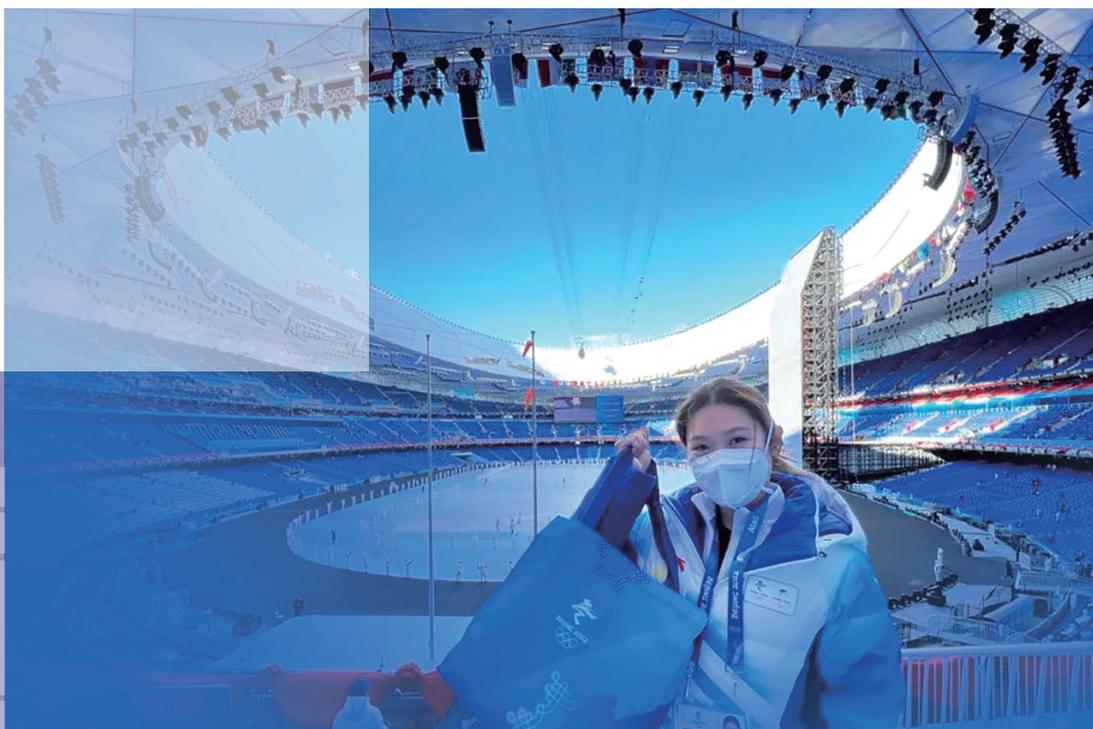


TSINGHUA NEWSLETTER

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- P02 China's original contribution to the Winter Olympics: Rock-filled Concrete Technology leads to "Revolution"
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FOCUS

New President and Secretary of the CPC Tsinghua University Committee announced



Qiu Yong



Wang Xiqin

Wang Xiqin was appointed President of Tsinghua University, while former President of Tsinghua University, Qiu Yong, was named Secretary of the CPC Tsinghua University Committee. Chen Xu, former Secretary of the CPC Tsinghua University Committee, will no longer serve in her post.

The decision was announced by Li Xiaoxin, Deputy Head of the Organization Department of the CPC Central Committee, at a meeting held at Tsinghua University on February 25, 2022.

Tian Xuejun, a member of the Leading Party Members' Group and Vice Minister of Education, and Sun Meijun, a member of the Standing Committee of the CPC Beijing Municipal Committee and Head of the Organization Department of the CPC Beijing Municipal Committee, attended and addressed the meeting.

Qiu Yong, born in July 1964, is a Member of the Standing Committee of the 13th National People's Congress. He is also Vice Chairman of Education, Science, Culture and Public Health Committee of the 13th National People's Congress and a member of the Chinese Academy of Sciences.

He has served as Chair of Tsinghua University's Department of Chemistry. He has also held the following positions: Deputy Dean of the School of Sciences, Vice Chairman of the University Committee of Academic Affairs, a member of the Standing Committee of the CPC Tsinghua University Committee and Vice President, Executive Deputy Secretary of

the CPC Tsinghua University Committee and Vice President, President of Tsinghua University and Deputy Secretary of the CPC Tsinghua University Committee.

Wang Xiqin, born in June 1968, has served as Chair of the Department of Electronic Engineering, Deputy Dean of the School of Information Science and Technology, Director of the Personnel Department and the Human Resources Development Office, Assistant to the President, a member of the Standing Committee of the CPC Tsinghua University Committee and Vice President, and a member of the Standing Committee of the CPC Tsinghua University Committee and Executive Vice President.



China's original contribution to the Winter Olympics: Rock-filled Concrete Technology leads to "Revolution"



Rock-filled concrete is a new type of mass concrete technology invented by Tsinghua University. For more than 20 years, it has been recognized in China and abroad for its salient features of low temperature rise of hydration heat, good crack resistance, simple construction process, reduced cement consumption and fast construction. In 2021, the Bulletin on Rock-filled Concrete Dam has been issued by International Commission on Large Dams (ICOLD), as the first technical standard with original Chinese technology as main content since the establishment of ICOLD nearly a century ago. Application of this technology to the reservoir project for the 2022 Beijing Winter Olympics fully demonstrates China's scientific and technological strength in original innovation.

Located in Jundu Mountain to the northwest of Yanqing District, Beijing, with 2199 meters above sea level, Xiaohaituo Mountain area has unique climate conditions, beautiful natural environment and high air quality, along with its unique hilly terrain of vertical drop of more than 800 meters which is suitable to build ski trails. All of these make it become the first choice of the 2022 Winter Olympic Games in Yanqing division.

These arenas, built on the top of mountains, must have sufficient water nearby to support the artificial snow. Baihepu Reservoir and Foyukou Reservoir convey water to the National Alpine ski center through a multi-stage pressurized pump station to meet the snow-making tasks under various working conditions. Therefore, it is necessary to build two dams in the competition area: one is 1050-meter dam and the other is 900-meter dam so as to achieve the goal of storage and recycling of water resources.





As the user of rock-filled concrete dam technology, Gao Xitao from Beijing Jinhe Water Construction Group Co., Ltd. is the Construction Director of Snow-making and Water Diversion Project. In the 1050 reservoir project they contracted, the height of the dam is 58m. From the first lift concrete pouring to the capping of the dam, the total pouring time of the dam body is 4 months. He said: "The concrete pouring of a 58-meter-high dam body is completed in 4 months. The progress is very fast in terms of the construction period, which is also a historical construction period for us to break through."

Considering the importance of the Winter Olympic Games and the concept of green ecological environmental protection, the reservoir project site is located in the narrow area between two mountains. The internal and external road transport capacity is insufficient to support fast construction. Moreover, given the complex and diverse terrain conditions of the competition area, conventional concrete dam cannot meet the requirements of short construction period and high construction quality in a high-temperature rainy season. After investigation, Beijing Institute of Water Conservancy Planning and Design Yang Xiaolei (General Director of Design of Snow-making and Water Diversion Project) and his team found that the rock-filled concrete technology is easy to be applied in construction. It makes full use of the site excavation material, and the temperature control measures are simple. Therefore, they chose the new type of rock-filled concrete dam, which has independent intellectual property rights in China, and has been recognized by International Commission on Large Dams.



Prof. Jin Feng is the Inventor of Rock-filled Concrete Technology and research team leader at Department of Hydraulic Engineering in Tsinghua University. He introduces that the Rock-filled concrete technology is a new type of mass concrete technology invented by Tsinghua University. This technology refers to packing large rocks (2~3m in height) in a natural manner, and using self-compacting concrete to fill voids among rocks, cementing to form a compact and dense concrete. It is featured by low hydration temperature rise, excellent crack resistance, convenient construction, reduced cement consumption and fast construction.

In addition, the rock-filled concrete technology has significant advantages in energy conservation and emission reduction. The carbon emission of rock-filled concrete is actually only two-thirds of that of ordinary concrete. Therefore, it is very energy-saving and environment-friendly. Especially on the promise that we need to achieve the goal of carbon neutrality, carbon



peak and dual carbon, rock-filled concrete will show more vigorous vitality. China's damming technology will surely go to the world, making the original Chinese technology become the mainstream damming technology recognized by the world.



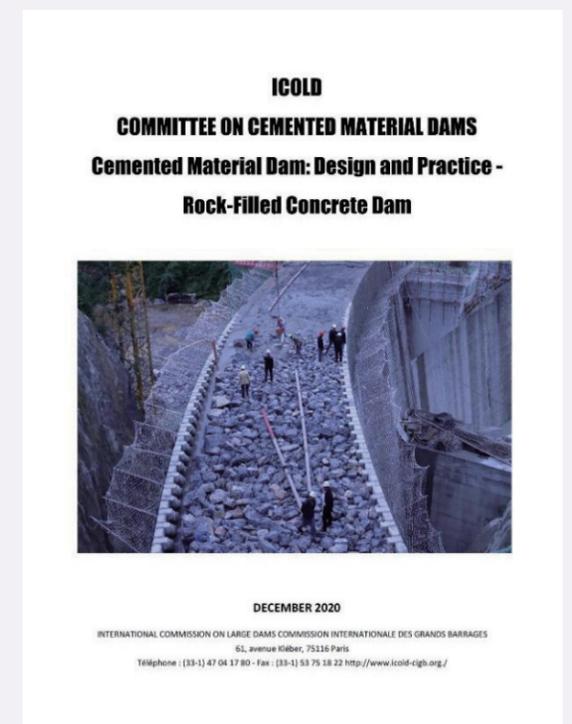
After being studied and repeatedly examined in engineering application by the teachers of the Water Conservancy Department of Tsinghua University in engineering application for 20 years, the technology of rock-fill concrete was finally mature. Professor An Xuehui, is inventor of rock-filled concrete technology. He says, "The application of rock-filled concrete technology in the Winter Olympics shows the approval of China's top water conservancy experts. It also marks that this technology will be able to move towards the world in the future, build a community with a shared future for mankind, and contribute our Chinese wisdom and strength."

