused on research and discipline in the academic fields," said Anwar.

Anwar pointed out that China's road to democracy and development demonstrated that while it prioritizes economic development, it also places significant emphasis on education, healthcare, infrastructure, and culture. He also noted that it is truly remarkable that China has made historic strides in poverty alleviation, a feat that has garnered worldwide attention. In addition, he praised China's efforts in tackling climate change. "China has taken up these bold measures, far better than many countries in Europe," said Anwar.



A Tsinghua student poses questions to Malaysia's Prime Minister Datuk Seri Anwar Ibrahim.



Wang Hongwei, vice-president of Tsinghua University, hosts the event.

He also stressed the historical and cultural ties between Malaysia and China. He stated that collaboration with Tsinghua and all the universities of Malaysia will be further strengthened and enhanced.

Following the speech, Anwar fielded several questions from Tsinghua students. The questions centered on topics such as the future of education in Malaysia, the Malaysian government's efforts to strengthen cultural and academic exchanges with China, and ways in which young people from both nations can contribute to future exchanges.



Malaysia's Prime Minister Datuk Seri Anwar Ibrahim meets Malaysian students studying in Tsinghua.

During the visit, Anwar also had a friendly exchange with Malaysian student representatives studying in Tsinghua.

Anwar assumed office as the 10th Prime Minister of Malaysia in 2022.

Tsinghua University has established a strong partnership with Malaysian universities and research institutions, having previously signed cooperation memorandums and student exchange agreements with the University of Malaya, as well as a cooperation memorandum with Tunku Abdul Rahman University College.



Malaysia's Prime Minister Datuk Seri Anwar Ibrahim and Qiu Yong, chairman of Tsinghua University Council, pose for a group photo with Malaysian students and scholars currently studying at Tsinghua University.

## The 3rd Latin American and Caribbean Ambassadors Convention held at Tsinghua University

On April 28, Latin American and Caribbean ambassadors to China convened at the Jianhua Building of the School of Economics and Management at Tsinghua University to explore the theme "High-Quality Development and Chinese Path to Modernization". More than 30 diplomatic envoys and representatives from the embassies and institutions of 20 Latin American and Caribbean countries attended the event. President of Tsinghua University Wang Xiqin, Head of the Mission from Latin America and the Caribbean and Ambassador of Uruguay to China H.E. Fernando Lugris, and former Chinese ambassador to Peru H.E. Liang Yu delivered opening speeches. Vice President of Tsinghua University Wang Hongwei delivered the closing remarks. Dean of International Affairs of Tsinghua University Li Jinliang, and Director of the Latin America Center Chen Taotao, jointly hosted the event.

He mentioned that Tsinghua University values the importance of cooperation with global trusted partners, and its long-standing friendship with embassies and institutions of Latin American and the Caribbean (LAC) countries is an exceptional example. He emphasized that China and LAC countries should jointly promote peace and development to build a community with a shared future for mankind as global efforts toward economic and social advancement are facing significant challenges amid the major changes occurring worldwide.



Wang Xiqin extended welcome and thanks to the guests. He said in his speech that Tsinghua University is seeking an approach to better integrate three fundamental and strategic factors for high-quality development, which are science and technology as the primary productivity, talent as the primary resource, and innovation as the primary driving force. Tsinghua is actively exploring a talent cultivation model that takes root in China and integrates Chinese and foreign characteristics, strengthening team science, and further promoting the integration of production, education, and scientific research.



Fernando Lugris highlighted the significance of understanding what high-quality development means and its impact on enhancing the China-LAC comprehensive cooperative partnership. He said this year witnesses the 3rd Latin American and Caribbean Ambassadors convention at Tsinghua University and we need to continue this good tradition. He expressed a desire to further explore collaboration models between Chinese and LAC universities to enhance mutual learning and progress.



Liang Yu said in his speech that China firmly supports Latin American and Caribbean countries in exploring modernization paths that suit their national conditions, and will take the Belt and Road Initiative and the Global Development Initiative as platforms to strengthen cooperation with Latin American and Caribbean countries in infrastructure, digital economy, electric vehicles, artificial intelligence, 5G, smart cities and other fields.



Bai Chong'en, Dean of the School of Economics and Management of Tsinghua University, delivered a report entitled "High-Quality Development and Chinese Modernization" in the keynote speech and roundtable discussion. During the round table discussion, ambassadors and diplomatic envoys from Ecuador, Mexico, Suriname, Barbados, Uruguay, Brazil, Jamaica, El Salvador and other countries had positive exchanges with Bai and had a detailed discussion on how Latin American and Caribbean countries can learn from China's development experience.

In the meeting, He Ping and Xu Xin, deputy deans of the School of Economics and Management of Tsinghua University, introduced the basic information about this school and conveyed their aspirations to establish more partnerships with LAC universities.



Ambassadors present at the meeting agreed that the event was very meaningful and enhanced their understanding of Chinese modernization. They hoped that China's experience will be better shared by Latin American and Caribbean countries and provide new impetus to local development. The ambassadors highly appreciated China's peaceful development strategy and multi-polar world proposition, expressed gratitude to China for its continued dedication and commitment to sustainable development, and looked forward to strengthening cooperation with China and learning from each other. At the same time, the ambassadors and envoys also expressed their sincere wishes to have more exchanges and cooperation with Tsinghua University in various aspects.



Finally, Wang Hongwei, vice president of Tsinghua University, declared the event closed successfully. He expressed appreciation to all the diplomatic representatives for their support and participation. He said China and LAC countries work closely together and have increasingly friendly relations. Universities are also an important part of this. He believes that this event will promote more pragmatic cooperation between the two sides on such important issues concerning our shared future as economic development, youth global competency, artificial intelligence and online education.



The representatives who attended the event include Fernando Lugris, Uruguay' Ambassador to China, Carlos Humberto Larrea Davila, Ecuador' Ambassador to China, Leonardo KAM, Panama's Ambassador to China, Anyin Choo, Guyana's Ambassador to China and Hallam Henry, Barbados' Ambassador to China, Jesus Seade, Mexico's Ambassador to China, Mauricio Hurtado, Chile's Ambassador to China, Pick Fung Ho-Chong, Ambassador of the Republic of Suriname to China, Sergio Cabrera, Colombian Ambassador to China, Jamaica Charge d 'Affaires Melissa Price Pryce, Grenada Charge D 'Affaires Tricia D. Bethel and

representatives from Venezuela, El Salvador, Dominica, Brazil, Cuba, Trinidad and Tobago, Argentina, Peru, Bahamas and other countries.

The event was hosted by Tsinghua University and organized by the Office of International Affairs of Tsinghua University, School of Economics and Management of Tsinghua University, Institute for Global Development of Tsinghua University and Latin America Center of Tsinghua University. Nearly 100 faculty and students from the University participated in the event.

## 2023 Carbon Neutrality & Design Innovation Forum Held

The "2023 Carbon Neutrality and Design Innovation Forum" co-hosted by Tsinghua University and Politecnico di Milano (Polimi), co-sponsored by China-Italy Design Innovation Hub, Climate Change and Sustainable Development Institute and Future Laboratory of Tsinghua University, was held on May 26 in Milan. Yang Bin, Vice President of Tsinghua University; Giuliano Noci, Vice-Rector for China, Politecnico di Milano; Corrado Clini, Former Minister,

the Italian Ministry for the Environment, Land and Sea; Yao Liangjun, Science and Education Counselor, Consulate-General of the People's Republic of China in Milano; Arianna Censi, Mobility Councilor, Municipality of Milan; Maria Rosa Azzolina, President of the Italian Institute of Chinese, and other distinguished guests attended the forum. More than 100 students and teachers from Tsinghua University and Polimi participated in the event.



Yang Bin addresses the forum

Yang Bin said that in the context of the current global crisis, innovation cooperation is the key to achieving a sustainable future. China and Italy have a long history of cooperation, and it is of landmark strategic significance for the two countries to strengthen cooperation in the field of addressing climate change. The two countries share a common vision for a sustainable future and have made unremitting efforts to set an example for the significance of global cooperation in addressing climate change by working together, leveraging strengths, and exploring groundbreaking research and innovative solutions. Yang emphasized that addressing climate change calls for unwavering commitment, dedication and global solidarity, with the hope that Politecnico di Milano and Tsinghua University will continue to build a bridge for cooperation, foster a partnership that transcends national boundaries and ideologies, open up new paths, expand new boundaries, and create a sustainable future for generations.



Giuliano Noci addresses the forum

Giuliano Noci said that through determined efforts made by Tsinghua University and Politecnico di Milano, the development of the cooperation platform

of the two sides has been consistently promoted. The two sides have made their visions increasingly clear and succeeded in shaping the past. He believed that the initiative on carbon neutrality and the activities with a variety of themes conducted on the platform have played an inspiring role, and expressed the hope that the two sides will continue to exert creativity with persistent and dedicated efforts.



Yao Liangjun addresses the forum

Yao Liangjun said both China and Italy are ancient civilizations with a long history of bilateral exchanges, which have strongly promoted the exchanges and integration of Eastern and Western civilizations, as well as the continuous progress of all mankind. Yao emphasized that China-Italy cooperation in the field of environment and sustainable development has been recognized in the industries of the two countries and aroused attention from the international community, becoming a model of bilateral cooperation in addressing climate change. The Chinese Consulate General in Milan will continue to support bilateral cooperation and exchanges in the fields of technology, education and culture, and expect more fruitful results.



Corrado Clini addresses the forum

Corrado Colini said the construction of building design models of sustainable ecosystems demonstrates the power that environmental cooperation drives economic development and international peace. Both China and Europe have actively explored the energy performance of green buildings and the fields of sustainable development, and strived to examine the future of the economy within the framework of eco-design. He also stressed the significance of addressing the challenge of decarbonization for global governance.



Arianna Censi addresses the forum

Arianna Censi delivered a keynote speech on Milan's Sustainable Urban Mobility Plan, highlighting transport ecosystems as one of the key ways to transform urban development. Milan aims to protect pedestrians' rights to bicycles and other new modes of transport by reducing the number of cars and improving the public transport system, innovating the development of sustainable urban mobility and promoting the change of the ways in which citizens act by creating a transport service platform.

focusing on olfactory computing and its application in environmental protection. Xu explored the application scenarios and theoretical prospects of odor calculation, analysis and collection. Upon the analysis of the basis and progress of monitoring technologies towards air pollution, vehicle exhaust and foul-smelling pollutants, Xu said that the monitoring of greenhouse gases is crucial to understanding and addressing climate change, and more attention and research is needed.



Rajendra Singh Adhikari addresses the forum

Rajendra Singh Adhikari, Professor of Politecnico di Milano, delivered a keynote speech on sustainable architecture. At the level of current technology, the challenge of zero-carbon architecture does not originate from the design of new buildings, but from how to make interventions in terms of urban building stock. Within the framework of addressing climate change, energy consumption needs to be minimized for sustainable buildings. He gave an introduction to relevant intelligent technology systems and relevant case studies.



Xu Yingqing addresses the forum

Xu Yingqing, Director of the Future Laboratory of Tsinghua University, delivered a keynote speech



Wang Xuan addresses the forum

Wang Xuan, Responsible Person ESG & SD of Lenovo Group, Secretary General of ESG & Social Value

Committee of Lenovo China Site, introduced Lenovo's efforts in sustainable development. As the first high-tech manufacturing company in China to pass the net-zero target validated by the Science Based Targets Initiative (SBTi), Lenovo is committed to achieving net-zero greenhouse gas emissions by 2050, and regards ESG as the strategic focus and core competitiveness of the company's global development layout. Wang shared some of Lenovo's practices and innovations in technology-driven carbon neutrality from the perspectives of green technologies such as warm water-cooling technology, green manufacturing, green supply chain, green solutions such as carbon-neutral buildings, ESG digital capability, and "new IT" to help biodiversity conservation. She said that Lenovo will continue to promote low-carbon transformation through the development of green innovative technologies and strive to mitigate climate change and achieve carbon neutrality.



Elena Dimichino addresses the forum

Elena Dimichino, Head of Corporate Social Responsibility, EssilorLuxottica Group, introduced the company's first sustainability plan covering various aspects including sustainability, environment and marketing. Dimichino added that carbon footprint has been actively reduced through Essilor Luxottica's vast global distribution network; risk assessment on climate resilience has been strengthened; investment has been increased in sustainable design; and all staff are mobilized to update their work on sustainability through digital platforms.



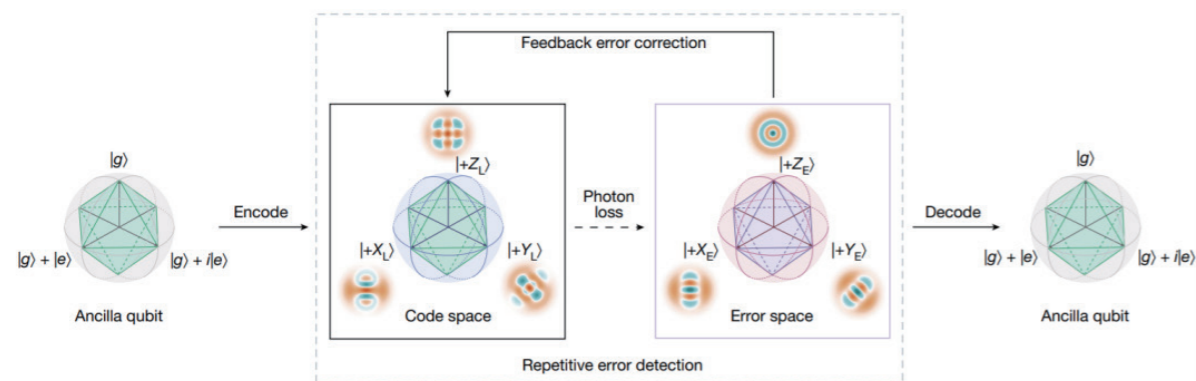
Zhang Jian addresses the forum

Zhang Jian, Deputy Dean, Institute of Climate Change and Sustainable Development, moderated the forum. Zhang said that the forum provides new knowledge for all parties to jointly promote reforms, facilitates sustainable design practices, and contributes to the future of carbon neutrality.



# SCIENTIFIC INNOVATION

## Beating the break-even point of quantum error correction



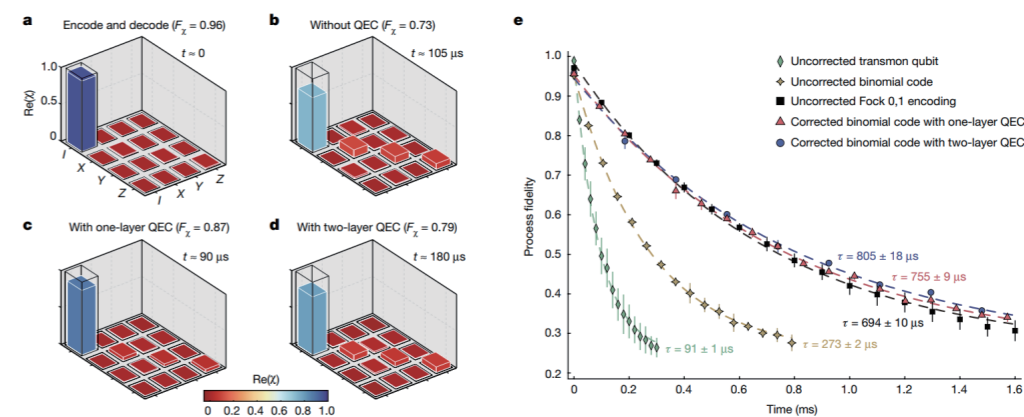
The quantum error correction protocol.

A joint research team from Southern University of Science and Technology of China, Tsinghua University, Fuzhou University, University of Science and Technology of China, and Beijing Academy of Quantum Information Sciences demonstrates a breakthrough QEC experiment, where the break-even point for a discrete-variable qubit is beaten by repetitive error detections and corrections in real-time. This work is recently published online in Nature (s41586-023-05784-4) titled "Beating the break-even point with a discrete-variable-encoded logical qubit".

In the past few decades, tremendous progress in superconducting quantum computing has been made: both coherence times and the number of qubits integrated on a chip have been significantly improved, and quantum advantage has been realized experimentally. However, the demonstration of large-scale superconducting quantum circuits is still facing the major obstacle of decoherence. Quantum error correction (QEC), believed to be able to fight against

decoherence, is thus vital for realizing universal and reliable quantum computers.

As a significant milestone, demonstrating the QEC advantage of extending the lifetime of the protected quantum information over the best available physical component, i.e., beyond the break-even point, is extremely desirable. To achieve this goal, a logical qubit is binomially encoded in photon-number states of a microwave cavity and dispersively coupled to an ancilla superconducting qubit. Such a logical qubit can correct single photon losses, the dominant error channel of this system. This QEC scheme benefits from the infinite-dimensional Hilbert space of the cavity for redundant information encoding without increasing the number of error channels, thus greatly reducing the hardware requirement. By using a fast real-time feedback control technique, the joint team demonstrates the exceeding of the break-even point of QEC by about 16%, representing a key step towards scalable quantum computing.

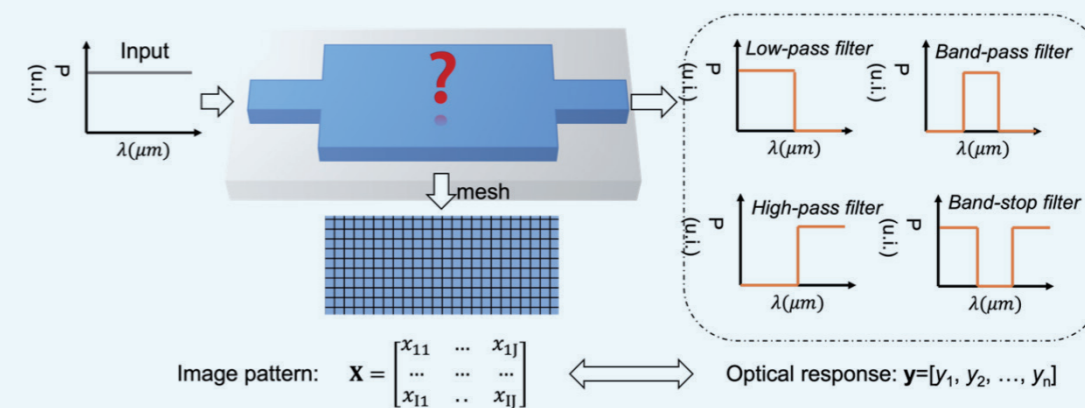


Quantum error correction results show the beating of break-even point.