By November 2020, more than 130 new rock-filled concrete dams had been built; the technical route of dam construction had been innovated; the difficult problem of temperature control of concrete dam had been overcome; and the technical standard system of rock-fill concrete dam had been established. The Rock-filled Concrete Dam won second class of 2017 national technological invention award (ranking 1). The rock-filled concrete dam has also been promoted to "The Belt and Road Initiative" hydropower construction from China.

The Bulletin on Rock-filled Concrete Dam has become the first technical standard whose main content is China's original technology issued by the International

Commission on Large Dams over the past 100 years since its establishment. Michael F. Rogers, President of the International Commission on Large Dams, gives a high appraisal on this technology. He believes the original rock-filled concrete dam is safe, reliable and environment-friendly, which is the most rapidly developed dam design and construction technology in the world in recent 20 years. He said, "As ICOLD President, I sincerely support the continued development of Rock-filled concrete dams as critical infrastructure for water resources that that will enable the global scientific and technology community to continue to make progress in science and technology as priority for the well-being of mankind as part of a global awareness for sustainable progress of our human civilization."

The successful application of original Chinese technology in the reservoir project of the Olympic Winter Games thoroughly explains the scientific, technological, and green Olympics concept, and the rock-filled concrete technology is going to the world " together go to the future ".



From 2008 to 2022, a dual Olympic volunteer in dual Olympic city



For Yu Zhongqi, a doctoral student at School of Public Policy and Management of Tsinghua University, the memory of volunteering for the Beijing Olympic Games in 2008 remains vivid and fresh, prompting him to serve again for the 2022 Beijing Winter Olympics.

"The Beijing 2008 Summer Olympics was held when I was an elementary school student. But watching the competitions on TV was nowhere near enough for me, and I was eager to feel the Olympic atmosphere live," he recalled.

When the Olympic flame was ignited in Beijing for the first time in 2008, Yu was an 11-year-old pupil. He signed up to become an Olympic volunteer, providing translation and consultation services at a volunteer station.

"I just wanted to practise English and introduce China to more foreign friends," Yu said.

In order to achieve this, he prepared detailed English introductions of traditional Chinese culture, including the Great Wall, the Forbidden City, Beijing courtyard and Peking duck.

"Looking back, I feel it's more important to give foreigners a better understanding of the core concepts of Chinese culture," Yu added.

In his mind, from "Welcome to Beijing" to "Together for a Shared Future," China is showing its consistent welcome to the world, and he hopes the world can gain a better understanding of China.

Yu has been selected to volunteer for Beijing 2022 as an Olympic Family Assistant (OFA), responsible for coordination and communication.

"Being a volunteer in Beijing 2008 was a start for me," Yu said. "I have gained experience of organizing activities at Tsinghua University in recent years. It makes me better aware of the strength of teamwork. Volunteers are never alone, and the OFA is also a big family."

More than 1,000 volunteer stations were in place during the Beijing Olympics. Working in one of them 13 years later, Yu is dedicating himself to contributing to a "simple, safe and splendid" Olympic Winter Games with fellow volunteers.

"As a dual Olympic city, Beijing is ready. So am I, a dual Olympic volunteer," Yu said.



Yang Yang: light the Olympic passion once again



"The Olympic Games is a stage for the athletes, as their fighting spirit will inspire more people to face challenges positively and work hard to solve difficulties, especially for kids who look up to athletes as role models."

Yang Yang, China's first-ever Winter Olympics gold medalist, who graduated from Tsinghua in 2007, is one of the most accomplished short track speed skaters of all time. Currently, she serves as the vice president of World Anti-Doping Agency (WADA) and chairperson of the Athletes Committee of the Beijing 2022 Organizing Committee, busy assisting in organizing the Winter Olympics.

During her active years, Yang claimed her dominance with 59 world titles, including 6 consecutive Overall World Championships. At the 2002 Winter Olympics, she pocketed two gold medals in the Women's 500m and 1000m short track events, and also shared a silver medal in the 3000m relay, achieving a milestone breakthrough for both herself and China.

After her retirement, a feeling of loss struck her. "When I was an athlete, I had a clear goal, which was to stand on the world's highest podium. But then it disappeared, and I did hope to find something else to motivate myself in the future."

Volunteering experiences in Africa have given her inspiration; when playing football with disabled children in Ethiopia, she was touched by their sincere love for sports, and realized the power of sports in youth development, which gradually led her to engage more in philanthropy empowered by the spirit of sport. Afterwards, she founded Champion Foundation to promote youth sports activities in schools and communities, and initiated the Feiyang Ice Skating Center in Shanghai.

"Sometimes opinions from the outside could be disturbing, yet I found that listening to the voice deep inside you is of utmost importance."

Actively involved in sports organization at the same time, she was elected a member of the International Olympics Committee (IOC) in 2010, and became a council member for the International Skating Union in 2016. All these working experiences contributed to her participation in the Beijing Winter Olympics.

The bid for Beijing 2022 has been an especially unforgettable experience for her, as Yang was pregnant at that period. Her little daughter has accompanied her throughout the journey, including the reception of representatives from the IOC to inspect Beijing's venues, as well as the delivery of a wonderful speech to bid for the Winter Olympic Games.

Shortly after the successful bid, Yang's schedule became even busier as she worked to help prepare for and organize the games. As the chairperson of the Athletes Committee of the Beijing 2022 Organizing Committee, she has made more than 40 proposals, ranging from preparing supplies for ensuring adequate equipment, to assisting to create the menus for the Olympic Village.

Despite the rapidly changing world nowadays, Yang believes hosting the Olympic Games will provide a spiritual motivation for humanity to work together and put the Olympic motto of "Together" into practice.

"As an Olympian and chairperson of the Athletes' Committee of Beijing 2022, I want to express that we are ready to welcome the best athletes from all over the world to meet in Beijing and light the Olympic passion once again," Yang says.



A shining snowflake at the opening ceremony of Beijing 2022

Editor's Note

Sanghee Cheong is a senior Korean student in the School of Journalism and Communication at Tsinghua. As the NST Event Services Assistant, she was a volunteer in the opening ceremony of the Beijing Winter Olympics. Here, she shared her experience during the Winter Olympics.



Since childhood, I have been keen on public welfare activities. During my college years, I participated in many charity programs such as animal protection, caring for the elderly, and supporting education.

Beijing 2022 is not only a once-in-a-lifetime opportunity, but also makes up for my regret that I failed to participate in Pyeongchang 2018. So, when seeing the recruitment information for volunteers at Beijing 2022, we Korean students signed up without hesitation.

I didn't tell my father about the signing up until this winter. I once thought he might oppose my volunteering because of COVID-19. However, to my surprise, he was very supportive of my decision. "Despite the epidemic, people in any country always have a good heart to help others," he said, encouraging me to perform well.



In the opening ceremony, my main task was to guide the audience in the ring gallery. At first, I didn't understand why I had to stand there holding a number plate when there was a large number printed on the wall.

On the day of the opening ceremony, countless members of the audience passed by me and many people asked me for help.

This task was not easy. I had to stand steadily in the cold wind for a long time. Although I had been working for nearly 15 hours, I still smiled brightly when members of the audience thanked me. This is not only due to the professional ethics of volunteers, but also due to the happiness and pride in my heart for what I was doing.

When seeing athletes from all countries get together and so many national flags waving in the National Stadium, I cheered together with the people around me, and my tears were about to flow.

Since the outbreak of the pandemic, we have rarely seen such an international and global scene. At the site of the Winter Olympics, I feel that the dream of a global village and human unity has been put on the agenda again.

It's inseparable from China's attention to epidemic prevention and its huge manpower and material investment in the Winter Olympics. All work is valuable since we created a wonderful ceremony together, which brought the world closer.

Touching friendship of a connection through the Olympics

Editor's Note

This exceptional Winter Olympics welcomed friends from all over the world to Beijing, where members of the International Olympics Committee, sports federations and international organizations gathered to enjoy the Games.

Liu Dibo, a PhD student from the School of Environment, served as an Olympic Family Assistant (OFA) in Beijing 2022, offering service and kindness to distinguished guests. 16 days of excellent service in the Games gained him a precious friendship with his client. Let's read his story about this touching friendship of a connection through the Olympics.



"Dibo is not only my assistant, but also a friend important to me in Beijing," said Francesco Ricci Bitti, President of the Association of Summer Olympic International Federations (ASOIF), also a client of Dibo in Beijing 2022. The word "friend" surprised and touched Dibo, which mattered so much for his assistant service in his voluntary work in Beijing 2022.

Feb 5th, 2022, marked the start of his journey with Francesco. With his anxiety and worries, Dibo waited for his coming client, of whom all Dibo knew was just that he was the 80-year-old ASOIF President. But when he saw Francesco walking to him, smiling and greeting gently, he regained his confidence and showed Francesco his best

performance and service. Later he knew that Francesco had accidentally fallen to the ground the night before, but he came to doctors even after meeting with his assistant, Dibo, not making him wait too long. "I will definitely do my best to assist such a kind gentleman," Dibo said to himself, "I made up my mind long ago that I would try my best to bring him a wonderful memory of the Beijing Winter Olympics."

As an OFA at Beijing 2022, one should work as a personal secretary for clients, assisting them with scheduling arrangements, language service, accompanying visits, etc., but Dibo had done a great job beyond the call of duty. "I tried to know more about his preferences and make tailored plans for him to watch events every day," Dibo said. "Every day we traveled our way to the venues, and I introduced the tourist attractions to him for a better journey in Beijing." A settled schedule can also be unexpectedly changed due to the Games' arrangements, but Dibo was always there with Francesco to offer timely solutions.

One day, Francesco took him to Casa Italia, a cultural promotion event organized by the Italian government during every Olympic Games where customers and athletes can enjoy Italian culture with their friends. Francesco introduced Dibo to his friends, "Dibo is not only my assistant, but also a friend important to me in Beijing". When other foreign friends greeted him with smiles, Dibo



felt surprised and was touched by Mr. Francesco who truly treated him as a real friend in China. Francesco also invited him to taste Italian cuisine to thank him for days' long service as an OFA.

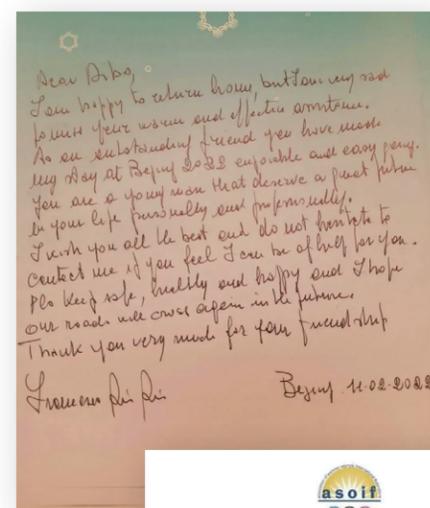
In his happy journey with Francesco, Dibo completed his duty successfully as a volunteer, and also had a lot of fun with Francesco. Their daily life was always filled with laughter, thanks to Dibo's effective and efficient arrangement which satisfied Francesco with more wonderful events to watch. Dibo also showed his excellent competence when faced with some emerging change or arrangement, enabling Francesco to participate in important meetings in a short time. "You are the smartest assistant I've ever seen," Francesco praised Dibo.

Time flies. When it was time to say goodbye, Dibo prepared Francesco a special gift. He colored and added the logo of Beijing 2022 to a "chair" model that he 3D printed at the Tsinghua University Art Museum. The "chair" was designed by the famous Italian designer Mendini. The moment he saw it, Francesco's eyes sparkled with amazement and joy. "Dibo, you really serve as a bridge between Chinese and Italian culture. I will take it onboard with me on my way back home." In return, Francesco gave him a copy of the program for the Opening Ceremony of the Games, attached with a long hand-written letter of thanks.

"As a good friend of mine, you have made my day at Beijing 2022 well every day. Don't hesitate to contact me if you travel to Europe."

"I hope to see you at Milan 2026, and be sure to contact me if you choose to be a volunteer there again," said Mr. Francesco. This promise between two friends may be rooted in Beijing, and is expected to be harvested at the next Winter Olympics Games. It's the Olympics that makes it possible to connect Dibo and Mr. Francesco over the continents and oceans.

The stories between them, the gifts that they gave to each other, the long hand-written farewell letter and most important, their invaluable friendship at Beijing 2022, have proved that the Olympics cauldron has ignited the light of humanity, shining and powerful though dimmed and faded in the pandemic, and have witnessed the confidence, openness, inclusiveness and sincerity of China's youth volunteers, carrying the world together for a shared future.



"Welcome to China!"

Editor's Note

Countless acts of friendship and kindness have happened during the Beijing 2022 Winter Olympics. Sun Zeyu from Tsinghua moved American snowboarder Tessa Maud during the Olympics opening ceremony with his sincere enthusiasm.



American representative Tessa Maud vlogged her first time participating in an Olympic opening ceremony during the Beijing 2022 Winter Olympics. During the ceremony, her Chinese "Hello" was returned with a passionate and enthusiastic "Welcome to China" from Sun Zeyu, a volunteer from Tsinghua, which left a great impression on Maud.

"That guy who said 'Welcome to China' literally just makes me tear up every time because they are so nice. All the volunteers are so sweet and so kind. They are just so happy that we are here. We feel so welcomed," commented Maud as she rewatched the ceremony again and again, with that moment warming her to tears every time it shows up.

Maud's vlog and reaction soon went viral on social media. After watching Maud's vlog, Sun immediately went and wrote a reply letter to Maud, expressing his gratitude

to Maud for recording his most unforgettable moment on camera and also invited Maud to visit China after the pandemic and said "Welcome to China" again without a face mask.

Alongside 144 volunteers from Tsinghua, Sun went through 267 hours of tiring yet rewarding training to show their best side during the opening ceremony and pass on warmth and the Olympic spirit to those around the world.

"I'm only a small part of what impressed the athletes, as it was the efforts of all the volunteers that brought such an amazing experience," says Sun as he and the other volunteers to bring about the true beauties of the Olympics on full display: togetherness, openness, and unity.

"The natural kindness between people truly is the most wonderful thing," says Sun during an interview, "being a representative to welcome people from around the world has been the coolest thing I have done so far. All love has gathered because of the Olympics."



Tsinghua volunteers: Making sports happen at Beijing 2022!

Editor's Note

Tsinghua volunteers have spared no effort for the mega sporting event Beijing 2022 Winter Olympic Games. With many #TsinghuaRen joining as volunteers, they are sticking to their posts with the most resolved dedication to delivering a successful Winter Olympic Games. Let's meet some of the volunteers.

Contributing twice for Olympics Zhang Junying

"I couldn't wait to see what the Bird's Nest, whose design I participated in nearly 20 years ago, would look like during the Beijing Winter Olympics," says Zhang Junying (China), a senior architect from China Architecture Design & Research Group, who is engaged in doctoral studies at the School of Architecture and who serves as one of the Tsinghua volunteers for Beijing 2022.

Starting her career in 1999, the first task she received was a research project in green venue design for Beijing's 2008 bid. Four years later, Junying became an architect of the Bird's Nest Chinese design team and got involved in considering audience viewpoint, green technology application, and more. She says, "Continuous utilization of the venue was one of the key ideas of our design, and we are proud that the Bird's Nest is once again playing an important role in Beijing 2022."



Serving for Beijing 2022 after PyeongChang 2018

Wang Ziqi

"I have a simple expectation, to help showcase the best Beijing as a dual-Olympic city," says Wang Ziqi (China), a second-year master's student from the Global Innovation Exchange, who volunteered at the PyeongChang 2018 Winter Olympics and is now serving as a volunteer at Beijing 2022.

During his freshman year, coming across the recruitment notice by chance, he signed up for his "childhood Olympic dream" of becoming an Olympic volunteer. Finally, he was accepted and went to Korea as one of the Chinese volunteers for PyeongChang 2018.

Four years later, he has once again become an Olympic volunteer. He is volunteering for the opening and closing ceremonies of the Beijing Winter Olympics. "At Beijing 2022, showing a better image of China to the global community is my focus."

Feeling connections built through winter sports

Jessica Zhao Huiting

"I see strong connections built through winter sports in China as people prefer enjoying the sports with others," says Jessica Zhao Huiting (US) from the Academy of Art & Design, who provided language services in the opening and closing ceremonies of Beijing 2022.

Jessica's love for the Olympics sprouted in the summer of 2008 when she witnessed the striking beauty and sporting spirits of the Olympics at the Summer Games in Beijing.

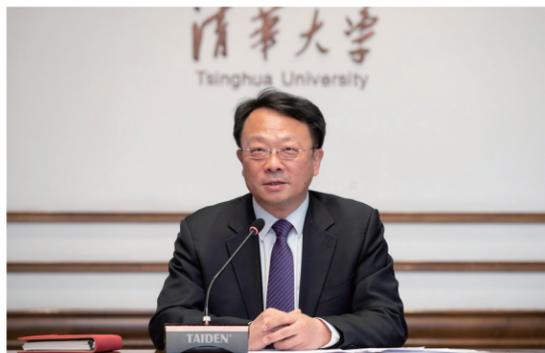
A winter sports lover, Jessica considers winter sports in China not only about an individual but also about a community.

"I was grateful to be here 14 years ago, and as soon as I learned that Beijing would host the 2022 Winter Olympics, I knew I had to be a part of it."



GLOBAL ENGAGEMENT

President Wang Xiqin meets Rector Ferruccio Resta online



Tsinghua President Wang Xiqin met Ferruccio Resta, Rector of the Politecnico di Milano online on March 28, and signed an agreement on the presentation of Tsinghua's self-developed course "Winter Olympics and Winter Sports" to the Politecnico di Milano, a leading technical university based in Milan, Italy.

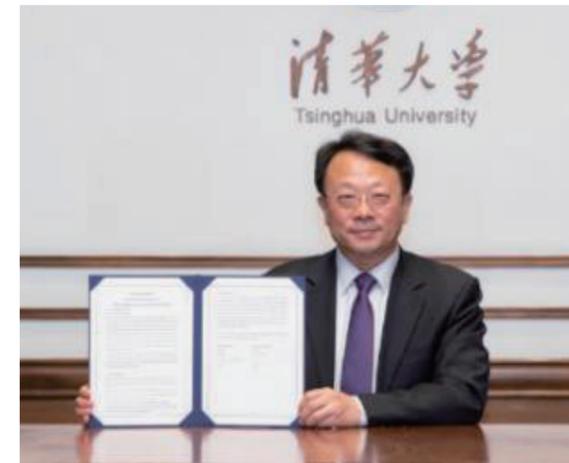
At the meeting, Wang said, "China has successfully delivered the 2022 Beijing Winter Olympics with a 'green, inclusive, open and clean' approach. Tsinghua has fully utilized its academic strengths in the fulfillment of 18 tasks in seven key projects and effectively supported the planning and design of competition venues, low-carbon management, landscaping building, the incorporation of creative elements into special visual effect, the access to interactive experience and volunteering service, and the construction of barrier-free facilities for the Winter Olympics with its technological expertise, aesthetic taste and humanistic spirit."

Resta reviewed the history of the friendship with Tsinghua University and the achievements made during the past years. Both universities have made consistent efforts to deepen bilateral cooperation in exchanges between teachers and students, talent cultivation and online education.

As one of seven open online courses launched by Tsinghua for global students in the autumn semester of 2021, this course aims to present the origin and development of the Winter Olympics, the history and culture of China's winter sports, and the development of China's ice and snow sports industry driven by the 2022 Beijing Winter Olympic and Paralympic Games in an all-around, multi-perspective and three-dimensional manner through theory, case studies and Q&A sessions.

The online course also specifically reviews China's preparations for the 2022 Beijing Winter Olympic and Paralympic Games and offers a detailed introduction and analysis of the designs of venues and post-Olympic utilization, aesthetic visual elements in the games, and innovative technology applications in winter sports.

Tsinghua and the Politecnico di Milano have built a strategic cooperative partnership in a wide range of fields since they signed a university-level cooperation agreement in 2010. Wang said their cooperation vividly reflects the positive development of China-Italy relations over the past decade.



Wang noted that Tsinghua is willing to share its practices and experiences with the Politecnico di Milano and make joint efforts in the exploration of the sustainable development of sports and the Olympic Games.

Wang hopes that the two universities should grasp opportunities to kick off long-term cooperation in the promotion of the sustainable development of the Winter Olympics and make great achievements in the joint sponsorship of three symposiums featuring the Winter Olympics.

Wang said educational cooperation and exchanges are an integral part of overall cultural cooperation and exchanges between China and Italy, and also between the people of both nations.

The China-Italy Design Innovation Hub launched by the two universities has brought about tangible results and become a key platform and bridge between both countries in their bilateral cooperation in innovation since its establishment in 2017.