## Progress in the multi-task inverse design of photonic devices

Silicon photonics technology enables the development of compact, multifunctional, and mass-produced integrated photonic devices. However, the design of high-performance free-form optical devices remains a challenge due to the complex light-matter interactions involved and the significant time required for electromagnetic simulation. This challenge becomes even more pronounced when designing multiple silicon photonics devices, often requiring lengthy iterative optimization. Solving the problem of inverse design for large-scale silicon photonics devices has significant research value and industrial implications for design and production.

Recently, a research group led by Associate Professor Hongyan FU from Tsinghua-Berkeley Shenzhen Institute (TBSI), Tsinghua Shenzhen International Graduate School (Tsinghua SIGS) has developed a fully automated inverse design method for large-scale multi-task silicon-based photonic devices. This method is a topological optimization method based on low-dimensional Fourier frequency domain and deep neural networks, which can quickly train deep neural networks for device design while effectively controlling the minimum feature size of the inverse-designed components, without requiring any preprepared datasets.

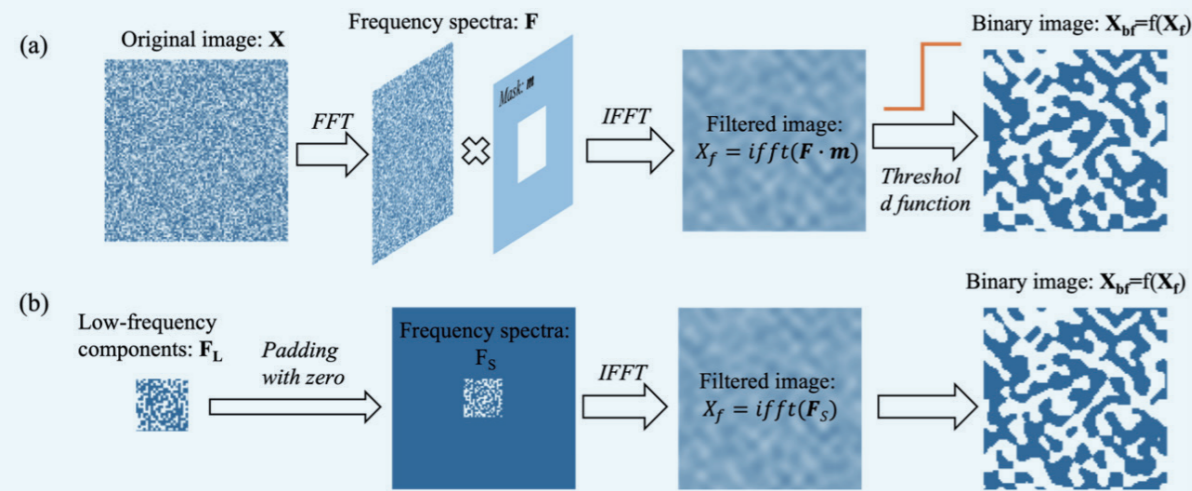


Schematic of wavelength filters on SOI platform



Inverse design is the process of pixelating the entire design area and determining the specific structure of the device through a goal-oriented optimization method. Considering the device processing requirements, isolated pixels and narrow gaps cannot be processed. Therefore, it is necessary to smooth the edge of the structure to meet the processing needs, which also makes some design degrees of

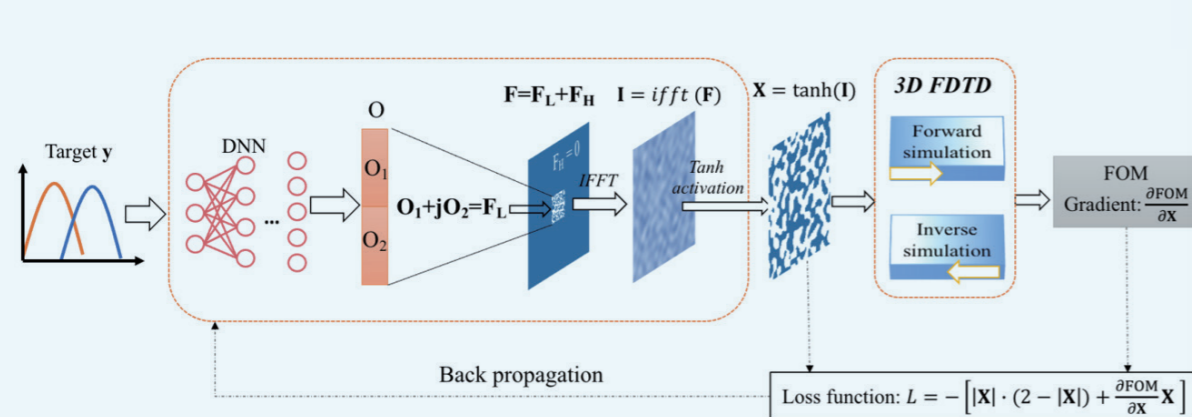
freedom redundant. The Fourier low-frequency signal corresponds to the main structure of the device, while the Fourier high-frequency signal represents noise and rapidly changing information in the image. By using only the low-frequency Fourier component, the redundant design degrees of freedom can be reduced while controlling the minimum size of the device during the reconstruction of the time-domain image structure.



Minimal feature size control methods

To achieve a multi-task device optimization design, the research team mapped the design objective to low-frequency Fourier components through a deep generative neural network. These components can be restored to the specific structure of the device graph by Fourier inverse transformation after high-

frequency padding. The generated device structure is then simulated by electromagnetic simulation software to obtain the actual optical response, and the difference between the simulated response and the target optical response can be used to train the generative neural network.



Schematic of the proposed DNN-assisted topology optimization in Fourier domain for multi-task optimization

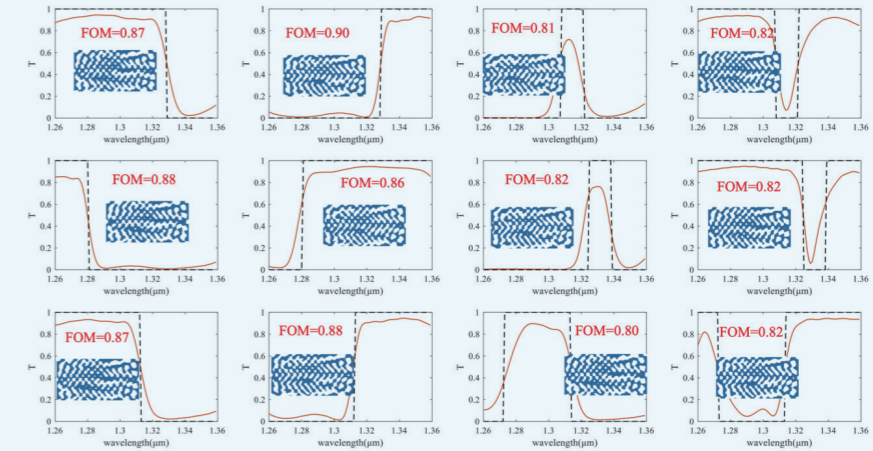
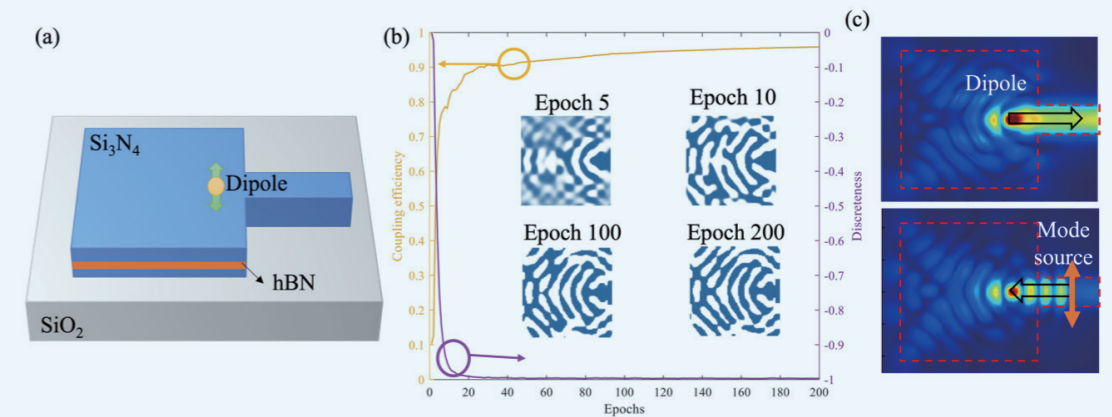


Illustration of 12 randomly generated wavelength filters and their corresponding spectra.

The trained neural network can be used to directly generate multiple optical devices without the need for additional optimization and simulation time. Researchers used the above-trained network for the design of optical filters. It designed 400 optical filters with high-performance metrics within less than 1 second.

This method is almost a fully automatic multi-task optimization method, which can be easily used for the design of other free-form devices. Researchers also used this method to design an integrated single-photon source, and the efficiency of the designed integrated light source can reach over 90%. This multi-task optimization method greatly reduces the time and resources required for multi-device design, making it possible for rapid inverse design of large-scale devices in the future.

The relevant research results were recently published with the title "Multi-task topology optimization of photonic devices in low-dimensional Fourier domain via deep learning" in the journal Nanophotonics. The first author of the paper is Simei MAO, a Ph.D. student from TBSI, and the corresponding author is Associate Professor Hongyan FU from TBSI. Other authors of the paper include Lirong CHENG, a Ph.D. student from TBSI, Houyu CHEN, a master's student from TBSI, Xuanyi LIU, a Ph.D. student from TBSI, and Associate Professor Qian LI from Peking University Shenzhen Graduate School. This work was supported by the Guangdong Basic and Applied Basic Research Foundation and the Science, Technology and Innovation Commission of Shenzhen Municipality.



Optimization of single photon emission

## Research groups of Sen-Fang Sui and Hong-Wei Wang from Tsinghua School of Life Sciences and Xinzheng Zhang from the Institute of Biophysics, Chinese Academy of Sciences, collaborated to achieve a milestone research result in the field of photosynthesis

Phycobilisomes (PBSs), the largest light-harvesting complexes (LHCs) known so far, are the major light-harvesting antennae in cyanobacteria and red algae. They are located on the matrix side of the thylakoid membrane and efficiently transfer the captured sunlight to the photosystems II and I (PSII and PSI) to induce the conversion of light energy into chemical energy, a process called photosynthesis. While many photosynthetic protein complex structures have been determined through in vitro purification, their natural interactions and energy transfer pathways within cells remain unclear.

The research group led by Sen-Fang Sui from the School of Life Sciences at Tsinghua University

has been dedicated to exploring the structure of phycobilisomes. In 2017, the team published an article in *Nature*, reporting the first structure of the complete phycobilisomes from the red alga *Griffithsia Pacifica* at a resolution of 3.5 Å via the use of cryo-electron microscopy. This discovery revealed the complex and refined assembly mechanism of phycobilisomes. Furthermore, the team published another article in *Nature* in 2020, reporting the structure of phycobilisomes from the red alga *Porphyridium purpureum* with a higher resolution of 2.8 Å, which uncovered the energy transfer mechanism within phycobilisomes. This achievement is considered a significant breakthrough in the field of photosynthesis.

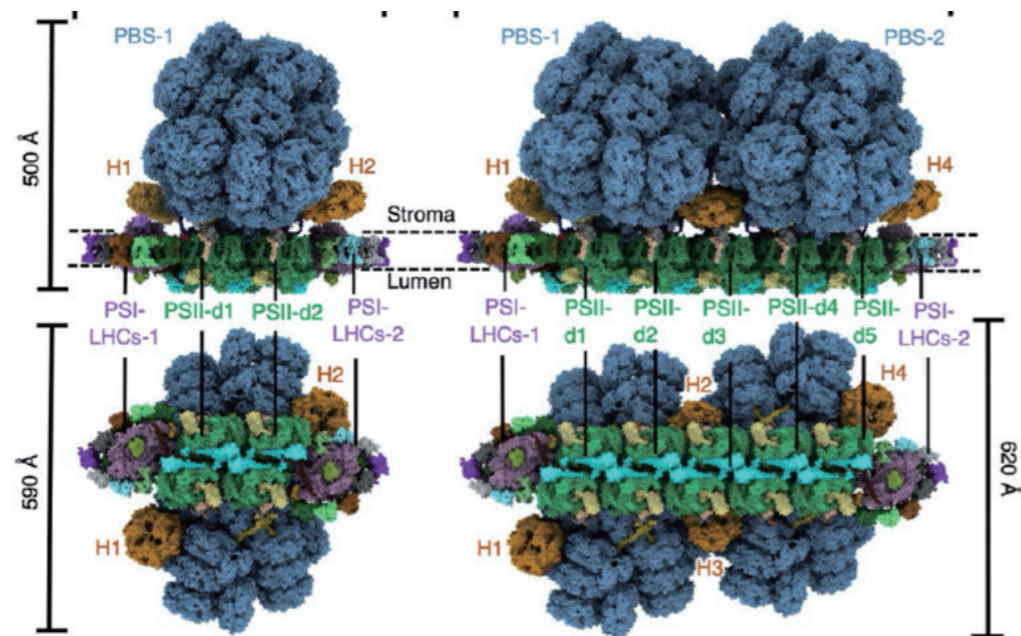


Figure 1. The overall structures of two types of assembly of PBS-PSII-PSI-LHC megacomplex

Recently, Sen-Fang Sui's group and Hong-Wei Wang's group from the School of Life Sciences, Tsinghua University, along with Xinzheng Zhang's group from the Institute of Biophysics, Chinese Academy of Sciences, collaborated to report the first in situ structure of the red algal PBS-PSII-PSI-LHC megacomplex. This work is a milestone in the field of photosynthesis as it provides a solid structural foundation for understanding the assembly mechanism of PBS-PSII-PSI-LHC megacomplex in its native cellular state, as well as the efficient energy transfer mechanism from phycobilisome to PSII and PSI.

Based on previous research on phycobilisomes, the research team selected *Porphyridium purpureum* as the target organism for the in situ high-resolution structural analysis. By combining cryo-focused ion beam (cryo-FIB), cryo-electron tomography (cryo-ET), subtomogram averaging, and in situ single-particle analysis (isSPA) methods, the team resolved the in situ structures of two types of assembly of the PBS-PSII-PSI-LHC megacomplex, single PBS-PSII-PSI-LHC and double PBS-PSII-PSI-LHC, at resolutions of 3.3 Å and 4.3 Å, respectively (Figure 1). Most

notably, these structures reveal some novel protein molecules, which are essential to the assembly of the megacomplex, but have not been previously observed in purified and isolated samples. Structural analysis discovers that four linking proteins (LRC2, LRC3, LPP1, and LPP2), along with LCM and ApcD, are involved in the interaction between phycobilisome and PSII, enabling the red algal phycobilisome to stably bind to PSII in vivo.

Photosynthetic organisms have evolved sophisticated mechanisms to cope with the constantly fluctuating light conditions in nature. In cases where the excitation energy accumulated by PSII is excessive, the light-harvesting antenna transfers the energy to PSI to redistribute it and protect PSII from damage. Current understanding suggests that phycobilisome in cyanobacteria and red algae can transfer energy to PSI through direct phycobilisome → PSI pathway and indirect phycobilisome → PSII → PSI pathway. However, due to the lack of structural information, there has been ongoing controversy over the energy transfer mechanism between phycobilisome and PSI. The findings from the in situ structure of the

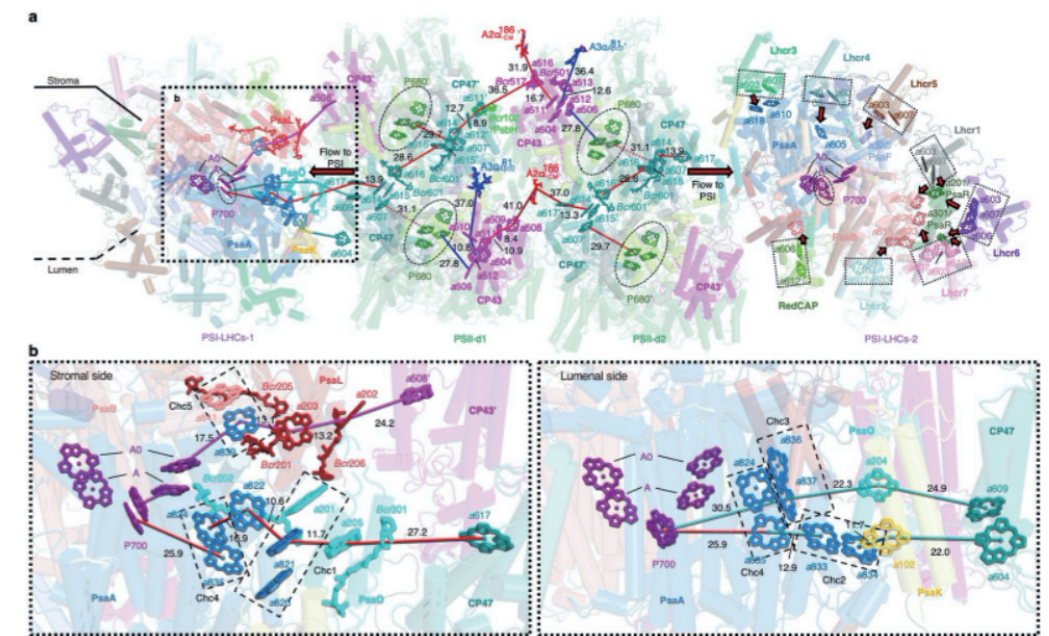


Figure 2. Key pigment arrangements and possible energy transfer pathways in in situ PBS-PSII-PSI-LHC megacomplex

PBS–PSII–PSI–LHC megacomplex provide a new perspective on this debate. The research has shown that red algal phycobilisome exclusively interacts with PSII, indicating that the light energy captured by phycobilisome is first transferred to PSII and then subsequently conveyed to PSI through a PSII-mediated process, consistent with the energy spillover model (Figure 2). Additionally, the team discovered that both PSII and PSI contain special arrangements of tightly packed chlorophyll clusters, which can form excitonic coupling states via  $\pi$  electrons in the conjugated rings, reducing the energy level to ensure efficient energy transfer (Figure 2). Taken together, these findings demonstrate that red algae transfer energy to PSI using the indirect phycobilisome  $\rightarrow$  PSII  $\rightarrow$  PSI mode, thereby redistributing the energy between PSII and PSI. At the same time, this study also provides new theoretical support for the development of artificial photosynthesis.