Wang called on both universities to further consolidate and expand their cooperation, deepen bilateral relations in such sectors as talent cultivation, scientific research and innovation, the sharing of educational resources and discipline building, and achieve mutual complementarity, the sharing of resources and win-win cooperation.



The building of the China-Italy Design Innovation Hub has lifted cooperation between the two universities to a new height. Resta believes that it is a great honor for both his university and Milan to accommodate Tsinghua University's first European base for education and scientific research.

Resta stressed that the friendship between both universities has been further consolidated during their joint efforts to get the COVID-19 pandemic under control since its outbreak in early 2020.

In addition, Resta congratulated China on the splendid performance of its athletes during the just-concluded 2022 Beijing Winter Olympic and Paralympic Games and Tsinghua University on its glorious contributions to the high-level international sports events.

Resta said that the presentation of the themed course by Tsinghua comes at a perfect time, as Italy will hold the Winter Olympics in 2026, representing the profound friendship between both universities.

Resta added that teachers and students at the Politecnico di Milano will spare no effort to learn from the positive experiences of Tsinghua and make great contributions to the success of the upcoming 2026 Winter Olympics. Resta hopes both universities will further strengthen their cooperation and promote joint development in the future.

Wang and Resta signed an agreement on the presentation of the online course on behalf of their universities at the ceremony.

Yang Bin, Vice President and Provost of Tsinghua University, said that the university attaches great importance to its friendship with the Politecnico di Milano. He added that the course presentation is a new symbol of the joint efforts made by both universities to promote the development of the Olympic Games with unique wisdom and strength and that both universities will work together to prepare for Winter Olympics-related symposiums and promote their exchanges and cooperation in talent cultivation in arts design and architecture, the alignment of academic learning with market demand, and the expansion of the development of sports industry.

Giuliano Noci, Vice Rector of the Politecnico di Milano, said that the integration between cultural inheritance and technological development is an important part of cooperation between both universities, adding that he hopes they will take the 2026 Winter Olympics as an important opportunity to consolidate bilateral cooperation in architecture, arts, and design-driven technological innovation in the future.



Ilaria Valente, former Dean of the School of Architecture at the Politecnico di Milano, believes that Tsinghua's experience in the Winter Olympics provides them with a valuable reference point. Zhang Li, Dean of the School of Architecture at Tsinghua University and instructor of the thematic course, expresses willingness to further cooperation with the university. Ma Sai, Party Secretary of the Academy of Arts & Design of Tsinghua University, hopes the two sides can strengthen cooperation based on the China-Italy Design Innovation Hub.

Li Jinliang, Dean of International Affairs of Tsinghua University, presided over the meeting.



Tsinghua President Qiu holds a virtual meeting with UW President Cauce

Tsinghua President Qiu Yong and President of the University of Washington Ana Mari Cauce held a virtual meeting on January 20, 2022.

Tsinghua President Qiu Yong said that he was pleased to meet President Cauce again, and thanked her for her strong commitment to working together with Tsinghua through the Global Innovation Exchange (GIX) and in all the shared efforts to innovate for the future.

"Over the past 6 years, we jointly witnessed the fast development of GIX from its establishment to a globally renowned program which exemplifies a 'next-generation' university collaboration, with strong support from industry partners," he said. "From Beijing to Seattle and Bellevue, I am happy to see that our friendship shines through, along with the collaboration between Tsinghua and UW."

President Qiu expressed his confidence that, with the inspiring visions from both sides, the two universities would set up a long-term partnership with more fruitful outcomes

and make greater contributions for the world innovation in the years ahead.

"In two weeks' time, China will celebrate the spring festival in the lunar new year, the year of the Tiger. In Chinese culture, the tiger symbolizes bravery and strength. I wish you all a very prosperous new year, and hope GIX will continue to thrive and flourish in the year of the Tiger," he said.

President Qiu also extended a warm welcome to new GIX Executive Director Sean Carr.

"I believe that with your profound experiences and inspiring vision, you would become the accelerator of our mission and vision, enlightening our students to bring their love of technology and their drive to truly make a difference to the world," he added.

Ana Mari Cauce, President of the University of Washington, said that her university was grateful for the friendship with Tsinghua University and for the spirit of cooperation and the commitment to GIX between the two universities.





She said that the outbreak of the pandemic showed how interconnected the world is and that the works the two universities are doing under GIX are more important than ever before.

She expressed delight in welcoming Sean Carr as the new Executive Director of GIX, saying that she has confidence in him to bring a new level of energy and a new vision to GIX.

"I really do think that we will continue to do great things together and that we can use this as an opportunity to be more creative than we have been in the past," she said. "I really look forward to seeing where this goes and believe me we will stand out."

Vice-Provost for Global Affairs of the University of Washington Jeff Riedinger hosted the meeting. Li Jinliang, Dean for International Affairs, also attended the meeting.

GIX Executive Director Sean Carr said that he was truly honored to join GIX, and to meet Tsinghua President Qiu for the first time.

He also said that he was excited to work together with Tsinghua to explore new areas of cooperation for the future of GIX.

He pointed out that he would approach his new role at GIX in the spirit of cooperation and friendship and the original vision for GIX.

"Not only are we all interconnected, but there is no more important time that I can think of when technology and innovation can be brought together to address the kinds of challenges we are facing, whether the global health crisis or crisis of any other kind. GIX is just the kind of platform the world needs to bring together industry, academia, even governments to solve big problems through innovative ideas of our young professionals," he said.

Liu Yunhao, Dean of Tsinghua GIX Institute, said he was hopeful that GIX with Sean Carr as its new Executive Director would have more impact in the world. He shared an update on GIX activities at Tsinghua with University of Washington representatives and underscored the need to include more partners around the world into GIX to spur global innovation.

Global Innovation Exchange Institute, or GIX, is a multi-culture and open education-research platform co-created by two of the world's leading research universities: Tsinghua University and the University of Washington. GIX locates in Seattle, Washington, U.S., dedicating itself to the cultivation of leaders with global vision and innovation sprits, exploring a series of global challenges such as smart hardware, medical health, smart education, and clean energy.

AUA holds conference to explore possibilities of "flipped museums"



The 2022 AUA Academic Conference on Co-Curating Flipped Museums for Asian Civilization: A Blended Research and Teaching Approach was held online from February 15 to 17.

As one of several themed activities for the fifth anniversary of the establishment of the Asian Universities Alliance (AUA), the conference was organized by the Universiti Malaya, which holds the Executive Presidency of the AUA from 2021 to 2022.

Dato' Mohd Hamdi Abd Shukor, Vice-Chancellor of Universiti Malaya, said at the opening ceremony that

University museums are becoming gateways in terms of educational and research resources, using conventional and emerging digital platforms.

He said the conference, as the first event of the UM-AUA Month, will highlight efforts to promote stronger interactions between science, technology, art and humanities studies from the context of museum-based teaching and learning, as well as research and outreach.

Du Pengfei, Executive Deputy Director of the Tsinghua University Art Museum, and Fan Aihong, Assistant Director of the Tsinghua University Science Museum, shared Tsinghua's concepts and practice of using museum resources to serve talent training and raise the quality of public cultural offerings.

In his speech, Du said the Tsinghua University Art Museum (TAM) officially opened in the fall of 2016. In the past 5 years, TAM has welcomed over 2.3 million visitors and presented over 260 academic and educational activities.

"By harnessing the arts and humanities disciplines at Tsinghua University, TAM is committed to strengthening the



intersection and integration between the major disciplines at the university, including science and engineering," Du said.

Due to the COVID-19 outbreak, digital engagement has emerged as a new trend at TAM. Several series of digital activities have been developed to reach audiences in a safe and broad manner during this time, Du said, adding that students can easily access TAM's website and view most exhibitions through its Digital Exhibitions section.

Fan introduced the Tsinghua University Science Museum's mission, reviewed research on "flipped museums", and shared four innovative examples.

The examples of collaboration with Tsinghua University Academy of Arts & Design, School of Journalism and Communication, School of Architecture and Department of Electronic Engineering show that museum exhibition resources can be embedded into the curricula of academic departments, making it possible to further enhance students' experience and also help build a scientific and cultural education platform.

The conference is the first university museum exchange activity organized by AUA. At the event, a museum working group mechanism was proposed to exchange and share resources regularly.

Nearly 20 scholars addressed the meeting, including Andrew Simpson, Vice-Chair of the International Council of Museums Committee for University Museums and Collections (UMAC), Yoshihiro Nishiaki, Director of the University Museum, the University of Tokyo, Abd AzizBin Abdul Rashid, Head Curator of the Museum of Asian Art Universiti Malaya & Conference Chair, and Siddharta Perez, Curator of the National University of Singapore (NUS) Museum.

The AUA was initiated by Tsinghua University and established by 15 member universities from 14 Asian countries and regions. It was established in Beijing on April 29, 2017. Qiu Yong, president of Tsinghua University, served as the founding president of the alliance.



Tsinghua hosts 2022 Academic Forum on Engineering Education and Engineering Culture to mark World Engineering Day

Editor's Note

March 4th marks World Engineering Day, an international day that celebrates engineering and the contribution of the world's engineers for a better, sustainable world.

Tsinghua University hosted the 2022 Academic Forum on Engineering Education and Engineering Culture on March 1-2 in a hybrid online and offline format. The forum, attended by leading experts and scholars from around the world, called for the increased participation of youth and women in engineering education for sustainable development.

The 2022 Academic Forum on Engineering Education and Engineering Culture was hosted by Tsinghua University on March 1-2, under the theme "Engineering Education Reform and Sustainable Development—Call for Young People and Women to Participate in Engineering Education."

The forum held to mark the third World Engineering Day was organized by the UNESCO International Center for Engineering Education (ICEE), and co-organized by Tsinghua Symposium, with support from the World Federation of Engineering Organizations, the UNESCO International Science, Technology and Innovative Center for South-South Cooperation, and the Chinese Women's Research Society.

The particular emphasis of the forum on increasing women's participation in engineering education couldn't have come at a better time as it fits well with the theme of this year's International Women's Day "Gender equality today for a sustainable tomorrow."





Yang Bin, Vice President and Provost of Tsinghua University, who is also the Executive Director of the ICEE, delivered opening remarks at the forum.

He said that Tsinghua University hoped to leverage the platform of the ICEE to share China's best practices in engineering education with countries around the world, jointly promote global engineering education and call for more young people and women to participate in engineering education.

"We managed to put in place a complete engineering education system that suits the realities in China. Remarkable achievements have since been made. The Chinese government has been a champion of gender equality and equal opportunities to create a better policy environment for women to unleash their full potential and play their due part in society," he said.

Yang noted in his speech that engineering education undertakes the mission of producing highly qualified engineers, and that numerous highly skilled and professional engineers and technologists have entered the workforce across the globe thanks to the advances in engineering education programs. He, however, mentioned that, although women engineers and technologists represented a vital part of the community, a lack of highly qualified professionals and the prevalent glass ceiling still pose great challenges.

Yang pointed out that in recent years, Tsinghua University has invested more in engineering education, established the Engineering Doctoral Program for innovative leaders, and strengthened international exchanges and cooperation.

He also informed the forum that Tsinghua held the Global Forum of University Presidents 2021 and issued the GFUP Tsinghua Consensus. Likewise, on World Engineering Day last year, the ICEE and UNESCO jointly released the

Engineering for Sustainable Development report. The report was jointly supported by Tsinghua University and the Chinese Academy of Engineering. Audrey Azoulay, Director-General of UNESCO, praised it as an important milestone in UNESCO standards-setting work.



Irina Bokova, former Director-General of UNESCO, noted in her speech that engineering education as well as a call for young people and women to participate in engineering education are essential to achieving the 2030 Sustainable Development Goals.

She emphasized that engineering was the engine that drives the great transformation of China which amazed the world. There could hardly be a place better than Tsinghua University to celebrate the power of engineering. Moreover, the ICEE is a highly effective organization as evidenced by its continuous efforts to deepen cooperation among international organizations amidst the COVID-19 pandemic.

She also said that engineering education should go beyond the traditional boundaries and take an interdisciplinary approach. Participation of young people and women is vital to engineering as their bright minds prove to be invaluable assets, and this is also consistent with the guiding principles of the Engineering for Sustainable Development report.



In his speech, Gong Ke, President of the World Federation of Engineering Organizations (WFEO), said that the WFEO attaches great importance to the role of women in sustainable development and focuses on the well-being of humankind.

He said that the WFEO hoped to deepen cooperation with the ICEE to jointly promote the progress of engineering education. He pointed out that the focus on sustainable development, integration into the digital economy, a cross-cultural and inter-disciplinary approach, and teaching students about professional ethics are crucial in engineering education.



Lee Yee Cheong, former Director of the UNESCO International Science, Technology and Innovation Center for South-South Cooperation (ISTIC), said that UN members should make efforts to achieve SDG 1: No Poverty. China has been a pioneer in poverty alleviation through building a moderately prosperous society and achieving progress in infrastructure construction. It can be said from China's experience in promoting engineering development that engineering technologies lay the groundwork for poverty alleviation.



Tan Lin, Vice President of the Chinese Women's Research Society and former Vice President of the All-China Women's Federation, highlighted the significance of gender equality in engineering education. She said prioritizing gender equality helps achieve UN SDGs, better implement the basic national policy, and encourage more young women to receive engineering education and even pursue their careers in this field.



Xiang Botao, Deputy Secretary of the CPC Tsinghua University Committee and Vice Chairman of Tsinghua Symposium, moderated the opening ceremony of the forum.



Following the opening ceremony, Wu Qidi, former Vice Minister of Education, China and Director of the ICEE, moderated the thematic symposium on "Reform and Strategic Thinking on Engineering Education."

Zhang Dongmei, Professor of Tongji University, Marlene Kanga, former President of the WFEO, Anette Kolmos, Director of the Aalborg Center for Problem Based Learning in Science, Engineering and Sustainability at Aalborg University in Denmark, and Jiang Hui, postgraduate of the Department of Chemical Engineering at Tsinghua University, delivered their remarks.



Han Jingyang moderated the first session of the thematic symposium on Engineering Education and Engineering Culture.



Yuan Si moderated the second session of the thematic symposium on Engineering Education and Engineering Culture.

On the last day of the forum, Han Jingyang, former Vice Chairperson of the Tsinghua University Council and Vice Chairperson of Tsinghua Symposium, moderated the first session of the thematic symposium on "Engineering Education and Engineering Culture, while Yuan Si, Vice Chairperson of the Tsinghua University Council and Executive Director of the ICEE moderated the second session.

Renetta Tull, Vice Chancellor of the University of California Davis, Peggy Oti-Boateng, Director of the Division of Science Policy and Capacity Building of the UNESCO Natural Sciences Sector, Norlida Buniyamin, President-Elect of the Institution of Engineers Malaysia, Li Zhengfeng, Deputy Director of the Institute of the Belt and Road Initiative of Tsinghua University and member of Tsinghua Symposium, and Cong-Thang Huynh, Co-founder and CEO of InnoLab Asia, delivered speeches.

Kang Jincheng, special expert with the ICEE and former Chief of the Bureau of International Cooperation of the Chinese Academy of Engineering, Li Shuangshou, Director of the Fundamental Industry Training Center of Tsinghua University, Li Donghai from the Department of Energy and Power Engineering at Tsinghua University, and Lu Yang from the Institute of the Belt and Road Initiative of Tsinghua University, also attended the forum.

The forum attracted altogether over 1,500 scholars and experts from around the world.



Promoting the global flow of quality content and pedagogy



February marked an important milestone for the future of higher education in Asia and the Pacific. China and Indonesia, two massive higher education systems within the E9 countries, signed a cooperation agreement between the Indonesia Cyber Education Institute (ICE Institute) based at Universitas Terbuka and XuetangX based at Tsinghua University, two major national MOOC platforms in Indonesia and China.

As a result of the agreement, XuetangX will donate 60 MOOCs developed by 18 Chinese higher education institutions to Indonesian learners via the ICE Institute. This is a significant achievement in promoting the international flow of quality content and pedagogy, which can help to improve the access, quality and equity of higher education provision in the Asia-Pacific region.

Tsinghua SEM successfully maintains AACSB Business Accreditation

Recently, Tsinghua SEM was officially notified by the Association to Advance Collegiate Schools of Business (AACSB) that the peer review team's recommendation for the extension of the business accreditation of Tsinghua's SEM had been approved by the Continuous Improvement Review Committee and the Board of Directors of AACSB International. Tsinghua SEM was the first business school in the Chinese mainland to obtain AACSB accreditation in April 2007, and it successfully retained this accreditation in 2012, 2017, and 2022.

From October 31 to November 3, 2021, the AACSB business accreditation peer review team (PRT), which consisted of Professor Kar Yan Tam, dean and chair professor at the School of Business and Management at Hong Kong University of Science and Technology, Professor Andrew K. Rose, dean of the National University of Singapore (NUS) Business School, and Professor Paul Kofman, dean of Business and Economics at the University of Melbourne, conducted a virtual visit to the school. Professor Yang Bin, vice president and provost of Tsinghua University, spoke

with the PRT members on topics such as the positioning of Tsinghua SEM, interdisciplinary development, and university admissions.

During the four-day visit, 19 online sessions were held between the peer review team and relevant stakeholders, including representatives from the Dean's Council, Advisory Board members' companies, faculty and staff, students, and alumni. Through talks with different parties, the peer review team developed a comprehensive understanding of Tsinghua SEM's overall operations including development strategy, research innovation, faculty resources, student cultivation, social impact, and recent achievements.

The peer review team affirmed Tsinghua SEM's achievements and offered valuable suggestions to the school. Dean Bai Chong-En expressed his gratitude to the peer review team in the feedback session, and said that AACSB accreditation has continuously promoted the school's improvement and development, and Tsinghua SEM will spare no effort to accomplish its mission and become a world-class school of economics and management.

AACSB business accreditation has become the authoritative standard in global management education. The maintenance of AACSB accreditation will help the school continuously enhance its high level of management and standardization, and promote its international visibility and influence.

SCIENTIFIC INNOVATION

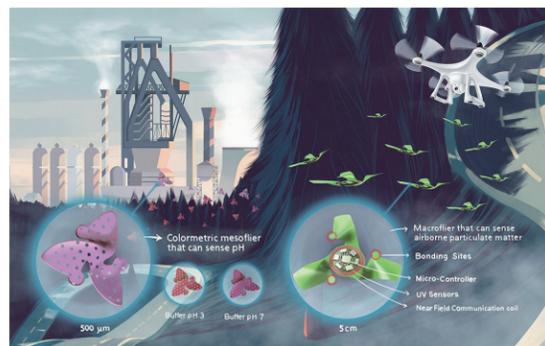
Airborne sensors inspired by seeds

Imagine floating fleets of small-scale, low energy fliers that can monitor pathogens or particulate matter in the air.

Seeds have planted new inspiration for scientists who are trying to emulate their ability to travel long distances in freefall.

The geometries of seeds combine high drag forces and significant uplift, relative to the downward force of gravity, which results in the very slow descent speed or 'terminal velocity', explains Yihui Zhang, who works within Tsinghua's Engineering Mechanics Department and Center for Flexible Electronics Technology.

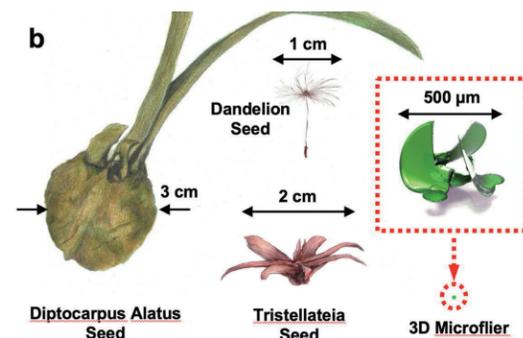
In *Nature* in September 2021, Zhang and his collaborators described a framework to explore some of the possibilities seed-inspired fliers bring to environmental monitoring. To do so, they created and tested a number of shapes, the most complete version of which was a 5 cm battery-free wireless flier capable of detecting airborne particles.



The researchers modeled a number of fliers with geometries inspired by seeds that were designed to carry out environmental monitoring. These included helicopter style 'mesofliers' (usually about 1 mm) with polycarbonate surfaces that respond with different colours based on local pH and 'macrofliers' (>1 mm) that use UV sensors to identify airborne particulate matter.