This work was published in Nature with the title "In situ structure of the red algal phycobilisome–PSII–PSI–LHC megacomplex". Professors Sen-Fang Sui and Hong-Wei Wang of the School of Life Sciences, and Researcher Xinzheng Zhang of the Institute of Biophysics, Chinese Academy of Sciences are co-corresponding authors of this paper. Xin You, a doctoral student in the School of Life Sciences, Dr. Xing Zhang from the School of Life Sciences, Dr. Jing Cheng from the Institute of Biophysics, Chinese Academy of Sciences, and Dr. Yanan Xiao from Southern University of Science and Technology are co-first authors. Other authors include Dr. Jianfei Ma and Research-Track Associate Professor Shan Sun from the School of Life Sciences. This research was supported by the National Natural Science Foundation of China, the National Basic Research Program, the National Key R&D Program of China, and the Xplorer Prize.

## Yong-Chun Liu from the Department of Physics and his collaborators made progress in a sensitive search for spin-dependent exotic forces

The standard model of physics points out that there are four basic interactions in nature: gravity, electromagnetic force, strong interaction force, and weak interaction force. However, the standard model is not perfect, for example, it does not contain dark matter particles. In recent decades, exploring new physics beyond the standard model, including searching for dark matter particles, has been an important direction in the field of basic physics research. In various experimental schemes, the use of precision measurement technology to detect the presence of novel interactions beyond the standard model (also known as the "fifth force") provides an important method for discovering new physics and searching for dark matter particles.

The exotic force that can couple to the spins of microscopic particles is an important candidate for the fifth force. For example, axion, one of the

possible constituents of dark matter predicted by theoretical physicists, is a particle that can transfer spin-dependent exotic forces. According to theoretical predictions, the spin-related singularity force between two particles depends on their spin and is also related to factors such as their relative position and velocity. Due to the interaction being extremely weak, there is currently no experimental evidence to suggest the existence of a fifth force. Nevertheless, it is exciting that with the development of precision measurement technology, scientists can continuously improve measurement precision, thereby detecting the force with a higher sensitivity, and continuously lowering the upper limit of the corresponding coupling coefficients as long as the fifth force is not detected.

Recently, Associate Professor Yong-Chun Liu from the Department of Physics at Tsinghua University and his collaborators proposed a new experimental scheme,

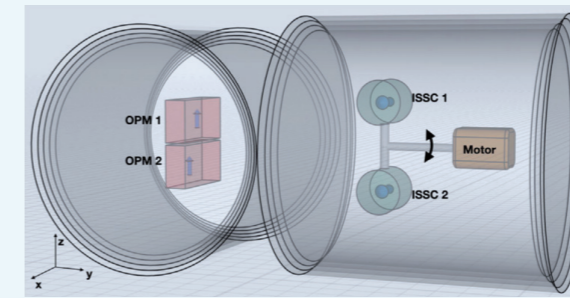


Figure 1: Schematic diagram of the measurement device of spin-dependent exotic forces. On the left is the atomic magnetometer, and on the right is the spin source.

providing new limits on the coupling coefficient of spin-dependent exotic forces. This experiment uses two sets of specially designed pure iron-compensated cobalt magnets as spin sources for generating spin-dependent exotic forces, which have extremely high electron spin density and extremely weak magnetic leakage. The detection of spin-dependent exotic forces can be achieved using a highly sensitive atomic magnetometer. When the spin source is rotated using a DC motor, if spin-dependent exotic forces exist, the coupling between the spin source and the spin in the atomic magnetometer produces a weak spin-spin-velocity-dependent interaction, which is similar to that of a magnetic field. By designing two sets of atomic magnetometers with opposite sensitive axes, efficient differential suppression of common mode noise signals can be achieved, while maintaining sensitivity to the effective magnetic field of spin-dependent exotic forces.

By using a motor to drive the spin source to periodically rotate clockwise and counterclockwise, effective modulation of the measured signal can be achieved, avoiding the influence of DC noises. By analyzing signals from multiple sets of experimental data, false signals caused by various noise sources can be effectively removed. Through statistical analysis of long-term measurement data, no signal for the fifth force has been found, but the experimental results provide new limits on the electron-proton coupling coefficient. Due to the high spin density, high magnetic field measurement sensitivity and energy resolution of the designed experimental scheme, as well as the effective suppression of common-mode noise, the coupling coefficient limit obtained in this

experiment is ten orders of magnitude better than the limit obtained using other methods at the centimeter to kilometer force-range scale. With further future development of technology, it is expected to measure the presence of a fifth force with an even higher sensitivity.

This work was jointly completed by Yong-Chun Liu's research group at the Department of Physics of Tsinghua University, Beihang University and Dmitry Budker's research group at the Helmholtz Institute, Johannes Gutenberg University, Mainz, Germany. The article was published in Physical Review Letters on March 28, 2023, with the title "Constraints on Spin-Spin Velocity-Dependent Interactions" [Phys. Rev. Lett. 130, 133202 (2023)]. The first author of the paper is Dr. Ji Wei, a postdoctoral fellow at the University of Mainz in Germany (the 2019 doctoral graduate of the Department of Physics of Tsinghua University, served as the research assistant of Yong-Chun Liu's Group from August 2020 to March 2021). The corresponding authors of the paper are associate Professor Yong-Chun Liu from the Department of Physics of Tsinghua University, and associate researcher Wei Kai from Beihang University. This work was supported by the Key-Area Research and Development Program of Guangdong Province, the National Natural Science Foundation of China, the National Key R&D Program of China, the State Key Laboratory of Low-Dimensional Quantum Physics, the DFG Cluster of Excellence PRISMA+, and the Frontier Science Center for Quantum Information.

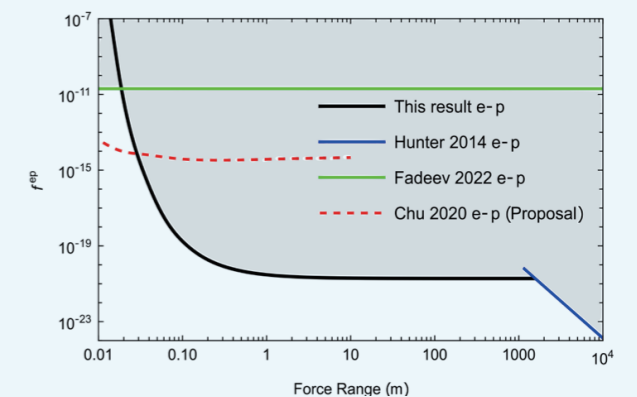


Figure 2: Limitation range of the coupling coefficients of spin-dependent exotic forces.

## FASER first detects neutrinos made by particle collider, with contributions from Tsinghua University

**The discovery promises to help physicists understand the nature of the universe's most abundant particle.**

FASER Collaboration at CERN has for the first time detected subatomic particles called neutrinos created by a particle collider, as announced by the collaboration on March 19, 2023. The discovery promises to deepen scientists' understanding of the nature of neutrinos, first spotted in 1956, which are the most abundant particle in the cosmos and a key participant in the process that makes stars burn. The work could also shed light on cosmic neutrinos that travel large distances and collide with the Earth, providing a window into distant parts of the cosmos. Tsinghua University has made long-term contributions to FASER detector design, construction and operation, and Tsinghua has also directly contributed to this discovery.

"We've discovered neutrinos from a brand new source, from particle colliders, where you have two beams of particles smashing together at extremely high energy to make the neutrinos," said Jonathan Feng, Co-Spokesperson of the FASER Collaboration and particle physicist at UC Irvine who initiated the project, which now includes over 80 researchers at 22 partner institutions.

"Neutrinos are particles that we know exist," said Jamie Boyd, a particle physicist at CERN and a Co-Spokesperson of FASER alongside Feng. "They've been known for several decades, and were very important for establishing the standard model of particle physics. But previously, no neutrino produced at a collider had ever been detected by an experiment."

Qing Wang, director of the Center for High Energy Physics and professor of the Department of Physics at Tsinghua University, said: "The production and detection of this ghost particle at the highest frontier of energy has opened up new territory for basic science."

"The collider neutrinos that were detected by FASER this time are in an energy regime between that of fixed target experiments and cosmic neutrinos, and are muon neutrinos from CC interactions. It opened a door for understanding the mechanism of neutrino productions, the proton behavior in small-x regions, and the forward detector physics. In the future, we expect FASER to detect neutrinos of other types, as well as provide clues to potential new physics signatures such as sterile neutrinos and dark matter particles," said Xin Chen, Team Leader of the Tsinghua FASER group and associate professor of the Department of Physics at Tsinghua University.

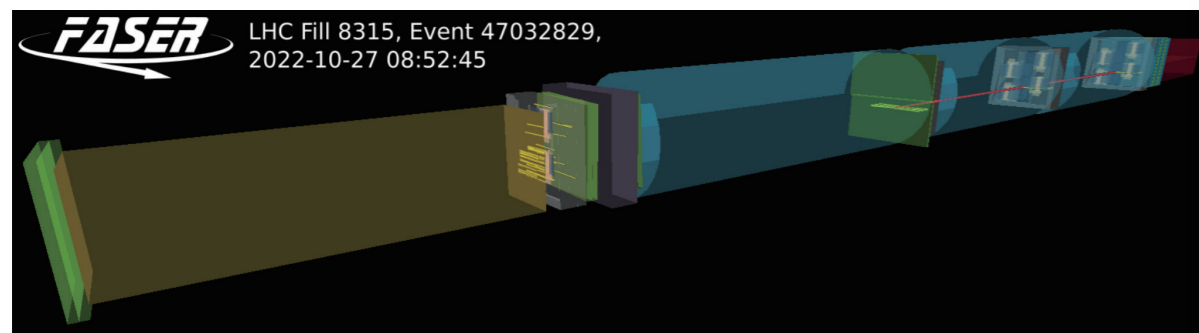


Fig 1. Collier neutrino events detected by FASER

Since the discovery of neutrinos in 1956, the majority of neutrinos studied by physicists have been low-energy neutrinos. But the neutrinos detected by FASER are the highest energy ever produced in a lab, and are similar to the neutrinos found when deep-space particles trigger dramatic particle showers in our atmosphere. "They can tell us about deep space that we can't learn in other ways," said Boyd. "These very high-energy neutrinos in the LHC are important for understanding really exciting observations in particle astrophysics."

It's the latest result to come from the Forward Search Experiment (FASER), a particle detector designed and built by an international group of physicists and installed at the European Council for Nuclear Research (CERN) in Geneva, Switzerland. There, FASER detects particles that are produced by CERN's Large Hadron Collider (LHC). FASER itself is brand-new and unique among particle-detecting experiments. Compared to

other detectors at CERN like ATLAS or CMS, which are several stories tall and weigh thousands of tons, FASER is only about one ton and fits neatly into a small side-tunnel at CERN. That, and it took only a few years to design and construct, using spare parts from other experiments. FASERv is a project to study collider neutrinos at TeV energies, which detected the first high-energy neutrino candidates at the LHC in 2021.

"Neutrinos are the only known particles that the much larger experiments at LHC are unable to directly detect, so FASER's successful observation means the collider's full physics potential is finally being exploited," said UC Irvine professor and experimental physicist Dave Casper.

Beyond neutrinos, one of FASER's other chief objectives is to help identify the particles that make up dark matter, which physicists think comprises most of the matter in the universe, but which they've never



Fig 2. Tsinghua joined the first FASER Collaboration Meeting



Fig 3. Shuimu Tsinghua Scholar Tomohiro Inada worked on the emulsion detector installation and commissioning at FASER

the emulsion neutrino analysis where first collider neutrino events have been presented,” said Boyd.

On March 5, 2019, the FASER experiment was officially approved by CERN, and Xin Chen and Zhen Hu, associate professors of the Center for High Energy Physics of Tsinghua University and the Department of Physics of Tsinghua University, joined the FASER Collaboration. The team undertook a number of work such as tracker detector R&D, emulsion detector R&D, and data analysis.

Tomohiro Inada, a postdoctoral fellow in the team and Shuimu Tsinghua Scholar, has made direct contributions to the discovery of collider neutrinos due to his work on the tracker’s commissioning, operation and data analysis. The collaboration has submitted an article “First Direct Observation of Collider Neutrinos with FASER at the LHC” to arXiv and Phys. Rev. Lett. on March 24.

Di Wang, a 2020 master’s student in the Department of Physics, worked on the design, construction and integration of multiple electronics modules of the tracker, as published in Nucl. Instrum. Methods Phys. Res. A in 2022. 2019 doctoral students Jinfeng Liu and Hao Pang also actively participated in the shifts and maintenance of the detector. These works have been supported by the National Natural Science Foundation of China and the Tsinghua University Initiative Scientific Research Program.

directly observed before. FASER has yet to find signs of dark matter, but with the LHC set to begin a new round of particle collisions in a few months, the detector stands ready to record them, should they appear.

“Tsinghua joined FASER in 2019 in the early days of the collaboration. During the past 4 years, Tsinghua physicists, postdocs, and students have made continuous contributions to FASER and FASERv detector R&D and simulation studies, and Tsinghua has also made direct contributions to these first physics results using real LHC data,” said Feng.

“The Tsinghua group has made leading contributions to the first FASER physics results, both through their work on the FASER tracking detector and on the neutrino analysis. The tracker, a crucial component for the new results, is an area where Tsinghua has been heavily involved in the hardware, commissioning, calibrations and operations. Tsinghua members, especially Tomohiro, have also actively worked on

## The mobile machining robot developed by Tsinghua revolutionizes high-efficiency and high-quality manufacturing of Tianzhou-6

The Tianzhou-6 cargo spacecraft successfully docked at the rear port of the Tianhe core module at 5:16 on May 11th, then transformed to a combined flight phase. This is another magnificent leap forward for China’s aerospace industry.

Tianzhou-6 has a cargo-carrying capacity of 7.4 tons, making it the world’s largest cargo spacecraft in active service. The cabin of Tianzhou-6 has the characteristic of large dimensions and local high accuracy, which puts forward a high requirement for the capacity of machining equipment.

Professor Xin-Jun Liu’s Laboratory from the Department of Mechanical Engineering at Tsinghua University has been inspired by the working behaviors of creatures. They have proposed a novel in-situ machining mode of “wide-range positioning + local high-accuracy milling” for large-scale complex structures. On this basis, a five-axis parallel machining functional module was invented, and a mobile hybrid machining robot was designed and developed.

In November 2021, the developed technology was applied to the Tianzhou-6 cargo spacecraft. The final assembly accuracy of 0.1 mm was achieved without manual repair, and a remarkable efficiency improvement was achieved. In this way, a robot with a 10-ton level weight is successfully applied to replace the conventional machining method of “machine tool with 100-ton level weight + manual repair”. The developed robot has become the main equipment for the machining of Tianzhou-series cargo spacecraft.

China Academy of Space Technology said Tianzhou-6 is the first cargo spacecraft in China that uses industrial robots to complete final machining. By utilizing the mobile hybrid robot, the spacecraft’s cabin can be machined on-site, eliminating the frequent transportation between different workshops. This significantly enhances production efficiency and manufacturing intelligence.



In-situ machining of Tianzhou-6’ conical segment

## Prof. Yong-Chun Liu's group makes progress on PT-symmetry and linewidth narrowing

Recently, a research group led by Prof. Yong-Chun Liu from the Department of Physics at Tsinghua University used feedback to construct a parity-time symmetric Hamiltonian in a single dissipative resonant system, and effectively narrowed the linewidth of the system in the parity-time symmetric phase. The research results were published in Physical Review Letters under the title of "PT-Symmetric Feedback Induced Linewidth Narrowing".

Linewidth is one of the key factors that determine the performance of resonance systems, such as atoms, optical cavities and mechanical resonators. Especially, for precision measurement and sensing, we always strive for a narrow linewidth to achieve better measurement sensitivity. In various precision experiments such as atomic magnetometry and atomic gyroscopy, a very narrow linewidth enables to detect extremely weak signals. On the other hand, narrow linewidth also represents a long coherence time, which is beneficial for quantum storage and

quantum information processing. In order to reduce the linewidth, various methods have been proposed, e.g., anti-relaxation coating of vessel walls, spin-exchange-relaxation-free mechanism, nonlinear magneto-optical rotation approach and coherent population trapping scheme in atomic systems. However, these methods typically have specific and stringent requirements, e.g., highly demanding fabrication, strict magnetic shielding or specific energy levels. Therefore, a method for narrowing linewidths that is universally applicable to dissipative resonance systems and can be implemented using a simple device is of great significance.