Why are these shapes being examined now? Very small objects tend to have advantages in the aerodynamic behaviour that makes passive 'flight' possible, explains Zhang. Recent developments in 3D mesostructure manufacturing and miniaturized electronic, optoelectronic, microfluidic and microelectromechanical technologies make the fabrication of seed-inspired 3D electronic devices practical.

The paper's authors identified promising forms and fabrication techniques, but they also note the challenges of wind and biodegradability. Nonetheless, Zhang estimates that it could take as little as "three to five years to realize useful environmental monitoring via seed-inspired fliers".



Shown to scale: the helicopter shaped seeds of *Diptocarpus alatus* and *Tristellateia*, a parachute type seed from a dandelion, and a 3D microflier.

Seeds of innovation

There are many potential uses for fliers. Chinese researchers have been working hard to understand the sources of airborne particulate matter from pollution, for instance.

After a series of weather events, exacerbated by pollution, caused widespread health problems across the country in 2013, the Chinese government's 2013 Air Pollution Action Plan put in place reforms that helped make significant

improvements to air quality. Atmospheric particulate matter (PM) 2.5 levels in Beijing reduced by 33% between 2013 and 2017, for example.

So far, these reductions have come about largely due to stringent regulation of industry, but to understand smaller sources of airborne particulate matter is complex. Plane, drone or weather balloon measurements are limited by the cost implications, while tracking by satellite can only show detail at a resolution down to 3 km. Fliers could provide much more detailed data than stationary ground monitors. This detailed data could also help build algorithms to improve satellite pollution assessments, says Zhang.

Tiny seed-inspired fliers could be deployed by plane or drone, he suggests. "Even releasing the fliers by hand at the ground level is possible, as the fliers can be carried far away by the wind," he speculates.

Size does matter

In their study, Zhang and his collaborators set out to look specifically at the possibilities of passive structures designed for controlled, unpowered flight across natural environments or city settings.

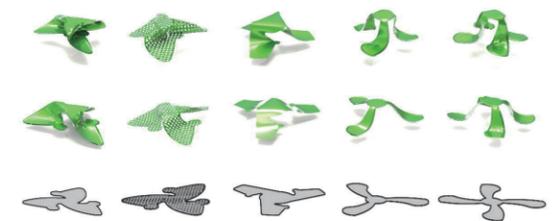
Seed geometries, they note, fall broadly into four categories: parachutes, gliders, helicopters and flutterers, all of which are of a large area relative to their mass, slowing their descent.

Using theoretical, experimental and computer simulations, the international group determined that helicopter fliers exhibited the most stable falling behaviours. They also noted that small micro-fliers were typically more aerodynamically effective. "But a trade-off is that the small scale microfliers cannot carry large payloads, such as electronic components for targeted missions," says Zhang. "Therefore, practical applications will need balance terminal velocity and capability to carry payloads."

The team examined the effect of scale, porosity, number of wings and aspect ratio for helicopter style microfliers (<1 mm), mesofliers (about 1 mm) and macrofliers (>1 mm). "At small scales, shapes composed of fibers, or with porosity, can help create more drag and lower terminal velocity. At relatively larger scales, chiral design and improved blade design such as curved blades can help to reduce terminal velocity," explains Zhang.

While the team hopes to focus more on IoT enabled fliers, they also looked into an example that used electronic alternatives – pH-responsive 3D mesofliers that use a color indicator based on anthocyanin infiltrated into a polycarbonate membrane. Aerial photographs of these sensors could be analyzed for monitoring purposes.

Other options for non-electrical sensors, says Zhang, include ultraviolet light intensity sensors, temperature/humidity-triggered sensors and chemically driven Volatile Organic Compounds (VOC) gas sensors.



The geometrical transformation of different 2D precursors (bottom row) into corresponding 3D structures with modest (middle row) and large (top row) aspect ratios.

Particulate matter sensing

Polymer films were used to form each of the fliers the group tested via shape material memory effects. Specifically, after etching, heating the assembled flier to 70°C for one minute in an oven and cooling it to room temperature created the 3D shape. Immersing the structure into chemical solutions to eliminate bonding site layers then helped further release the structures as free-standing objects.

To make their largest test flier, the electronics-carrying particulate matter sensing flier, Zhang and his team layered 12 micrometre shape memory polymer and 18 micrometre copper foils.

The copper foils can serve as reliable metal interconnections for electronic components after wet etching, explains Zhang. Transfer printing the individual components and soldering yielded a wireless sensing system of particulate matter.

This 'planar-fabrication-based process' is intrinsically compatible with the well-developed fabrication techniques of conventional silicon-based electronics, Zhang points out.

Five Tsinghua alumni win Sloan Research Fellowships

Five Chinese scientists who graduated from Tsinghua University have won this year's Sloan Research Fellowships.

According to a list released on Feb 16, 2022, 118 faculty from around the world were granted fellowships. Among them were five Tsinghua alumni: Gu Quanquan, Fang Fei, Chen Danqi, Chen Yuxin, and Ju Long.

Gu Quanquan, a graduate from the Department of Automation (matriculated in 2003), Fang Fei, a graduate from the Department of Electronic Engineering (matriculated in 2007), and Chen Danqi, a graduate from the Institute for Interdisciplinary Information Sciences (matriculated in 2008), won this year's awards in computer science.

Chen Yuxin, a graduate from the Department of Microelectronics and Nanoelectronics (matriculated in 2004), won the award in mathematics. Ju Long, a graduate from the Department of Physics (matriculated in 2005), won the award in physics.

Awarded annually since 1955, the fellowships are given to early-career scientists and scholars in recognition of their achievements, as well as their potential to contribute substantially to their fields.

The fellowships are open to scholars in physics, chemistry, mathematics, neuroscience, economics, computer science, and computational & evolutionary molecular biology.



Robotic lab on wheels offers fast and accurate COVID-19 testing

A state-of-the-art diagnostic van can test up to 2,000 people a day, return results within 45 minutes with a very high sensitivity (limit of detection of 150 copies/mL), and reduces contact risks.

A new laboratory-on-wheels developed by Tsinghua University scientists allows for fast-turnaround and highly-accurate COVID-19 testing, without the stress and risk of people with suspected coronavirus infections having to travel and wait long for a diagnosis.

Equipped with oropharyngeal (middle throat) swap sampling robots, a new type of virus inactivation device, integrated microfluidic nucleic acid analyzers, and a 5G communication system for automated result reporting, the small-footprint mobile testing van can deliver results in under 45 minutes, with almost 100% accuracy and minimal human involvement.

At this point in the COVID-19 pandemic, the coronavirus is largely under control in China and in parts of the world that adopted aggressive containment measures, notes Jing Cheng, who headed the development of technology at Tsinghua. But outbreaks still flare up occasionally, demanding quick, accurate local testing responses — which is where the COVID-19 Mobile Laboratory comes in.

Biosafety first

Technologies that streamline and contain the complete workflow of the molecular diagnostic assays set the laboratory apart from others like it. "Unlike conventional systems that simply adopt the layout and instruments of typical biological laboratories to construct a 'laboratory-on-a-truck', our mobile laboratory uses state-of-the-art robotics and microfluidic technologies to create a system of automated and contained sample acquisition and processing," explains Cheng.





Validated design

Cheng and his colleagues clinically validated their mobile testing set-up on more than 700 clinical samples collected from patients across China. Compared to the gold standard PCR testing platform, the Tsinghua system yielded the same result roughly 99% of the time, demonstrating the feasibility and accuracy of the approach. The researchers detailed their findings and experimental design in the journal *Clinical Chemistry*.

“The small footprint mobile testing facility enables molecular diagnostics outside people’s homes,” Cheng says. “In this way, not only can we save time and identify potential patients on-site, but also reduce the risk of contamination during sample transportation to central laboratories.”

“The industrial design takes biosafety and functionality into consideration, enabling highly automated and self-sustained nucleic acid testing within a compact footprint,” explains Cheng, who is a member of the Chinese Academy of Engineering, Director of the National Engineering Research Center for Beijing Biochip Technology, and CEO of CapitalBio Corporation, a company that helped with the van’s development.

The microfluidic component of the van, for example, can extract and amplify coronavirus RNA much quicker than other genetic analysis instruments. The thermoelectric inactivation device, which relies on infrared radiation to precisely control sample temperatures, ensures biosafety without compromising the integrity of pathogen nucleic acids. The six-axis sampling robot arm, guided by a digital camera with a force feedback system, can swab the oropharynx with minimal discomfort for test participants.

The mobile laboratory is also equipped with cables for plugging into a municipal electric supply, along with a power generator capable of delivering backup power. In addition, there are ventilation systems for both the biosafety cabinet and the laboratory cabin, and a water distribution system to avoid cross-contamination. In total, it can provide on-site tests for up to 2,000 people daily, requiring only two lab technicians and a driver for its operations.



Group of Shuhong Liu and Zhigang Zuo from Tsinghua University makes important advances on the interactions between cavitation bubbles and particles near a solid substrate

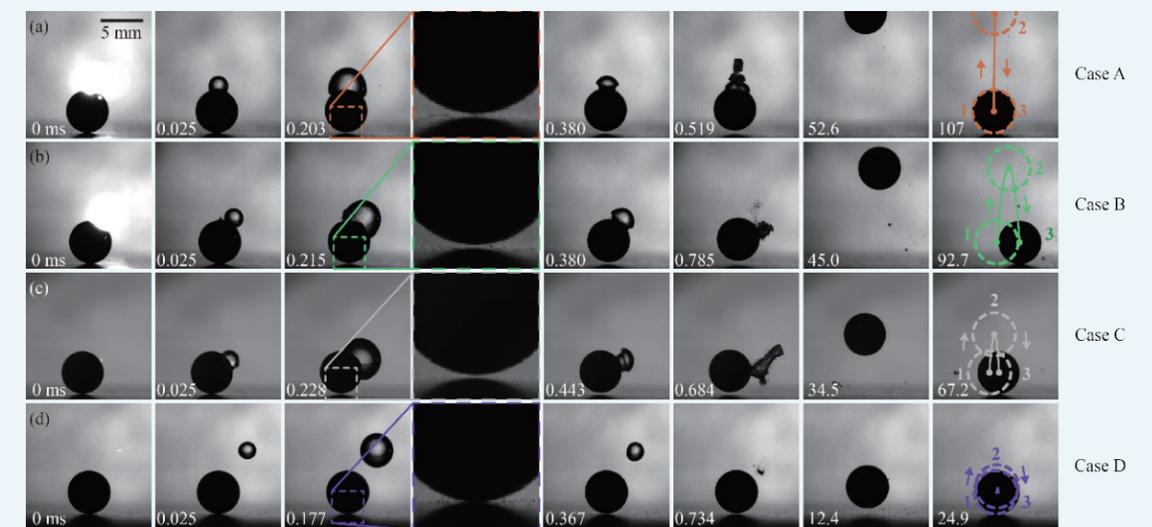
Cavitation occurs when a liquid experiences low pressure and vapor bubbles (cavitation bubbles) grow explosively and collapse impulsively. Cavitation in a liquid containing particles exists in various technological fields, e.g., cavitation erosion of hydraulic machinery in silt-laden rivers, ultrasonic cleaning, kidney stone fragmentation, etc. These processes involve interactions of cavitation bubbles with free and/or surface attached particles, being attributed to the collapsing cavitation bubbles. Upon generation, a cavitation bubble expands with a tremendous velocity, during which period the influences on a nearby particle have not been fully investigated.