They realized a novel type of parity-time-symmetric (PT-symmetric) system by utilizing a single resonance mode, which leads to efficient and tunable linewidth narrowing. In recent years, PT symmetry has attracted much interest, inspired by its unique property that exhibiting real energy spectra with non-Hermitian. The study of PT symmetry provides a powerful tool

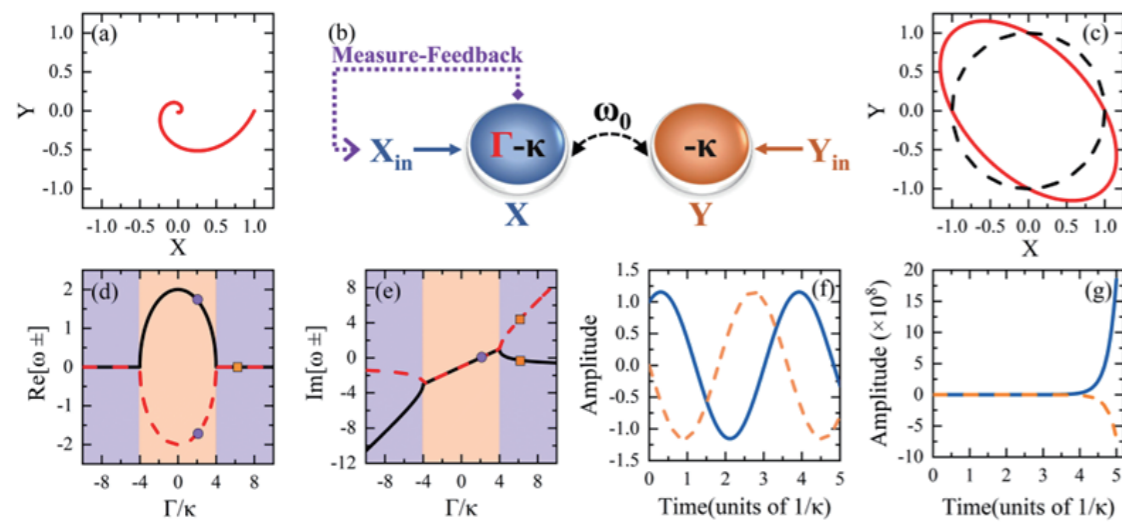


FIG. 1. (a) Typical trajectory of a dissipative resonance system in the phase space. (b) Schematic diagram of the PT-symmetric feedback system. (c) Phase-space trajectory of the PT-symmetric feedback system (red solid curve) and Hermitian resonance system (black dashed curve). (d),(e) Real and imaginary parts of the eigenvalues. (f),(g) Typical time evolution of quadratures X (blue solid curve) and Y (orange dashed curve) in PT-symmetric phase and symmetry broken phase.

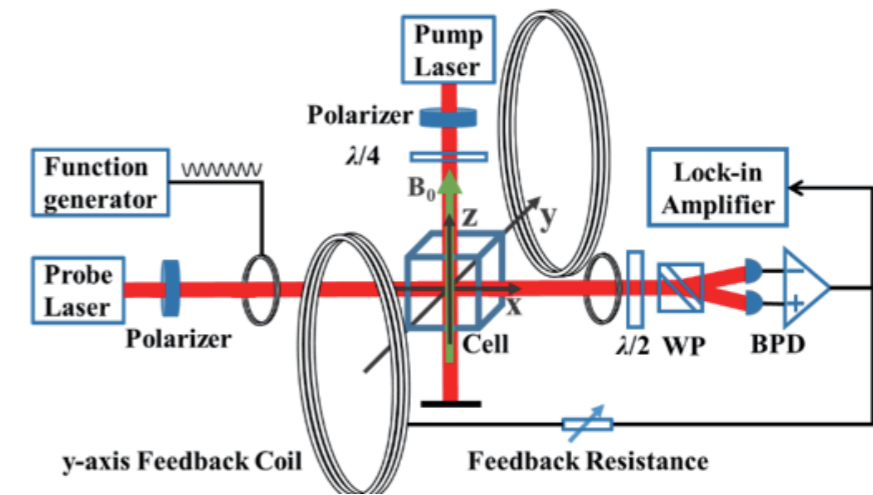


Fig.2. Experimental setup with a thermal atomic ensemble.

for engineering gain and loss and controlling the system linewidth. However, previous realizations of PT symmetry require two or more modes, which is not applicable in a large variety of systems that contain only a single resonance mode. They found that a single resonance system has two orthogonal quadratures. By constructing a quadrature measurement-feedback loop in which one quadrature component is measured with feedback [Fig. 1. (b)], an equivalent gain is introduced, breaking the symmetry between the quadratures and realizing a PT-symmetric system. By adjusting the feedback factor, the eigenvalues of the system can be controlled [Fig. 1(d)-(e)]. In the PT-symmetric phase (orange area), the imaginary parts (dissipation) of the system's eigenvalues decrease with the increase of the feedback factor, resulting in a narrowing of the linewidth.

They demonstrated the PT-symmetric feedback mechanism in a thermal atomic ensemble, which is a typical example of magnetic resonance system. A beam of circularly polarized laser propagating along the -z direction optically pumps the atomic ensemble to polarize the collective spin. A static magnetic field is applied along the z-axis, then the collective spin undergoes a Larmor precession around the z-axis. Thus the transverse components  $P_x, y$  oscillates in the xy plane, constituting a harmonic oscillator. They measured the spin polarization component  $P_x$  using a probe laser via polarization homodyne detection, and the output signal is then fed into a loop that includes a feedback resistor and the y-axis feedback coil, which generate the feedback magnetic field. The effect is that the gain is introduced into the  $P_x$  orthogonal

quadrature, breaking the symmetry of  $P_x$  and  $P_y$ , making the collective spin oscillator become a PT-symmetric system.

In the PT-symmetric phase, the feedback factor is controlled by the feedback resistance, which can conveniently adjust the linewidth of the system. The linewidth is reduced from 654 Hz to 13.6 Hz, which is 48-fold narrowing. By applying the method in magnetometry, they realized a 22-times improvement in the measurement sensitivity. This work opens the avenue for studying non-Hermitian physics and high-precision measurements in resonance systems with feedback.

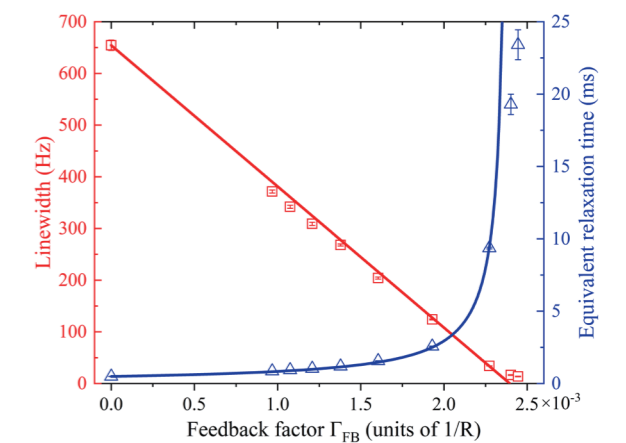


Fig.3. Dependence of linewidth and equivalent relaxation time on the feedback factor.

## Tsinghua and Cornell's scientists use AI to uncover key drivers of soil carbon storage

Soils store four times as much carbon as vegetation. Loss of soil organic carbon may accelerate global warming, whereas promoting soil carbon storage to sequester more carbon dioxide (CO<sub>2</sub>) as soil organic carbon can help mitigate climate change. A recent research led by Tsinghua University and Cornell University revealed that microorganisms are by far the most influential factor in soil carbon storage.

This interdisciplinary study incorporated a microbial computer model that describes various processes in the soil carbon cycle, the world's largest soil carbon dataset, and sophisticated techniques such as data assimilation and deep learning to better understand soil carbon dynamics. This international collaboration was coordinated by Professor Xiaomeng Huang and Ph.D. student Feng Tao from the Department of Earth System Science at Tsinghua University, as well as Professor Yiqi Luo from Cornell University.

This is the first study to compare the relative importance of microbial processes in the soil carbon cycle to other processes. The critical role of microbial carbon use efficiency identified in this study suggests that future research should investigate management practices that may influence microbial processes in order to increase soil carbon sequestration. The novel approach described in this study that combines process-based computer models, big data, and deep learning to better understand soil carbon dynamics also opens up new research avenues in related disciplines.

The study, titled "Microbial Carbon Use Efficiency Promotes Global Soil Carbon Storage," was published in Nature on May 24.

Microbes play dual roles in the storage of organic carbon in the soil. In addition to decomposing organic matter in soils and releasing CO<sub>2</sub> into the atmosphere, microorganisms also contribute to the accumulation of organic carbon by producing byproducts and dying. The key to understanding soil carbon dynamics and its responses to a changing climate is to disentangle the dual microbial controls on soil carbon storage and to quantify the relative importance of microbial processes compared to other processes.

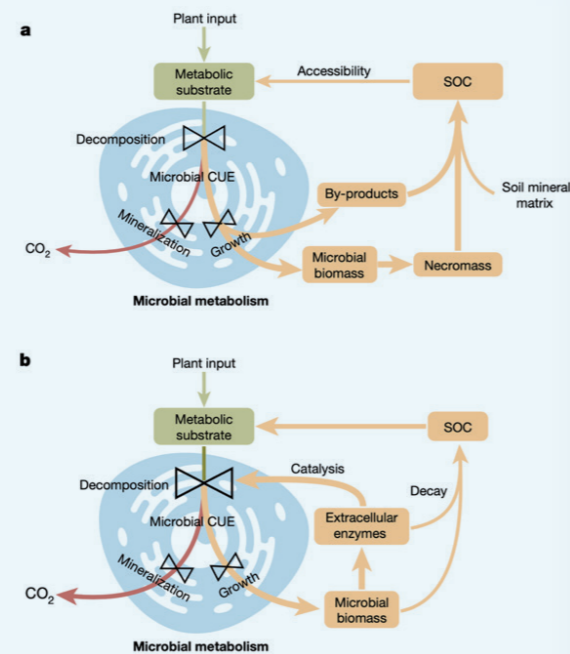


Figure 1. Two contrasting pathways in determining the relationship between microbial CUE and SOC storage

The authors investigated the role of microbial processes in global soil carbon storage by employing microbial carbon use efficiency. Microbial carbon use efficiency captures the dual control point by microorganisms by indicating how much carbon was used for growth versus how much was used for metabolism. A high carbon use efficiency may result in either an increase in microbial by-products and dead biomass with enhanced growth, which contributes to soil organic carbon accumulation, or an increase in enzyme production that catalyzes organic matter decomposition, which results in soil organic carbon loss (Figure 1).

This study identified the most likely mechanism by which microbes influence soil carbon storage by combining a microbial model that depicts complex

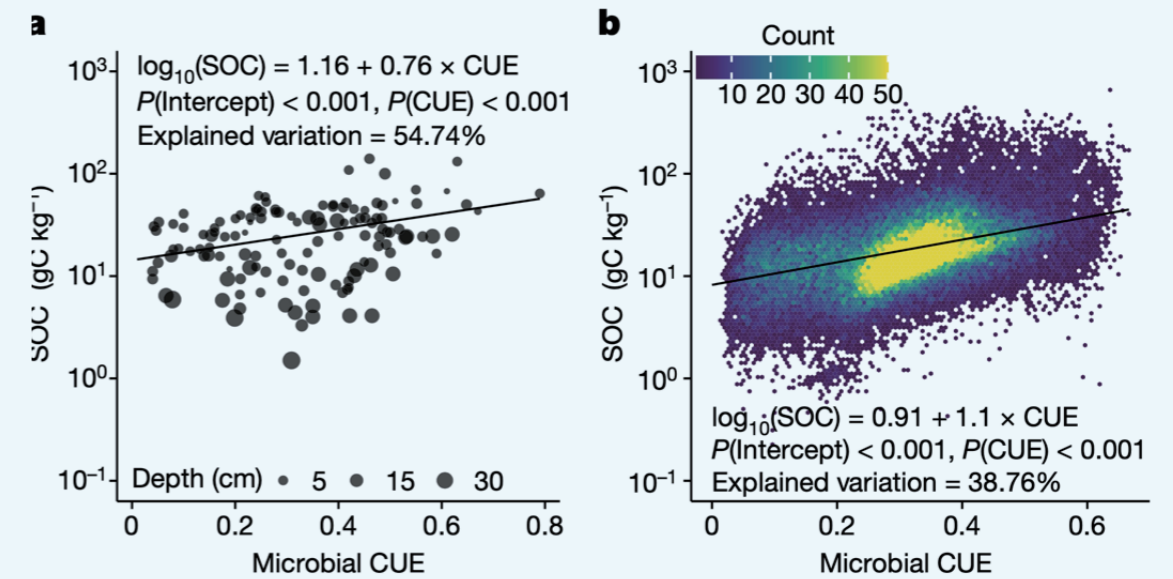


Figure 2. The emerging relationship between microbial carbon use efficiency and soil organic carbon storage

soil carbon processes with more than 50,000 soil carbon data within a Bayesian framework. The results indicated a global positive correlation between microbial carbon use efficiency and soil organic carbon storage (Figure 2). Consequently, a greater proportion of carbon allocated to biosynthesis in microbial metabolism primarily contributes to soil organic carbon accumulation rather than loss.

Further, a novel PROcess-guided deep learning and DAta-driven modeling (PRODA) approach was implemented to generalize the site-level data-model fusion results to the global scale. Using the PRODA approach, the authors obtained the global patterns of seven processes in the soil carbon cycle, including microbial carbon use efficiency, and assessed their relative importance for global soil organic carbon storage. The authors found that microbial carbon use efficiency is higher at higher latitudes and lower at lower latitudes (Figure 3). This suggests that microorganisms in warmer environments allocate less carbon to biosynthesis due to the increased energy demands in metabolism.

In addition, the authors found that microbial processes are the major determinant of soil carbon storage at the global scale. Specifically, representing the spatial

patterns of microbial carbon use efficiency is essential for the process-based model to accurately simulate the global soil organic carbon and its distributions. Microbial carbon use efficiency is at least four times more important than any other investigated processes, including biomatter decomposition and plant carbon inputs (Figure 4).

Feng Tao, a Ph.D. student at Tsinghua University, is the paper's first author. Yiqi Luo, a professor at Cornell University, and Xiaomeng Huang, a professor at Tsinghua University, are the corresponding authors.

The study was funded by the National Natural Science Foundation of China, the National Key Research and Development Program of China, the US National Science Foundation, and the China Scholarship Council, among others.

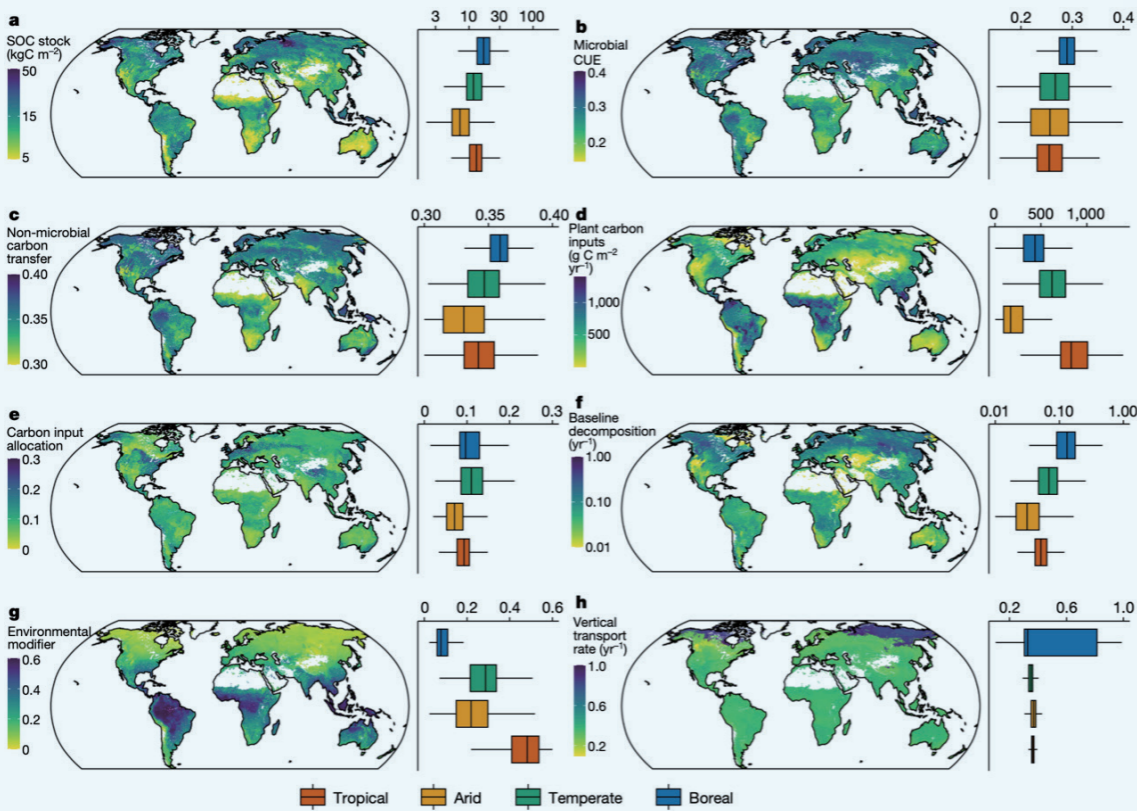


Figure 3. Maps of global SOC stock and related processes

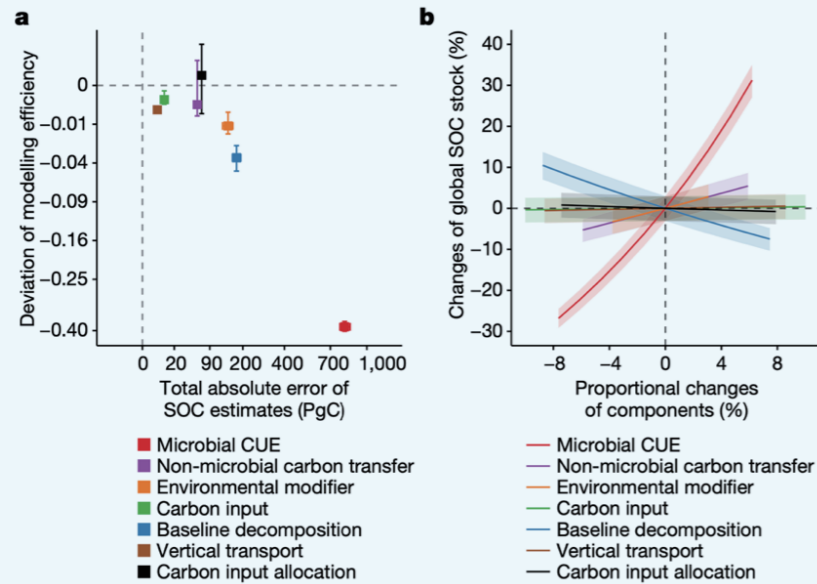


Figure 4. Microbial carbon use efficiency as the primary regulator of global soil organic carbon storage

## Tsinghua University research team proposes a new method for studying phase separation of epigenetic factors based on targeted protein degradation technology

On May 9th, the research team of Yu Rao from the School of Pharmaceutical Sciences, Haitao Li from the School of Medicine, and Pilog Li from the School of Life Sciences at Tsinghua University jointly published their research results. In this study, the authors utilized the efficient, rapid, reversible, and dynamic degradation characteristics of targeted protein degradation technology (PROTAC) to explore

the formation characteristics of related biomolecular condensates by degrading epigenetic regulatory factors (BRD4), monitored changes in the phase behavior and function of target proteins induced by PROTAC using immunofluorescence staining and high-throughput sequencing, and revealed the functional association between BRD4 and other components in the condensate during this process.