Entitled “Particulate Projectiles Driven by Cavitation Bubbles”, a recent work published in *Physical Review Letters* (128, 044501, 2022) and highlighted as an Editors’ Suggestion reveals an unexpected phenomenon that laser-induced cavitation bubbles provide a noninvasive way to lift millimeter-sized particles from an immersed surface (Figure 1). Shuhong Liu, Zhigang Zuo and colleagues of the Department of Energy and Power Engineering, Tsinghua University placed a spherical particle with diameter of 5 mm made of heavy metals (e.g., stainless steel) on a fixed horizontal substrate and generated a



cavitation bubble of diameter about 5 mm by a pulsed laser in the neighborhood of the particle. Using high-speed photography, they observed that the particle was lifted from the immersed surface like a projectile with a controllable vertical displacement depending on the size and the position of the cavitation bubble.

Following Rayleigh-Plesset equation, the lifetime of a cavitation bubble with diameter of millimeters in water at 1 atm is shorter than 1 millisecond. The bubble dynamics and its interactions with the particle have to be studied with high-speed photography at a framerate larger than 75,000 fps. In the high-speed recordings, the particle is observed to detach the substrate before the cavitation



bubble grows to its maximum size (Figure 2). This indicates that the particle is subjected to a strong lift force during the explosive growth of the cavitation bubble.

To investigate the lift force, the authors formulated a theoretical model for the system of a cavitation bubble, a particle and a rigid substrate. Based on calculations, the maximum lift force exerted on the particle can reach more than 100 times the weight of the particle, resulting in a huge acceleration and thus leading to the projectile motion of the particle. In the experiments, the record of the maximum vertical displacement of the particle reaches as high as 10 times its radius. Besides, the authors identified two different dominant regimes (Figure 3a) and proposed the scaling laws for the maximum vertical displacements of the particles (Figure 3b).

In conclusion, opening up a new mechanism of the particle removal from substrates by cavitation bubbles, this work indicates that cavitation bubbles with “soft” interfaces have huge power to lift particles made of heavy metals from substrates and throw them to a desired height. The

findings of this work may be helpful to the laser-assisted noninvasive manipulation of particles, e.g., on-demand collection of samples without mechanical contact from ground, and may be inspiring for the related situation of removing calculi and their fragments from tissues with reduced harm from ablation.

The work selected as an Editors’ Suggestion is judged to be particularly important, interesting, and well written by the editors of Physical Review Letters, one of the most prestigious journals in the field of physics. A highlighted Letter has additional significance, because only about one Letter in seven is highlighted as a Suggestion due to its particular importance, innovation, and broad appeal.

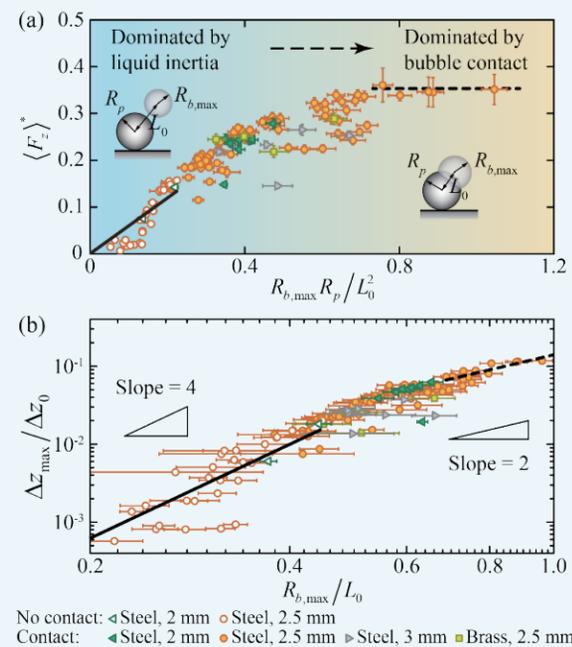
This research was supported by the National Natural Science Foundation of China, the Deutsche Forschungsgemeinschaft, the State Key Laboratory of Hydroscience and Engineering, and the Creative Seed Fund of Shanxi Research Institute for Clean Energy, Tsinghua University. PhD student Zibo Ren is the first author of this work. Associate Professor Zhigang Zuo and Professor Shuhong Liu are the co-corresponding authors.

Citation:

Ren, Zibo, Zhigang Zuo*, Shengji Wu, and Shuhong Liu*. 2022. Particulate Projectiles Driven by Cavitation Bubbles. Phys. Rev. Lett. 128 (4):044501. doi: 10.1103/PhysRevLett.128.044501.

Original Article Link:

<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.128.044501>



TSINGHUA COMMUNITY

From UN to Tsinghua: Gui's journey shaping gender equal future

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.

This piece of the TsinghuaRen for SDGs series features Gui Tianhan, an assistant professor at Tsinghua's School of Public Policy and Management who specializes in gender studies, and her fascinating journey from the United Nations to Tsinghua.



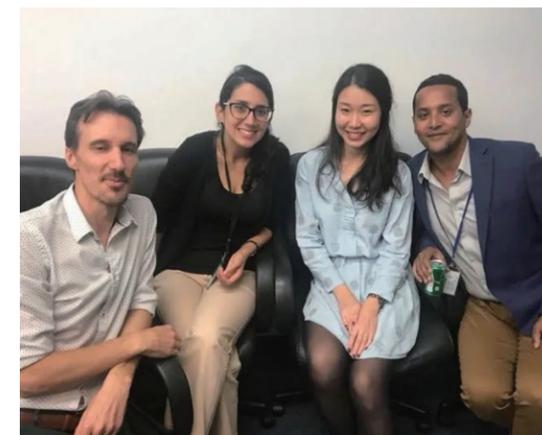
After completing her doctoral degree in sociology from the University of Florida in 2016, Gui Tianhan joined the United Nations.

“Travelling around the world and learning about different cultures have always been my dream—a reason why I chose to work with the UN,” says she.

After three years of working with the UN, she joined Tsinghua University in 2019 as an assistant professor in the School of Public Policy and Management. Currently, she is mainly offering three courses: International Organizations and Global Governance, Ethics in Public Management, and Sociology.

Like many employees at the UN, she started her UN journey as an intern. At the United Nations Population Fund (UNFPA), she conducted research on child marriage and gender-based violence in African and South Asian countries. Four months later, she received a formal offer from United Nations Development Programme (UNDP) Independent Evaluation Office (IEO) and became a program evaluator.

In the IEO, she was responsible for evaluating UNDP's programs implemented in developing countries. This experience offered her a chance to visit program sites in many less-developed countries. Besides, she also worked with colleagues from UNDP's country-level office, which was a great opportunity for her to gain a deeper understanding of the challenges faced by today's international organizations, as well as the complexity of many development issues.



Her last assignment at the UN was evaluation of the United Nations–African Union Hybrid Operation in Darfur, a conflict-hit region in western Sudan.

Working in multicultural settings broadened Gui's knowledge of the world and thus prompted her to pursue an academic career.

After joining Tsinghua, Gui carries out her research in gender studies and started a new research project on international organizations. She also offers a new course to graduate students named "International Organizations and Global Governance." Her work experience with the UN enables her to conduct research from an insider perspective, as she shares.

Her graduate course "International Organizations" consists of several sessions. Each session addresses a specific international development issue, which enables students to better understand how international organizations tackle various development issues. Further, she also encourages students to travel and work in developing countries.

"Since China is a developing country, we always assume that we naturally understand the developing world. However, there is still room for improvement in our understanding of other developing countries. That's where the younger generation can step up and make a difference," she emphasizes.



At the same time, she also incorporated the issue of gender equality into her teaching.

Gender equality is the fifth out of the 17 UN Sustainable Development Goals, which aims to end all forms of discrimination against women and girls. In April 2020, the UN Secretary-General announced that limited gains in gender equality and women's rights made over the decades are in danger of being rolled back due to the COVID-19 pandemic. Further, he urged governments to put women and girls at the center of their recovery efforts.



In 2018, Tsinghua University established the Center for Global Competence Development. Gui is one of the faculty members at the center.

"Many Asian students are hardworking and humble, but not confident enough to express themselves. So, I hope these students can be more assertive, and improve their self-confidence. Having self-confidence is very crucial if a student aspires to work in international institutions," she says.

Gui also suggests students gain experience in other relevant sectors before applying for UN jobs, such as NGOs. Because in the UN, most junior-level jobs require 2-3 years of relevant work experience. Besides, she encourages them to send their applications actively, and apply for every possible vacancy.

"Working with international organizations is a wonderful and valuable experience. It allows you to work with people from all over the world, to know different cultures, and to go to many interesting places. I hope you all have a chance to work in international development sectors and to explore the world."



Xing Guoqin: It's never too late to learn!



With the beautiful rhythm of "My Chinese Heart" lingering in the hall, Xing Guoqin, a 55-year-old cleaner in Tsinghua, was playing the piano at the center of the stage in the New Year Gala Night of the Center for Arts Education.

"Just three days before the event, I was told to perform on the stage. I was so surprised but also kind of nervous," said the amateur performer in her blue uniform. "My fingers were shaking when I was playing! But when I heard the big round of applause, I was so excited and happy."

Xing has been working in the Center for Arts Education in Tsinghua for eight years. She saw the piano for the first time when she came to the New Tsinghua Xuetang on the first day she arrived here. "Its sound was so amazing. It would be more beautiful than a beautiful dream if I had a chance to play it," Xing recalled.



Tsinghua pays great attention to esthetic education and has organized lots of activities that also allowed workers to attend. Surrounded by the music in the center every day and inspired by the teachers and students rehearsing here, Xing decided to learn to play the piano herself.

Luckily, Xing found two pianos lying around and started learning and practicing day by day.

"I didn't know how to search for music scores on the internet, I just found every single note by listening and testing on the piano. If there was a very emotional line in the song, then I added the stress as well," the hardworking learner explained. "If some lines were really too complicated to understand, I just made it sound comfortable to me," she added.

For Xing, hobbies have nothing to do with age. "It's never too late to do things you like. And for young people, just learn anything you want to learn and never leave any regret."



Overcoming barriers, inspiring change towards gender equality

2022.3.8, International Women's Day

March 8th marks International Women's Day, a global day to celebrate the accomplishments made by women around the world and to call attention to the challenges they continue to face.

Let's have a look at the life of four inspiring women who started young at Tsinghua and have taken different paths in their lives, achieving outstanding results in their respective fields.



Zhou Shuyun

"Research is like an adventure. You always set out with innovative ideas and feasible technological routes based on previous research, but you are going to places that no one has ever been before, so there is always a certain amount of uncertainty, and it is normal to encounter difficult problems," says Zhou Shuyun (China), Professor of the Department of Physics at Tsinghua.

Shuyun won the 2021 "Huang Kun Solid State Physics and Semiconductor Physics Science Research Award" for her outstanding research contributions in the field of two-dimensional materials.

Receiving the award was especially meaningful for Shuyun as the award commemorated Huang Fun, the founder of condensed matter physics in China and a role model for younger generations. "It is both an encouragement for our work ahead and an incentive for us to pursue excellence in scientific research," recalls Shuyun.

To the students who are unsure of their career and life paths, Shuyun has this to say: "If you just blindly follow a large group of people walking, you may lose yourself. But if you work hard to find your way, slowly your path will become clearer."



Lin Xiyang

"Balancing all my roles is exhausting, but I feel worth doing it for the little warriors," says Lin Xiyang (China), a senior student in the School of Life Sciences, refereeing to the children battling cancer with whom she spends time as a volunteer.

Although her academic life keeps her busy, Xiyang makes sure she has time to get involved in some extracurricular activities. She serves as an editor for in-depth reports at Qingxin Times, whereas for Curekids, a charitable project run by the Shiyu Children Foundation to raise public awareness about childhood cancer, she volunteers as a content writer.

Reporting on the issue of childhood cancer at times can be emotionally challenging. But Xiyang says listening to the inspiring story of the children battling cancer motivates her to continue telling their stories.

Every word she writes for Curekids captures the victory of these little warriors in their battle against cancer. Childhood cancer has a relatively high recovery rate, but the journey to recovery is not always smooth.

"It is hard to imagine the hardships they have to go through. Also, it is hard to believe that death is actually near-at-hand for them," remarks Xiyang, who is hopeful that more students would contribute to charity events and embrace the spirit of Curekids, which is "using your profession to light up hope."



Victoria Khu (Russia)

"There is not a single profession that does not benefit from the ability to communicate with people and the ability to analyze information," says Victoria Khu (Russia), an alumna of the School of Journalism and Communication.

Enrolled at Tsinghua to pursue her master's degree, Victoria was impressed by the wide range of resources available for students and the relentless motivation in every TsinghuaRen. Victoria clearly remembers the various activities she took part in, which were decisive to shape her career path. These activities included two summer programs—European Innovation Academy and Asia Innovation and Entrepreneurship Academy, workshop series, iTalk dialogue with peers, and many more.

During her time at Tsinghua, Victoria aimed for the best and was determined to further advance her career in international exchange. She now serves as Co-founder and President of the SCOLAR Network, a platform forging ties among young leaders from Shanghai Cooperation Organization (SCO) countries.

Over the past four years, the SCOLAR Network has set up 11 city-based hubs in nine countries and hosted over 350 events with more than 13,000 participants, promoting extensive communication and achieving increasingly practical and sustainable impact.

Even after graduation, Victoria's connection with her alma mater remains strong. She holds workshops on soft-skills development and global competencies at Tsinghua. "Over 150 students have already participated. I am very happy for the opportunity to give back to the community," expresses Victoria.



Jiang Hui

"We can try to do our best to devote more time to study and research, to communicate more openly with the rest of the world, and to collaborate to overcome obstacles. If we do so, a bright future awaits us," says Jiang Hui (China), a graduate student in the Department of Chemical Engineering at Tsinghua University.

Her journey to becoming a chemical engineer began with monitoring air pollution in her hometown when she was in high school. She noticed that chemical engineering has continuously played a key role in human development and human well-being, and is likely to play a vital role in the future. It only motivated her to study chemical engineering at university, she says.

Jiang Hui explained that she liked the field of engineering as it emphasized practicality by promoting cross-disciplinary collaborations and proposing technically and economically feasible plans to ongoing problems.

Since joining Tsinghua, not only has she immersed herself in her study, but also participated in various activities aimed at raising awareness about plastic pollution, winning many eminent awards like the 2019 Chemical Engineering Department's Excellent Student Cadre.

Jiang Hui thinks young engineers should direct their efforts to addressing urgent environmental issues and to achieving common goals such as the UN Sustainable Development Goals. "Nothing can stop you from achieving your values, and you can always take more responsibility for society."

Bringing diverse voices to life on stage

Editor's Note

College is a way to explore yourself, and so is the theater. In such a field, we put ourselves into situations that may never arise in our lives, which promote us to give power to truth, to take risks, and to advocate for diverse voices.

On World Theatre Day, meet with three TsinghuaRen creating "their moments" on and behind the stage.



Finding that soulmate waiting for you

Fan Yuqun

"Drama is an unfinished adventure for me," says Fan Yuqun, who chose to pursue her drama dream in England and China after graduating from the School of Humanities at Tsinghua.

In her sophomore year, Yuqun participated in the student festival and gained inspiration from drama and rehearsing. In her third year, she was encouraged by her experience in

the exchange program to turn her hobby into her career, leading her to study further at the Royal Academy of Dramatic Art in England.

When Yuqun came back, she started work as a musical producer and also began a podcast reflecting on theatre and its role in society.

"Don't wish to have instant success in the worldly sense, and don't be afraid to find that soulmate waiting for you in the distance," she says, as a TsinghuaRen who does not regret choosing her favorite career path.



The lingering fragrance of the seek for human values lives

Yang Suchun

"It is so amazing to create a drama, enrich its theme and truly bring it on stage with peers from diverse backgrounds," says Yang Suchun, an undergraduate student from the School of Humanities who has been exposed to drama in his college life and enjoyed the bloom under the spotlight.

Transferring from the School of Economics and Management to the Department of Philosophy, Suchun has never stopped pursuing the seek for human values in humanities, which also influenced his choice of scripts, preferences for theme and considerations in drama creation. "The lingering fragrance lives."

With attention to "how to work with actors and actresses", Suchun has always attempted to edit the script in order to integrate the distinct cast with their roles and plots, promoting them to find the hook into the characters.

"I love the atmosphere in the Drama Team. There is true freedom in thought and rigorous discussions. The communication between us will expand the dimension of our own lives."



Emphasizing dramaturgy to find social concern in theater

Liu Mengling

"Theatre is a unique field for sociology. I am glad that it can be my doctoral project, as I could explore human nature and social relations," says Liu Mengling, a PhD candidate from the School of Social Sciences who has integrated her exploration in academics with her pursuit for beloved theater commitments, and achieved mutual advancement.

Joining the drama team once entering Tsinghua, Mengling has stepped into her acting world. In years, a wide range of internships in crews, performing experiences and study-abroad programs have inspired her to discover the more concrete social value on stage. "With sociological methodology and knowledge, I applied social concern in theatrical practices."

Recalling her encounter with Diamante in Berlin, Mengling regards it as the most ideal theater for "stimulating the desire to discuss society-oriented thinking", which to some extent contributed to her emphasis on dramaturgy. As a road not taken in the academic field, difficulties are inevitable considering the lack of previous research and database.

While the continuous reflection has given rise to a fresh perspective, re-entering the industry as a researcher further facilitated her connections with different people in such a field.

DIVERSE CAMPUS

Donation ceremony for Wang Dazhong Scholarship held at Tsinghua University



A donation ceremony for the Wang Dazhong Scholarship was held at Tsinghua University on the afternoon of Dec 31, 2021.

Wang, 86, an academican of the Chinese Academy of Sciences (CAS), a renowned nuclear energy scientist and former president of Tsinghua University, received China's top science award for his outstanding contributions to the research and development of advanced nuclear energy technologies at a grand ceremony at the Great Hall of the People in Beijing on Nov 3, 2021.

Wang and his wife, Professor Gao Zuying, made a decision to establish a special scholarship with all the prizes conferred by the country and Tsinghua University upon him in a drive to encourage young Chinese people to better serve national development with personal talent.

Speaking at the donation ceremony, Wang stressed that he made the decision to donate his winnings to Tsinghua

University and set up the scholarship because it is the university that has fostered him and provided him with a broad platform for personal development over the past six decades.

Wang signed a donation contract with Yuan Wei, secretary-general of Tsinghua University Education Foundation, at the ceremony.

Chen Xu, secretary of the CPC Tsinghua University Committee, and Qiu Yong, president of Tsinghua University, presented a certificate to Wang for his donation.

Those in attendance at the event included He Meiyang, former Secretary of the CPC Tsinghua University Committee, Yang Bin, Vice President of Tsinghua University and chairperson of Tsinghua University Education Foundation, and Zhang Zuoyi, head of the Institute of Nuclear and New Energy Technology at Tsinghua University.

China-Poland Contemporary Material Art Exchange Exhibition opens



The China-Poland Contemporary Material Art Exchange Exhibition titled Material Thinking opened online on March 15, 2022.

The exhibition was sponsored by Tsinghua University and organized by the Contemporary Art Institute of the Tsinghua University Academy of Arts & Design. It will help promote



cultural and artistic exchanges between China and Poland and enhance the friendship between the two peoples.

This exhibition is the third in the Chinese Contemporary Material Art Exchange Exhibitions series. More than 100 works of material art by 76 artists from China and Poland are being featured at the exhibition.





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