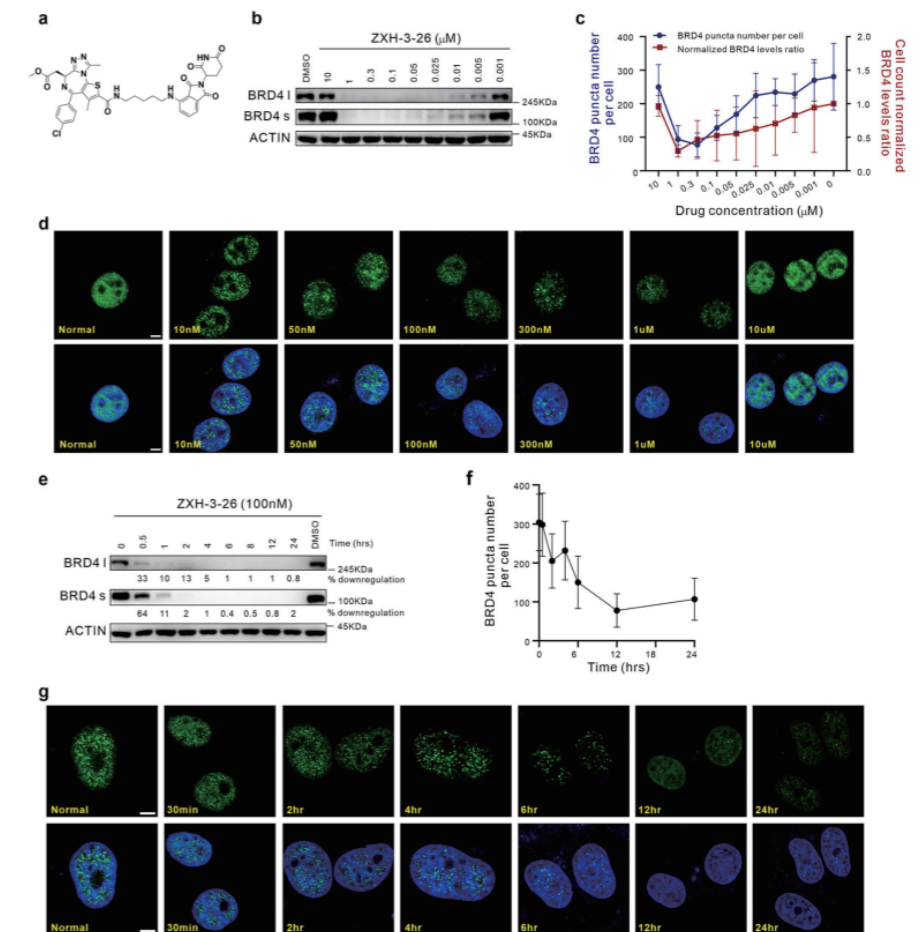


Figure 1. Establishment of the "PROTAC-target protein-LLPS" research method.



This is the first application of PROTAC in the study of liquid-liquid phase separation (LLPS), providing new methods and insights for solving critical problems in the field.

Targeted protein degradation technology (PROteolysis TARgeting Chimeras, PROTAC) is a rapidly developing novel protein degradation strategy in recent years. The basic principle of PROTAC is to use bifunctional small molecules to induce ubiquitination of the target protein through the ubiquitin-proteasome system, thereby achieving degradation of the target protein. Since the first targeted androgen receptor PROTAC molecule ARV-110 entered clinical research in 2019, the field of PROTAC has entered a period of rapid development.

Liquid-liquid phase separation (LLPS) is the basis for biomolecular aggregation to form membraneless organelles in eukaryotic cells, as well as an important mechanism for cellular localization. Currently, establishing the relationship between phase separation phenomena and biological function is an important scientific issue in this field. Phase separation is highly dependent on systematic quantification, and the concentration at which each component forms LLPS is particularly crucial,

requiring efficient, rapid, and dynamic perturbation techniques.

In addition, there is an urgent need to establish new methods to avoid false positives in vitro experiments, explore phase separation states under physiological conditions, and analyze the transition of scaffold proteins and client protein functions in condensates. Existing technical means such as CRISPR-Cas9/ RNA interference (RNAi) genetic tools face many challenges in directly studying phase separation in vivo. Gene editing methods have irreversible effects on DNA modification and it is difficult to study intermediate states of protein encoding. RNAi is not enough powerful tool because of its long effective time, which is inadequate to study dynamic phase separation processes in vivo. Although small molecule inhibitors can affect the formation of phase separation, they often act on active/enzyme sites, while phase separation is often induced by other protein functions such as scaffold domains, leading to insufficient research. At the same time, the functional effects of small molecule inhibitors often lead to upregulation feedback of target proteins. The field of phase separation still lacks efficient methods for directly interfering with LLPS in wild-type cell lines.

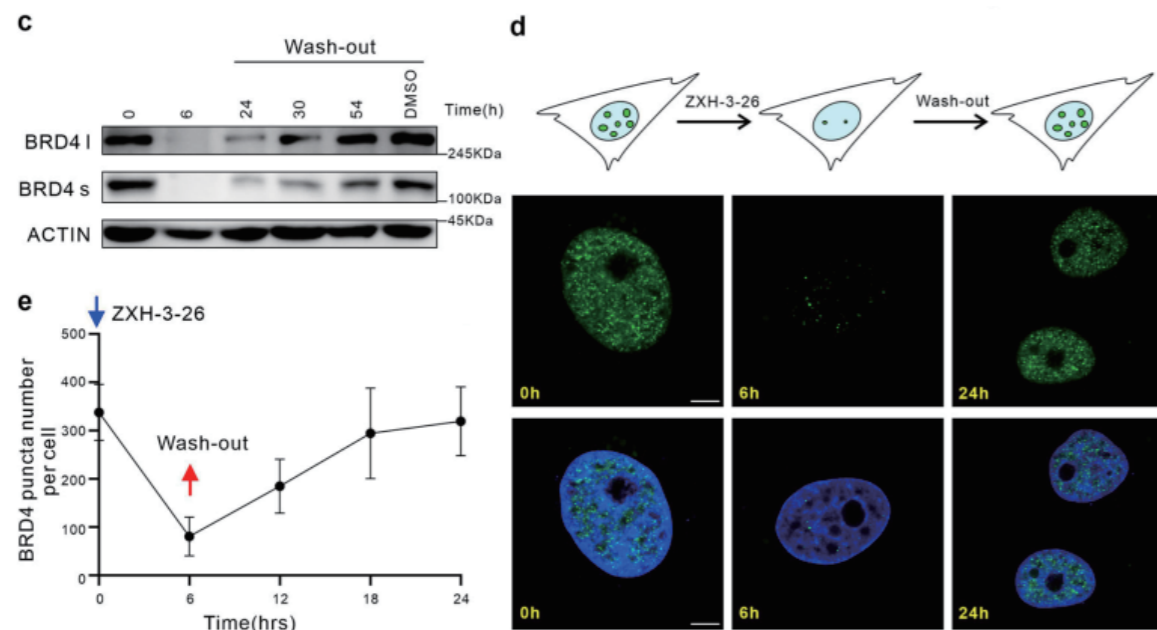


Figure 2. The reversibility of BRD4-PROTACs facilitates LLPS research

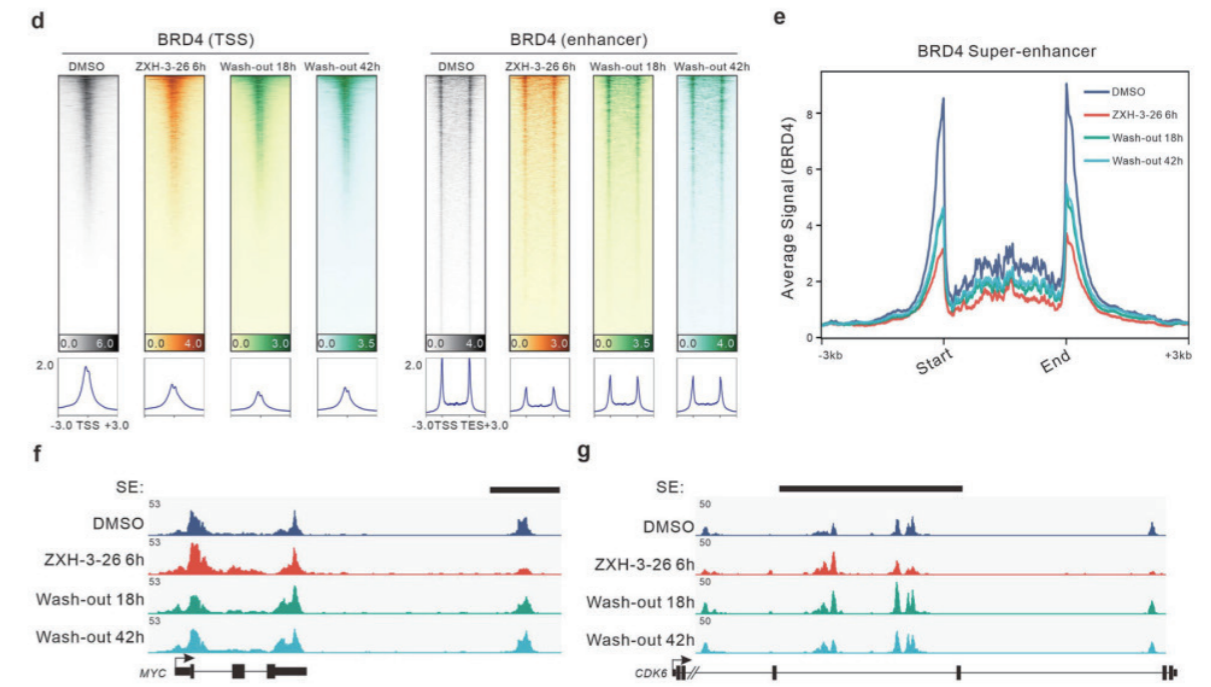


Figure 3. BRD4-PROTACs degradation and wash-out experiments

Through the combined use of PROTAC, immunofluorescence staining, quantitative calculations and other technologies, researchers have established a "PROTAC-target protein-LLPS" research method targeted at intracellular BRD4 condensates. The researchers used 100 nM of ZXH-3-26 to determine the endogenous BRD4 degradation kinetics in HeLa cells. They found that the PROTAC molecule targeting BRD4 (ZXH-3-26) could rapidly degrade BRD4 and its condensates at low concentrations and short times (Figure 1). After 30 minutes of BRD4-PROTACs treatment, a significant decrease in BRD4 protein levels was observed, and after 4 hours, BRD4 protein was completely degraded, while the amount of BRD4 condensates also decreased sharply. This indicates that PROTAC can serve as a tool for rapid perturbation of condensate components.

Subsequently, the researchers further explored the potential of using PROTAC for LLPS research by utilizing its reversibility. Interestingly, through wash-out experiments, they found that 24 hours after BRD4-PROTACs were removed, the number of endogenous BRD4 condensates had almost returned to the original levels, while at this time,

the protein level of BRD4 had just begun to show signs of recovery (Figure 2). This suggests that the recovery of BRD4-related condensates may occur prior to the recovery of BRD4 protein levels, which is a phenomenon discovered for the first time in the application of PROTAC in LLPS research.

To explore the interesting phenomenon, the researchers further carried out a multi-omics analysis to study its possible physiological and functional significance. Gene expression profiles of control groups, BRD4-PROTACs treated for 6 hours, wash-out for 18 hours, and wash-out for 42 hours were explored through RNA-seq and Cut&Tag-seq, as well as the enrichment changes of BRD4 in TSS regions, enhancer regions, and super-enhancer regions. The data showed that the gene expression profile of the wash-out 42-hour group had already recovered to a level similar to that of the control group. More surprisingly, as the degrader was removed, BRD4 quickly rebounded and preferred to occupy the super-enhancer regions, especially the super-enhancer regions of some key cancer genes and cell cycle genes (Figure 3). This result shows that PROTAC can be a powerful tool for studying the physiological and

pathological functions of biomolecular condensates, and its rapid and reversible degradation is a key advantage as an LLPS research tool.

The multivalent interactions between components in biomolecular condensates are the basis of LLPS, and analyzing the physical and functional interactions among key protein components is a critical issue in the field of LLPS. Thus, based on BRD4-PROTACs, researchers explored the phase separation changes of other important components (MED1/CYCT1/p300) in BRD4-related condensates. The researchers found that under the action of BRD4-PROTACs, endogenous MED1 and CYCT1 condensates significantly decreased within 6 hours, but then recovered to nearly the same level as the control group after 12 hours, while p300, as an upstream molecule of BRD4, was not affected (Figure 4). In addition, they discovered for the first time that BRD3 played a compensatory role in the recovery of MED1 and CYCT1 condensates as BRD4 degraded. Targeting BRD4 with PROTAC not only provides a new effective tool for studying BRD4

phase separation but also offers a new strategy for analyzing the molecular mechanism and kinetics of BRD4 phase separation.

In summary, in this study, researchers first established the "PROTAC-target protein-LLPS" research method to explore the precise mechanisms of intracellular protein-protein interactions and protein spatiotemporal regulation related to LLPS from multiple dimensions. In LLPS research, the PROTAC-based research method is rapid, efficient, and reversible, and is superior to traditional genetic tools for disturbing target genes. Moreover, compared with small molecules commonly used for dissolving condensates (such as 1,6-hexanediol), PROTAC is more specific and targeted. In addition, combining this method with multi-omics techniques can not only explore the interaction and functional linker between components of condensates but also provide a possibility to establish relationships between phase separation and biological functions. It is worth mentioning that the PROTAC technology is considered a groundbreaking

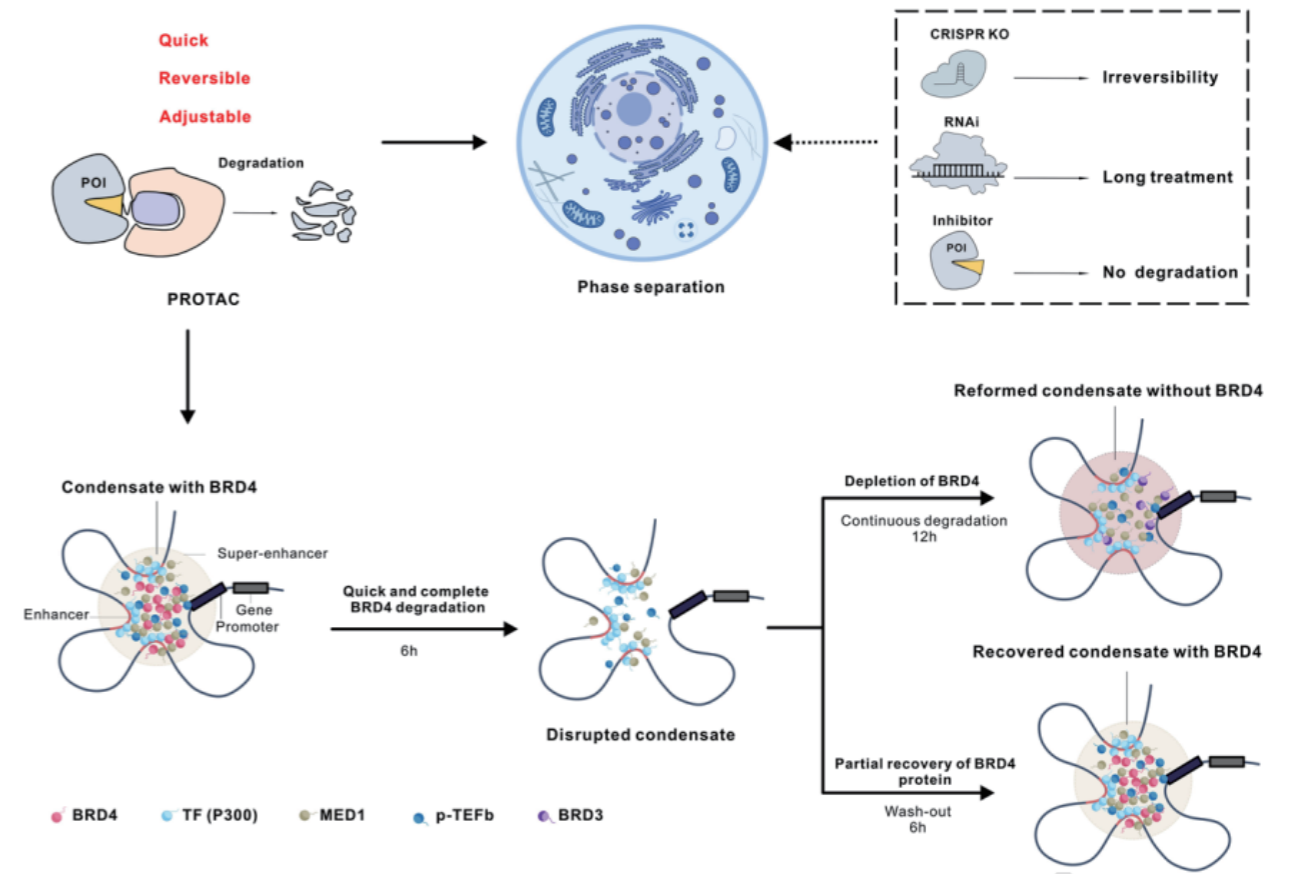


Figure 5. Working model of BRD4-PROTACs

tool that aids in the development of small molecule drugs, and it is expected to play an important role in the treatment of diseases caused by abnormal phase separation.

Recently, the above-mentioned research paper entitled "BRD4-PROTACs as a unique tool to study biomolecular condensates" was published in the journal Cell Discovery.

Shi Yi (CLS program, 2020) from Prof. Yu Rao's lab (School of Pharmaceutical Sciences) and Liao Yuan (PTN program, 2020) from Prof. Haitao Li's

lab (School of Medicine), are co-first authors of the paper. Qianlong Liu, Zhihao Ni, and Zhenzhen Zhang, participated in this work. Prof. Pulong Li, Prof. Haitao Li, and Prof. Yu Rao are the corresponding authors of the paper. Prof. Wei Wu, Prof. Haiteng Deng, Prof. Jianyang Zeng and Dr. Minglei Shi provided valuable advice and guidance for this paper. And technical support was provided by the Cell Imaging Center and the Nikon Imaging Center at Tsinghua University. This research was supported by the National Natural Science Foundation of China and the National Key Research and Development Program of China.

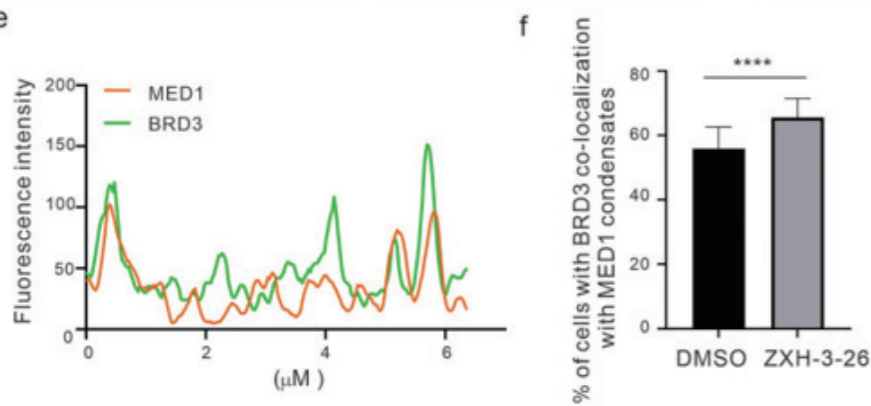
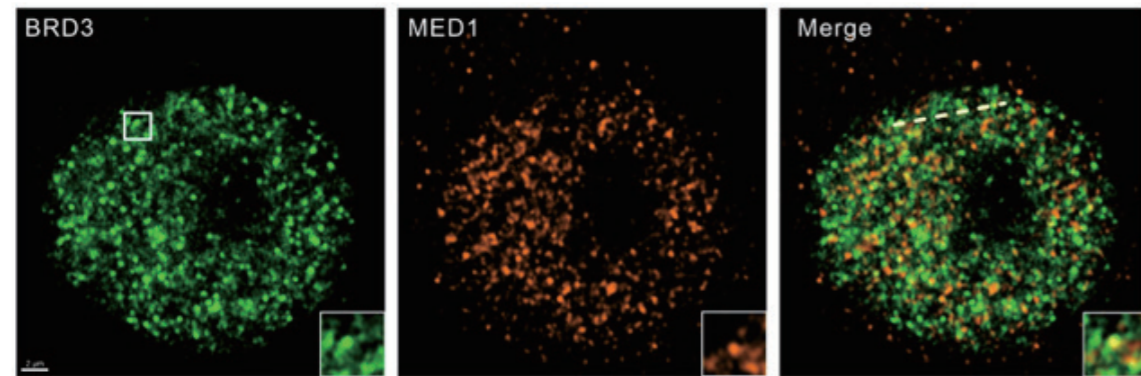
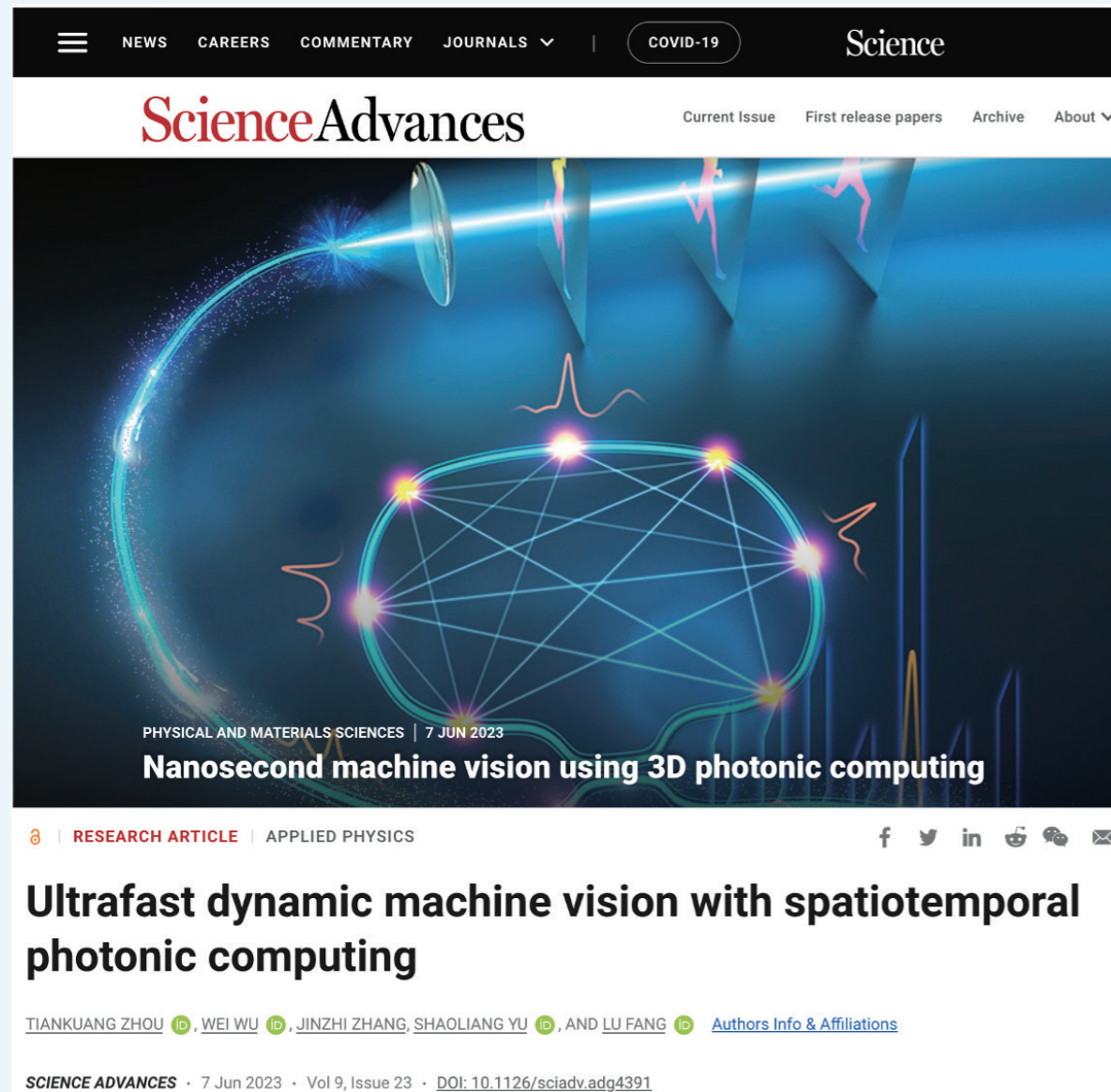


Figure 4. Exploration of the key functions of MED1/CYCT1/p300/BRD3 in BRD4 phase separation through BRD4-PROTACs

## Lu Fang's group from the Department of Electronic Engineering made progress in Ultrafast Machine Vision



As the application of artificial neural networks continues to evolve, the complexity of machine vision algorithms has increased significantly, requiring a huge amount of computing power. However, the slowdown of Moore's Law has led to saturating performances of electronic processing units, making it difficult to meet the growing demands for high

computing power and high energy efficiency. In the meantime, computing with photons presents an opportunity for revolutionary advancements in current vision computing. Unfortunately, existing intelligent optical computing architectures rely on electronic processors as computing relays, which significantly limit the computing advantages of high-speed and

high-parallel optical computing, restricting ultra-fast machine vision applications.

Recently, a research group led by Associate Professor Lu FANG from the Department of Electronic Engineering at Tsinghua University developed an ultrafast intelligent optical computing architecture in the spatiotemporal domain. They introduced spatiotemporal cross-dimensional matching methods and a spatiotemporal optical matrix-vector computing model. This research realized the first 3D spatiotemporal intelligent optical computing system, which surpassed the constraints of digital I/O and improved machine vision processing speed by three orders of magnitude, reaching the nanosecond level.

Lu's group developed a spatiotemporal photonic computing model (STPC) for continuous optical computation by characterizing a multi-dimensional optical field propagation model for the first time. To address the problem of intrinsic dimension mismatch in spatial and temporal optical fields, they proposed a spatial and spectral multiplexing computational model that matches the spatiotemporal optical computation dimension. Furthermore, they established a spatiotemporal matrix multiplication and addition computational model to expand the spatiotemporal optical computation dimension. All computational operations were conducted in the optical simulation domain, thereby eliminating constraints on the speed of spatiotemporal optical computation caused by

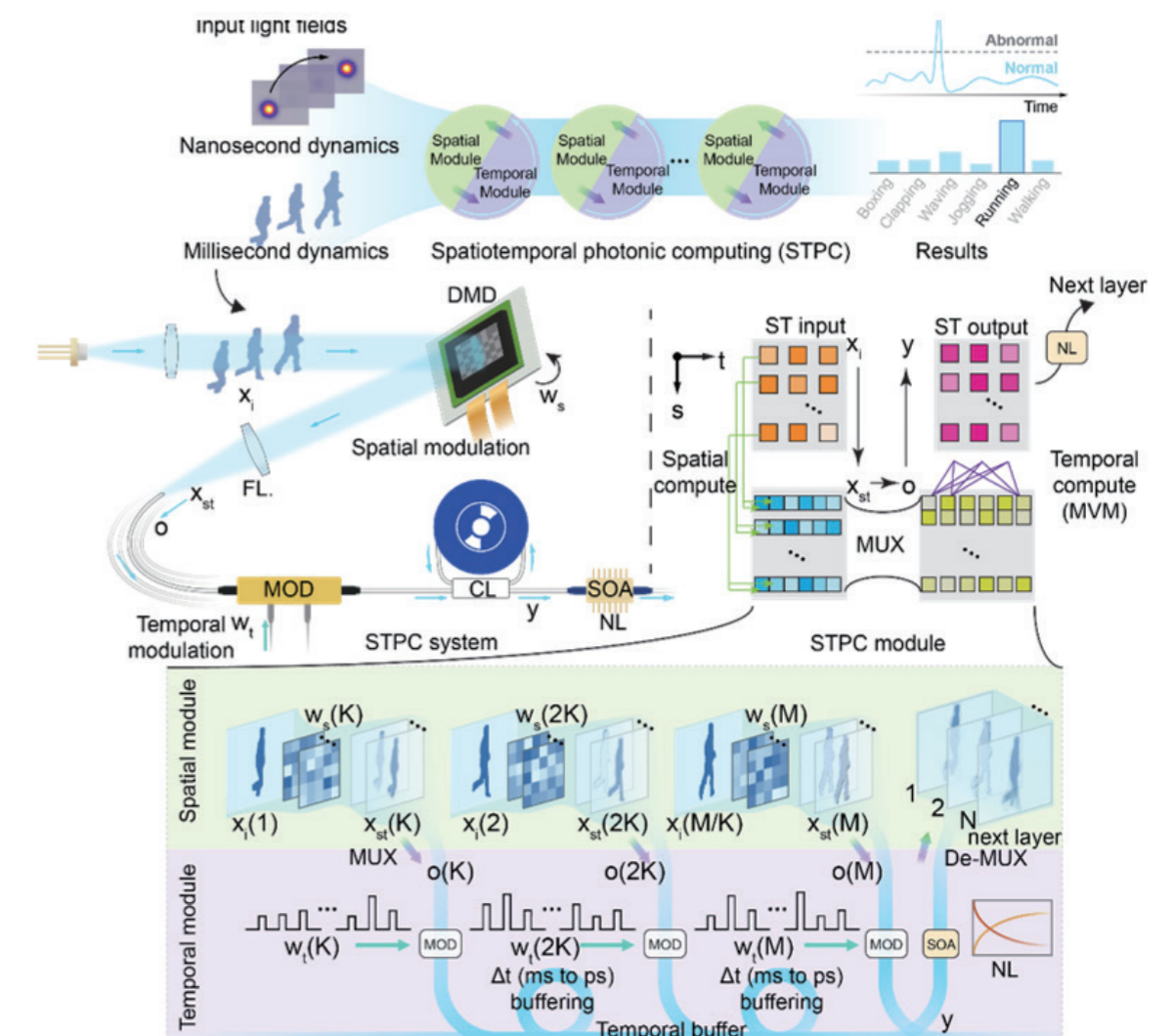


Figure 1. Spatiotemporal Photonic Computing Model

the transfer and read-write of electronic memory. The paper also proposed multi-variable all-optical nonlinear functions, which were used to construct multi-layer nonlinear neural networks that supported high-speed inference for complex visual intelligence tasks. Experimental results on several video dataset indicated that spatiotemporal optical computation could increase intelligent video processing speed up to several hundred megahertz. This approach is expected to bring about new opportunities in high-performance intelligent computing during the post-Moore era and real-time analysis and control of transient scientific phenomena.

This work was published in Science Advances with the title "Ultrafast Dynamic Machine Vision with Spatiotemporal Photonic Computing", and was selected as the Journal's feature article. Tiankuang Zhou and Wei Wu (Ph.D. students) are the co-first authors of the paper. The corresponding author is Associate Professor Lu Fang from the Department of Electronic Engineering.

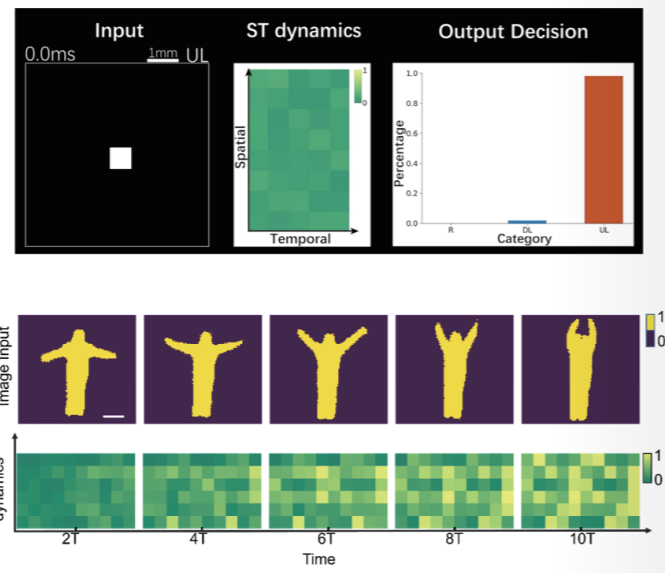


Figure 2: High-Speed Motion tracking

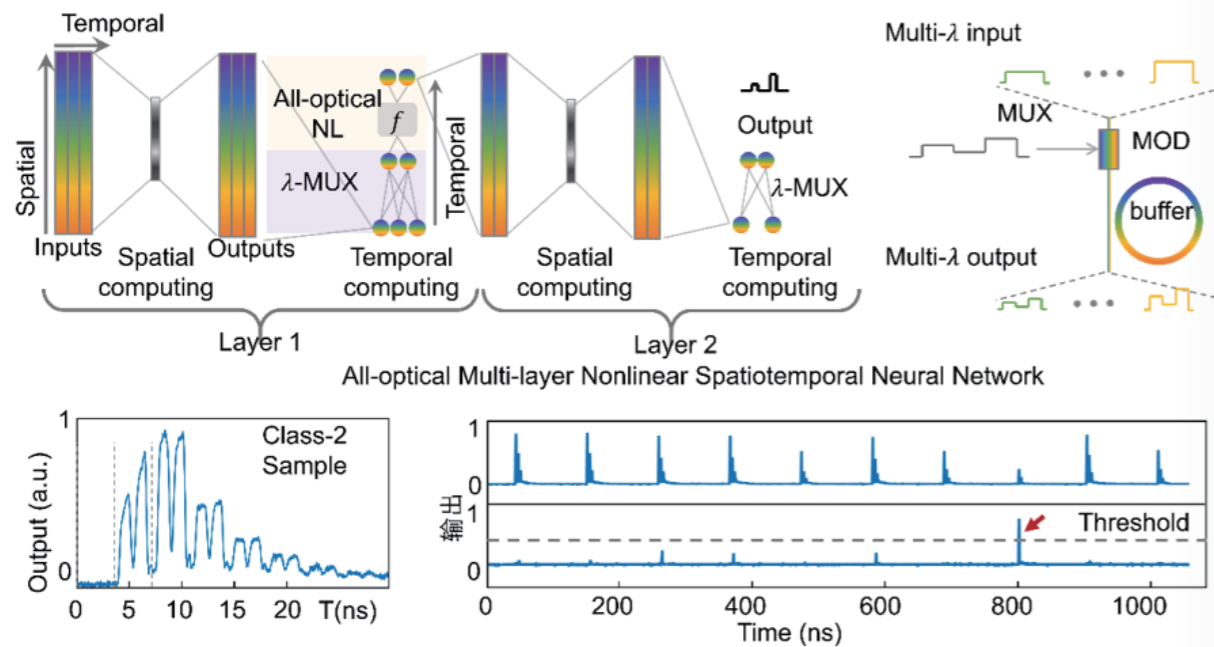


Figure 3. Nanosecond Ultrafast Computing

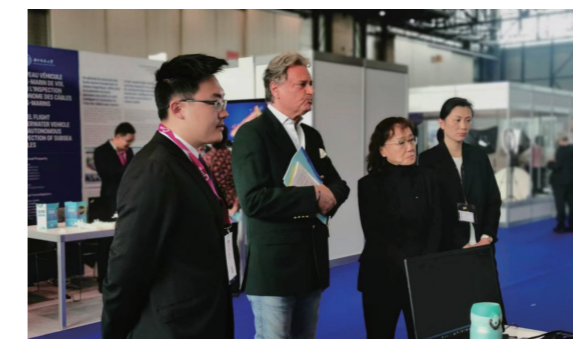
# TSINGHUA COMMUNITY

## Tsinghua team wows Geneva with aviation inventions



The award ceremony at the 48th International Exhibition of Inventions of Geneva

In a grand display of scientific prowess, Professor Piao Ying's team from Tsinghua University's School of Aerospace Engineering captured the coveted Gold Medal at the 48th International Exhibition of Inventions of Geneva, held recently in Switzerland. The research endeavor, "Theory and method on the enhancing mechanism of compressible turbulent combustion", also earned the Outstanding Innovation Award from the Saudi delegation to Geneva. With its profound influence, this invention lends unwavering support to the aviation industry, empowering the efficient design of diverse fuels and combustion apparatuses.



The International Exhibition of Inventions of Geneva, established in 1973, is one of the world's longest-running and largest-scale invention exhibitions, showcasing scientific and technological inventions and product innovations around the globe. After a 3-year hiatus, the exhibition was held in a brick-and-mortar venue this year. The event attracted over 1,000 inventions from more than 50 countries and regions, drawing over 40,000 visitors.

## Tsinghua doctoral student wins the first award at IFMBE Young Investigator Competition



Liao Zhuxiu, a doctoral student from the School of Medicine at Tsinghua University, won the first award at the IFMBE Young Investigator Competition.

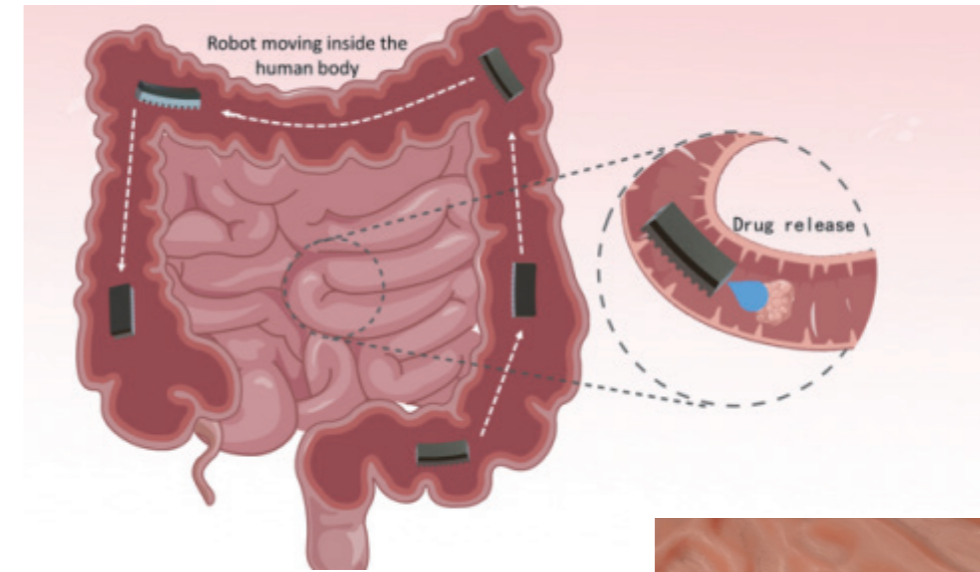
Liao Zhuxiu, a doctoral student from the School of Medicine at Tsinghua University, recently won the first award for a research paper titled "A Soft Robot Using Magnetic-pneumatic Hybrid Actuation that Functions in Unstructured Environments" at the final of the International Federation for Medical and Biological Engineering (IFBME) Young Investigator Competition in Suzhou, a city in East China's Jiangsu province.

The IFMBE Young Investigator Competition was held at the 12th IFMBE Asian Pacific Conference on Medical and Biological Engineering (APCMBE2023) and the 2023 China Biomedical Engineering Conference & Medical Innovation Summit (BME2023) from May 18th to 21st. The APCMBE2023 and BME2023 focused

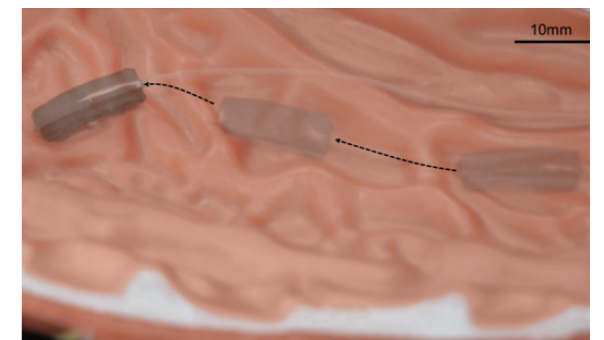
on major fields and core technologies in biomedical engineering and aimed to promote the integration of disciplinary development with medicine, enterprises, research, and education.

A total of 10 contestants, including Liao, out of over 2,000 participants, made it to the final competition.

Liao Zhuxiu, a doctoral student from the Department of Biomedical Engineering, School of Medicine, Tsinghua University, under the supervision of Professor Liao Hong'en, emerged as the sole recipient of the first award and received the title from Professor Kang-Ping Lin, secretary-general of the IFMBE, and Magdalena Stoeva, secretary-general of the International Union



A schematic diagram of the clinical application of a magnetically-pneumatically hybrid-driven medical soft robot.



An experimental motion diagram of a magnetically-pneumatically hybrid-driven soft robot in a gastric phantom model.

of Physical and Engineering Sciences in Medicine (IUPESM) at the conference.

Compared with traditional rigid robots, soft robots are known for their excellent flexibility, adaptability, and potential for miniaturization, demonstrating tremendous potential in both medical and industrial sectors. In his award-winning paper, Liao proposed a design plan for soft robots driven by a hybrid magnetic-pneumatic mechanism that achieves fast and controllable movement in various unstructured environments.

The research paper developed bionic movement gait models and actuation and control plans based on soft robots driven by magnetic-pneumatic hybridization. It achieved fast and precise management of soft robots and conducted lots of research in structural design, magnetization and sequential control of actuation to further enhance the movement of robots and their application in various scenarios.

In addition, the research emphasized the distinctive capabilities of soft robots in human-machine surgical

operation including image collection, automatic transport and drug delivery, highlighting their significant potential in clinical medicine. These robotic functions can assist doctors in performing minimally invasive operations and natural orifice surgery with greater ease and precision.

The research received financial assistance from the National Natural Science Foundation, National Key Research & Development Projects and the Beijing Municipal Natural Science Foundation.

## Prof. Shing-Tung Yau wins the 2023 Shaw Prize in the Mathematical Sciences

The 2023 Shaw Prize in the Mathematical Sciences was awarded to Shing-Tung Yau, Director of Yau Mathematical Sciences Center at Tsinghua University, and Vladimir Drinfeld, Professor of Mathematics at the University of Chicago, for their contributions related to mathematical physics, to arithmetic geometry, to differential geometry and to Kähler geometry.

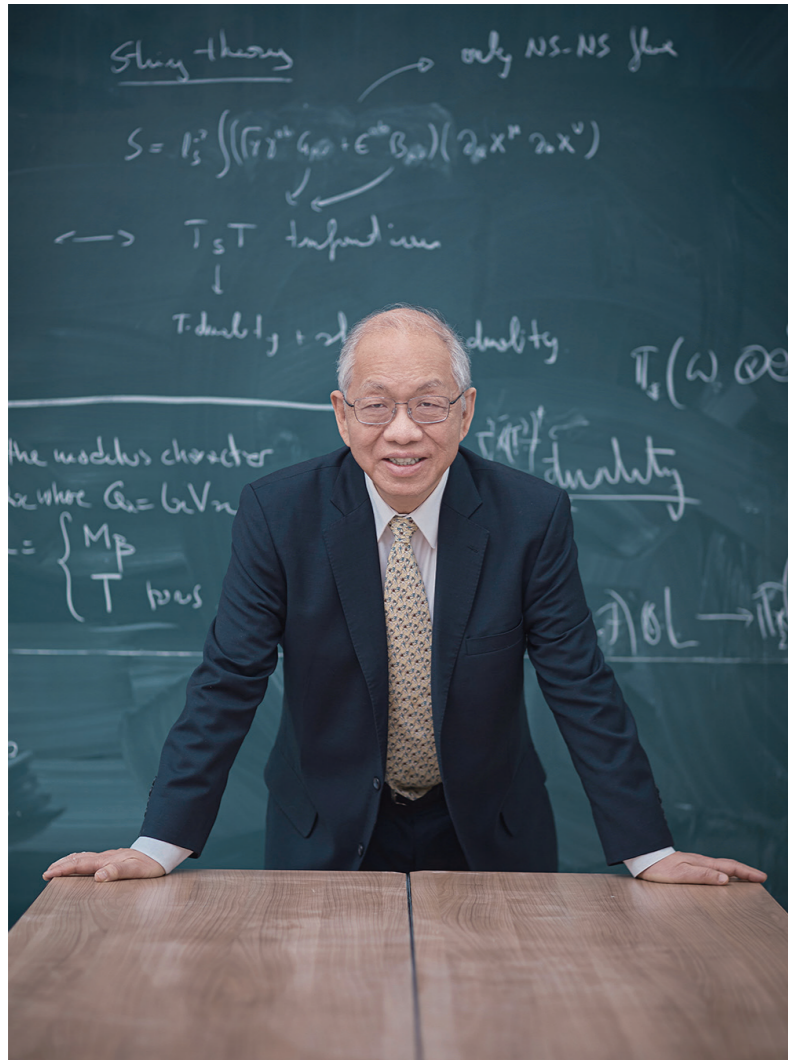
Yau and Drinfeld share an interest in mathematical physics. Yau worked on mathematical problems arising from general relativity and string theory.

Drinfeld launched with Beilinson the geometric Langlands program.

Yau is the Chair Professor of Tsinghua University, Director of Yau Mathematical Sciences Center and Dean of Qiuzhen College. He is a member of the Chinese Academy of Sciences, the US National Academy of Sciences, the American Academy of Arts and Sciences, and an honorary member of ASHK. He has won numerous top international mathematical awards, including the Fields Medal, the Crafoord Prize, the Wolf Prize, and the Marcel Grossmann Award.

Yau developed systematically partial differential equation methods in differential geometry. With these, he solved the Calabi conjecture, for which he was awarded the Fields medal in 1982, the existence of Hermitian Yang–Mills connections (with Uhlenbeck), and the positive mass conjecture (with Schoen) for which they used the theory of minimal surfaces. He introduced geometric methods to important problems in general relativity, which led for example to Schoen–Yau’s black-hole existence theorem and to an intrinsic definition of quasi-local mass in general relativity.

Yau's work on the existence of a Kähler–Einstein metric led to the solution to the Calabi conjecture, and to the concept of Calabi–Yau manifolds, which are cornerstones both in string theory and in complex geometry. The Strominger–Yau–Zaslow construction has had a major impact on mirror symmetry.



His work (with P Li) on heat kernel estimates and differential Harnack inequalities has changed the analysis of geometric equations on manifolds. It has influenced the development of optimal transportation and Hamilton’s work on Ricci flow.

Yau contributed to the fusion of geometry and analysis, now known as geometric analysis. His work has had a deep and lasting impact on both mathematics and theoretical physics.

2023 marks the 20th anniversary of the Shaw Prize. This international award, established under the

auspices of Mr. Run Run Shaw, recognizes imaginative individuals committed to scientific research and highlights their discoveries. It consists of three annual awards: the Prize in Astronomy, the Prize in Life Science and Medicine, and the Prize in Mathematical Sciences. In the past 20 years, 29 mathematicians, including Yau's tutor Shiing-shen Chern, Fields Medalists David Mumford, and Maxim Kontsevich, among others, have won the Prize in Mathematical Sciences. The 2023 presentation ceremony is scheduled for Sunday, 12 November 2023 in Hong Kong.

## Tsinghua's Storage Research Group takes honors on World Top 500 List

The Pengcheng Cloudbrain-II storage system, developed jointly by the Department of Computer Science and Technology of Tsinghua University and Pengcheng Laboratory, has secured the top spot on the latest IO500 world ranking announced on May 24 at ISC'23.

The storage system is based on the Pengcheng Cloudbrain-II infrastructure and fully powered by SuperFS, a high-performance file system independently developed by the Storage Research Group of the Department of Computer Science and Technology. It set a new world record in the full-node test with an overall score of over 210,000 points, surpassing the current second place by over 70,000 points. The key contributors to the SuperFS project are the faculty members including Professor Youyou Lu and Professor Jiwu Shu, and students in the Storage Research Group including Shaoxun Zeng, Hao Guo, and Yitian Yang. This project received guidance and great support from Academician Weimin Zheng and Professor Wenguang Chen, as well as the Pengcheng Laboratory.

Storage systems in high-performance computing are as significant as their computational counterparts. IO500, serving as a global benchmark of storage system performance, is one of the most influential rankings in the field of high-performance computing. Since November 2017, the IO500 lists are announced annually at the SC Conference in the US and the ISC Conference in Europe, both of which are premier conferences on high-performance computing.



## Tsinghua Professor Chen Guoqiang wins IMES Award in metabolic engineering

The 15th Metabolic Engineering Conference (ME15), held in Singapore from June 11 to 15, witnessed the IMES Award ceremony on June 14. Professor Chen Guoqiang from the School of Life Sciences at Tsinghua University, also the director of the Center for Synthetic & Systems Biology, was the sole recipient of this award recognizing scientists who have made significant contributions to metabolic engineering. He is the first scholar from the Chinese mainland to receive this honor.

Chen delivered a keynote presentation titled "Next Generation Industrial Biotechnology Based on Synthetic Biology of Halomonas" at the conference. He shared his latest research

achievements in the field of metabolic engineering.

The IMES Award, initiated by the International Metabolic Engineering Society, is presented biennially to recognize exceptional research scientists who have made significant contributions to the field of metabolic engineering. The award ceremony is a highlight of the International Metabolic Engineering Conference, jointly organized by the Society and the American Institute of Chemical Engineers (AIChE). The conference this year focused on topics such as "Big Data and Artificial Intelligence for Metabolic Engineering", "Metabolic Engineering for Next-Generation Medicine", and "Synthetic Biology for Metabolic Engineering".



Chen Guoqiang wins the IMES Award at the 15th Metabolic Engineering Conference.

## From WEF to COP 15: Zaizuo's experiences in environmental affairs

### Editor's Note

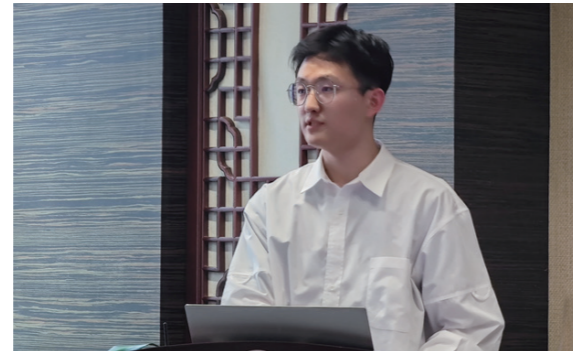
Tsinghua University plays an active role in promoting the 17 UN Sustainable Development Goals (SDGs) by nurturing innovative talents, enhancing research, among many other important ways.

Gong Zaizuo, a Tsinghua University undergraduate in the School of Environment, has devoted himself to addressing the world's environmental problems ever since he started college. He does so as a witness, participant, and future builder of a more sustainable world. After attending United Nations Biodiversity Conference (COP15) and interning at the World Economic Forum (WEF), his understanding as a global youth deepened. Today, let's listen to his story.

"During my internship, I had a Korean friend that sprang to mind. He worked in the same department as an intern as well. We both share a passion for, interest in, and conviction about dedicating ourselves to world affairs, so when I said goodbye and saw him off to his home country, I had an incredibly strong feeling that we would most likely cross paths again in the international arena."

When asked about his intern experience, Gong Zaizuo supplemented this touching detail. This young student, who was once an observer at COP15 and intern at the Beijing Representative Office of the World Economic Forum (hereafter referred to as the Office), consistently adheres to his commitment to global environmental affairs and Sustainable Development Goals (SDGs) with a sense of mission.





Zaizuo at Tsinghua

hanging out in the Great Hall's wooden circle filled with tables of admission teams from all departments.

That's his first step.

According to Zaizuo, the uniqueness of studying in GEP lies in two aspects.

Firstly, he was required to register for courses not only in Environmental Engineering, but in economics, law, international relations, and public management. Accumulating interdisciplinary knowledge, Zaizuo practiced his capability in evaluating environmental problems from different perspectives.

"Global environmental issues are multifaceted. To solve them, we not only need the environmental technology but consider its economic and social impact," Zaizuo concluded.

# 01

## At the Global Environment Program

Zaizuo felt "destined" to enroll in the GEP at Tsinghua University in 2019, a program designed to develop the next generation of environmental leaders.

He attended an orientation from the School of Environment four years ago while taking part in a summer camp following the National College Entrance Exam. He was particularly intrigued by the introduction of GEP.

"I'm committed to pursuing a career that is first and foremost helpful to the rest of the globe and the nation.

"So this program fits me perfectly," Zaizuo said.

In the interview, he doesn't mind using the word "impulsive" to describe his decision at the time. Despite the likelihood of failure and the possibility of rejection, Zaizuo fell in love with and applied for this program that was in line with his aspirations while

# 02

## At COP15

Encouraged and supported by GEP, Zaizuo attended the COP15 in Montreal, Canada as an observant in November 2022, applying what he had learned into practice.

Zaizuo visited Canada for six days, attending several seminars and negotiations while engaging in many cultural events.

Just like the World Cup, global biodiversity issues foster international understanding.

The Argentinean environment minister's key point was the most noteworthy. It so happened that the World Cup final—France vs. Argentina—took place on the Conference's final day.

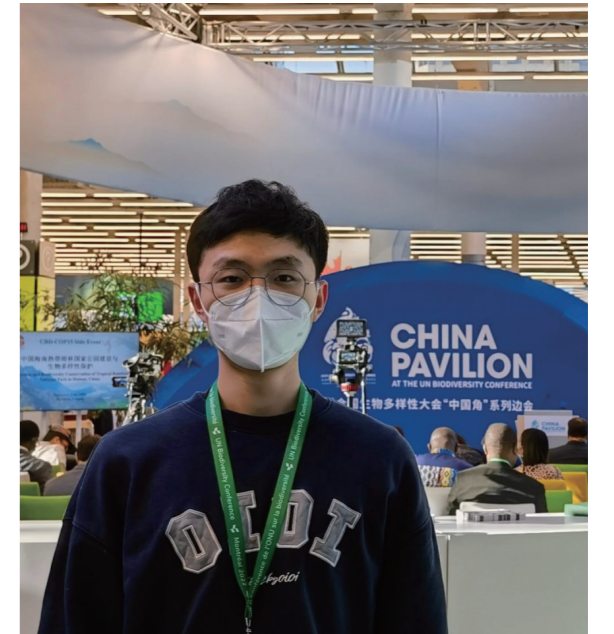
Despite being one of the tens of thousands of attendees, this experience helped him to better understand negotiations and the purpose of youth.

"The more negotiations take place in a climate of failure, the more likely they are to succeed."

"It's less likely that people with different stances will come to a consensus when an issue is less serious," he said. But because there is no agreement, the situation will only get worse before it becomes critical.

"I believe that as young people, we can encourage the relevant parties to focus on these concerns as soon as possible and take more proactive action."

That's his second step.



Zaizuo in Montreal





# 03

## At WEF

Zaizuo began preparing for the third phase early on.

"There is no doubt that a formal job at an international organization will be a part of my career development, but it may become a reality in the future." He believed it was vital to get additional expertise and put his abilities to the test before embarking on this quest.

That's why, from June to August 2022, Zaizuo interned at the World Economic Forum (WEF).

He aspired to develop his talent through various jobs, and WEF appeared to be an opportunity.

Zaizuo was a member of the Content and Interaction (C&I) Team, which is in charge of managing the Office's conferences, including the well-known Summer Davos. He was specifically involved in the preparation of the unique video debate between former Chinese Premier Li Keqiang and global businesspeople, the series' highest level and most important meeting.

"The moment Premier Li Keqiang said 'Goodbye,' I heard everyone in the room, including staff from WEF and the Chinese government, breathe a long sigh of relief because the meeting had finally come to a successful conclusion," Zaizuo said in retrospect of this intense and fulfilling internship.

Every successful conference is the result of his team's tireless efforts. Following extensive research, Zaizuo's team proposed a plan for this special dialogue that



Zaizuo at WEF

included two online meeting rooms and one webinar room. Following approval, they determined the meeting's agenda, practiced the process, set up Zoom backstage, and created the link to the meeting.

Zaizuo managed the meeting room as a co-moderator and ensured the successful completion of the meeting. During this process, he had to communicate and coordinate a lot with not only WEF Headquarters but the Premier's team, which practiced his communication skills and gave him a sense of achievement.

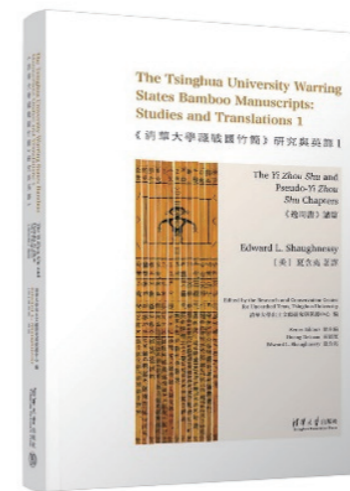
The Korean friend aforementioned is the souvenir of this journey, through which Zaizuo's resolve into tackling global issues, especially environmental ones, is enhanced. From GEP to WEF and COP15, he consistently felt surrounded by people passionate about global affairs and immersed in an aspiration to work for the welfare of humankind.

As a quote from Theodore Roosevelt says, "Keep your eyes on the stars and your feet on the ground." That's what this young student from Tsinghua has done in pursuit of his dream.



# DIVERSE CAMPUS

## Seminal work on Tsinghua University Warring States Bamboo Manuscripts launched



The first volume of *The Tsinghua University Warring States Bamboo Manuscripts:*

*Studies and Translations* book series

On April 27, the Research and Conservation Center for Unearthed Texts, Tsinghua University, together with Tsinghua University Press, and XuetangX held a book launch in celebration of the publication of the first volume in the book series, *The Tsinghua University Warring States Bamboo Manuscripts: Studies and Translations* 《清華大學藏戰國竹簡》研究與英譯.

The book launch was held in the Humanities Building and was simultaneously live-streamed through the MOOC platform XuetangX, and social media including Tsinghua University's Official Weibo and WeChat channels, Douyin, Bilibili, Facebook and Twitter, etc. Over 130,000 people at home and abroad attended the event online.

With 18 volumes planned, *The Tsinghua University Warring States Bamboo Manuscripts: Studies and*

*Translations* systematically translates, introduces, and studies the Tsinghua University Warring States Bamboo Manuscripts. The series editors are Professor Huang Dekuan 黃德寬, director of the Research and Conservation Center for Unearthed Texts, Tsinghua University, and Professor Edward L. Shaughnessy, director of the Creel Center for Chinese Paleography, University of Chicago. The series is published by Tsinghua University Press 清華大學出版社.

Each volume in the series presents the latest state of research and carefully annotated translations of a selection of manuscripts by a specialist in the field of early Chinese manuscript studies. The arrangement of manuscripts in the individual volumes in the series follows the ordering and the latest developments of scholarship presented in the *Qinghua daxue cang Zhanguo zhujian jiaoshi* 清華大學藏戰國竹簡校釋 *Collated Interpretations of the Tsinghua University Warring States Bamboo Manuscripts*, carefully prepared by scholars of the Research and Conservation Center for Unearthed Texts. The volumes bring together manuscripts from the Tsinghua University collection that are closely related in terms of text, topic, and materiality. The texts are presented in the original Warring States period (481-221 BCE) Chu-state script, transcriptions in modern standard Chinese, and annotated English translation. To ensure the translation meets high quality, members of the translation team meet regularly to discuss and review each other's work, and the final volumes are subjected to rigid peer review. Subsequent volumes are in the process of completion and the remainder of the series will be published in succession.

The launch event showcased the publication of the first volume in the series: *The Tsinghua University Warring States Bamboo Manuscripts: Studies and Translations 1, The Yi Zhou Shu and Pseudo-Yi Zhou*

*Shu Chapters*, written by Edward L. Shaughnessy, a renowned scholar of early Chinese paleography and history. The volume introduces six manuscripts from the Tsinghua University collection related to the *Yi Zhou shu* 逸周书 or "Leftover Zhou Scriptures." The *Yi Zhou shu* is a quasi-canonical collection of scriptures from the Zhou-dynasty (1045-249 BCE) said to be comprised of remaining material from Confucius' editing of the *Exalted Scriptures Shang shu* 尚书.

In the introductory chapters and the appendix, Shaughnessy provides a thorough introduction of the *Yi Zhou shu*, its textual history, and its relation to the Tsinghua Manuscripts. In the remainder of the book, Shaughnessy provides carefully annotated translations and studies of individual manuscripts and related texts from the transmitted tradition. The manuscripts include the *Instruction on Mandates (Ming Xun 命训)*; *Awakening at Cheng (Cheng Wu 程寤)*; *August Gate (Huang Men 皇门)*; *The Duke of*

*Zhai's Retrospective Command (Zhai Gong zhi Gu Ming 祭公之顾命)*; *The Protective Instruction (Bao Xun 保训)*; and finally, *The Command Enfeoffing Xu (Feng Xu zhi Ming 封鄴之命)*.

At the launch, Tian Lixin, director-general of the Ministry of Education's Language and Information directorate and Professor Peng Gang, Vice-president of Tsinghua University delivered addresses. Qiu Xianqing, the chairman of Tsinghua University Press introduced the publication process of the book series. Professor Huang Dekuan introduced the scope and aims of the book series and the editing of the Tsinghua bamboo manuscripts, and Professor Edward L. Shaughnessy introduced the contents and format of the volume, the translation team and their work on the manuscripts. Additionally, various scholars both from within China and the international academic community provided their views on the significance of the series and this first volume.

## Tsinghua's largest indoor sports facility unveiled

The inauguration ceremony of the North Gymnasium of Tsinghua University was held in Tsinghua on April 29. Qiu Yong, secretary of the CPC Tsinghua University Committee, Wang Xiqin, president of Tsinghua University, Yang Bin, vice president of Tsinghua University, Guo Yong and Xu Qinghong, deputy secretaries of the CPC Tsinghua University Committee, Shi Zongkai, vice chairperson of the University Council and director of the University Sports Committee, and Wang Chun, representative of the Construction Unit and deputy secretary of the Party Committee of China Construction First Group Construction and Development Co., Ltd. attended the ceremony.



Qiu Yong said that Tsinghua University has always attached great importance to sports education and has always regarded sports as an important link in talent training. He said that the important role of physical education in the University is to help students enjoy sports, enhance physical fitness, cultivate a sound personality, and exercise their willpower. It is hoped that all teachers and students will make full use of the North Gymnasium and other sports facilities, inherit and carry forward the fine traditions of Tsinghua sports, develop good exercise habits and "work healthily for 50 years for the country" with practical actions.



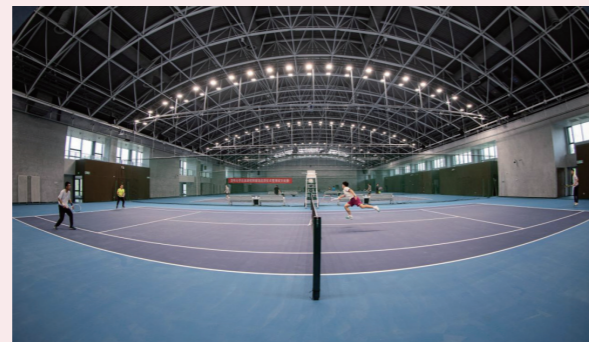
During the ceremony, Wang Xiqin presented a souvenir to Wang Chun on behalf of the University.



The North Gymnasium of Tsinghua University integrates tennis courts, table tennis halls, basketball and volleyball halls, fitness centers, physical training and rehabilitation centers, simulated skiing halls, ice sports centers, fencing halls, squash halls, multi-functional exercise rooms, and climbing walls. It has two floors above ground and two floors underground, with a total indoor area of 38,280 square meters, equivalent to six standard football fields. It is the sum of all indoor sports venues on campus.



The North Gymnasium will also provide services such as physical fitness training, rehabilitation training, and daily physical function testing. It can provide personalized exercise prescriptions for different individuals, and in the future will host more cultural and sports activities.



## International Cultural Festival held at Tsinghua



From May 13 to 21, the 11th Tsinghua University International Cultural Festival unfolded in all its splendor. Among its cherished traditions, the Global Village event stood tall, showcasing the rich diversity of students from various countries. The festival was a harmonious symphony of a music concert, a speech contest, and an exhilarating clash of talents on the basketball court.

The Global Village event included many cherished traditions. At the opening ceremony, students explored the captivating charm of the wider world. This cultural extravaganza delighted participants with diverse culinary delights from every corner of the globe, while immersing them in the customs and traditions of different countries. It was a celebration of cultural diversity, allowing students to broaden their horizons and embrace the richness of our shared planet.

Beneath the twinkling stars on a grassy field, students

came together on May 13 in a musical event that knew no boundaries. With melodies that captured the essence of spring, they embraced the enchanting diversity of cultures through the music of various regions. It was a celebration in which the universal language of music united hearts and everyone reveled in the beauty of different traditions.

With the theme of "Resonance", TEDxTHU touched the hearts of every attendee with a variety of unique stories on May 18. Students came together to listen to voices from around the world and feel the beat of global ideas. It was an event that brought inspiration, unity, and a sense of connection to all who took part.

As the night fell on May 19, the vibrant international ambiance only grew stronger, illuminated by the gentle summer evening breeze and the soft glow of street lamps. It was during this magical time that the essence of multiculturalism came alive, beckoning



everyone to venture hand in hand and embark on a journey to explore the world.

On May 21, under the perfect afternoon sun, basketball enthusiasts from Tsinghua University eagerly responded to the invitation for a thrilling basketball game hosted by Nike x THU.

The 11th International Cultural Festival, hosted by the International Students & Scholars Center (ISSC), stood as one of Tsinghua University's grandest and most remarkable events dedicated to celebrating global

culture on campus. The festival was a collaborative effort, organized by various student associations, including the Tsinghua University Association of Student International Communication (ASIC), the Tsinghua University Students' Association of International Culture Exchange (AICE), the Student Union of Tsinghua University, and the Graduates Union of Tsinghua University. Additionally, student associations in different countries and regions played a crucial role in its organization, ensuring a rich and diverse celebration of international culture.



## Tsinghua wins track and field honors, 14th consecutive title



From May 18 to 21, the 61st Beijing University Students Track and Field Games witnessed fierce competition among top-tier athletes. Emerging triumphant after four days of intense battles, the Tsinghua University Track and Field team stood out with an impressive tally of 30 gold, 15 silver, and nine bronze medals. Their stellar performance secured them the top position in the men's team category with 253 points and the women's team category with 281 points, amassing a total of 534 points. The Tsinghua team clinched the championship in total

points. Tsinghua men's team and women's team also won championships respectively. In addition to taking honors for the 14th consecutive championship, their outstanding performance was acknowledged with the Sportsmanship Award.

The annual competition, also the largest student sports event in Beijing, has been held for 61 years, with Tsinghua securing the team championship in total points on 41 occasions.



## Virtual Simulation Creative Design Contest concludes at Tsinghua's School of Materials Science and Engineering

2023北京市第一届暨清华大学第四届虚拟仿真创意设计大赛



The First Beijing & the Fourth Tsinghua University Virtual Simulation Creative Design Contest recently concluded at Tsinghua University's School of Materials Science and Engineering on May 27.

It was attended by 78 delegations from 25 universities, including Tsinghua University, the Beijing Institute of Technology, the University of Science and Technology Beijing, the National University of Defense Technology, Nanjing University, Beihang University and China Agricultural University, across 16 provincial regions.

The contest targeted the in-depth integration of virtual simulation technologies and higher education in the digital era, and aimed to help college students learn more about virtual simulation technologies and facilitate their application in different fields.

During the event, teachers and experts from universities and enterprises held 10 training sessions for contestants on the development and application of virtual simulation technology and provided them with professional guidance in the creation of high-quality products.

After the preliminary rounds, 16 delegations of undergraduate students and another 16 delegations of graduate students entered the final of the competition.

Organizers presented a special award to one delegation, first-class prizes to three delegations, second-class prizes to four delegations and third-class prizes to eight delegations.

The competition was hosted by the School of Materials Science and Engineering at Tsinghua University, supported by the School of Chemistry and Chemical Engineering at the Beijing Institute of Technology and the School of Materials Science and Engineering at the University of Science and Technology Beijing, and undertaken by Tsinghua University's state-level Virtual Simulation Experimental Teaching Center of Materials Science and Engineering.

## Third Tsinghua-PKU Low-carbon Campus Design Friendly Competition Held



The 3rd Tsinghua-Peking University Low-carbon Campus Design Friendly Competition was held on June 10th. The exchange meeting showcasing the outcomes of the "Handmade Innovation Practice" course from Tsinghua University and the "Sustainable Campus Practice" course from Peking University was also held that day.

Throughout this semester, more than 60 students from Tsinghua University and Peking University collaborated on the theme of "Sustainable Green Living". They transformed the iGarden, a horticultural education base of Tsinghua University, into seven

themed gardens and renovated four nucleic acid testing stations within Peking University's campus. These endeavors were a testament to their understanding and desire for a low-carbon and sustainable lifestyle. During the competition, the students explained the objectives behind their creations and the underlying principles guiding their renovations. The project outcomes reflected the essence of the low-carbon theme and received high acclaim from the course instructors.

This event is part of a series of activities organized by the iCenter during Tsinghua University's labor education month.





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