

TSINGHUA

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NEWSLETTER



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Tsinghua honors fourth cohort of Distinguished Professors of Arts, Humanities and Social Sciences

On January 13, Tsinghua University held a symposium for academicians of the Chinese Academy of Sciences and the Chinese Academy of Engineering, as well as Distinguished Professors of Arts, Humanities and Social Sciences. Qiu Yong, secretary of the CPC Tsinghua University Committee, delivered a speech. Li Luming, president of Tsinghua University, presided over the symposium. Also in attendance were Guo Yong, deputy secretary of the CPC Tsinghua University Committee, Wang Hongwei, vice president of Tsinghua University, and more than 30 academicians and Distinguished Professors of Arts, Humanities and Social Sciences.

During the symposium, a conferment ceremony was held for the fourth cohort of Tsinghua University's Distinguished Professors of Arts, Humanities and Social Sciences. The title is the highest academic honor conferred by the University upon faculty members in the field of philosophy and social sciences. Chen Jian from the School of Economics and Management and Li Daokui from the School of Social Sciences were selected for this distinguished honor.

Chen Jian, born in April 1962, is a professor at the School of Economics and Management. He received his PhD in Systems Engineering from Tsinghua and currently serves as the director of the University's Research Center for Contemporary Management, a key research base in the humanities and social sciences designated by China's Ministry of Education.

Professor Chen is an expert who has been granted special government allowances of the State Council and a recipient of the National Science Fund for Distinguished Young Scholars. He leads an Innovation Research Group funded by the National Natural Science Foundation of China and has served as a leading role in more than 50 research projects granted by the National Natural Science Foundation of China.

Professor Chen also holds several prominent academic leadership roles, including Secretary-General of the Ministry of Education's Educational



Chen Jian



Li Daokui

Steering Committee for Management Science and Engineering, Secretary General of the Discipline Evaluation Group (Management Science and Engineering) of the State Council's Academic Degrees Committee, Vice President of the Society of Management Science and Engineering of China, and the Editor-in-Chief of the Journal of Systems Science and Systems Engineering.

As an internationally recognized scholar, Professor Chen has published over 200 academic papers in leading journals in China and abroad, including Management Science. His honors include the Fudan Prize for Eminent Contributions to Management Science and the National Excellent Doctoral Dissertation Supervisor Award.

Li Daokui, born in December 1963, is a professor at the School of Social Sciences, Tsinghua University. He holds a PhD in Economics from Harvard University and is a recipient of the special government allowances of the State Council.

Professor Li currently serves as Co-President of the Society for the Analysis of Government and Economics and as Director of the Institute for Chinese Economic Practice and Thinking at Tsinghua University. He has held numerous influential public and academic leadership roles, including member of the 11th and 12th National Committee of the Chinese People's Political Consultative Conference

(CPPCC), member of the Standing Committee of the 13th CPPCC National Committee, and member of the Monetary Policy Committee of the People's Bank of China. He has also served as President of the Chinese Economists Society, Founding Dean of Schwarzman College at Tsinghua University, and the inaugural Chief Economist of the New Development Bank of the BRICS countries.

Professor Li's research focuses on synthesizing China's economic thought and development experience,

advancing an indigenous economic knowledge system, and promoting the theoretical framework of government and economics. He is the author of several influential books, including Economic Lessons from China's Forty Years of Reform and Opening-up and The Germany Model for The Chinese Economy.

His honors include the First Prize of the Outstanding Achievement Award for Research in Institutes of Higher Education issued by the Ministry of Education.

Tsinghua University, attended the ceremony, which was presided over by Vice President Wang Hongwei.

Li Luming extended a warm welcome to Professor Seeram on his joining Tsinghua University on a full-time basis. He noted that Professor Seeram is a world-leading scientist in the field of nanoscience and technology, with deep ties to both China and Tsinghua University. Li expressed anticipation that Professor Seeram will fully leverage his exceptional academic influence and leadership to produce more high-level research outcomes, nurture more outstanding talents with international perspective, and support Tsinghua's talent cultivation, discipline construction, and scientific research to reach new heights.

Professor Seeram said that since arriving at Tsinghua University, he has gained a deep appreciation for its rich academic heritage, strong humanistic spirit, and vibrant energy. He noted that Tsinghua's internationally oriented research framework aligns perfectly with his cutting-edge research and innovative work. He added that he will fully leverage his research expertise, deeply integrate into the interdisciplinary research ecosystem, and contribute to the development of the University's discipline construction, scientific innovation, and educational undertakings through concrete actions.

Zhou Ming, dean of Tsinghua's Department of Mechanical Engineering, stated that Professor Seeram's appointment creates valuable opportunities for deeper interdisciplinary collaboration, including in the fields of materials science and biomedical engineering. He expressed confidence that Professor Seeram will further drive interdisciplinary innovation and continue to strengthen Tsinghua University's academic influence in these areas.

Tsinghua University alumnus, donor of the "Xinghua Fund of the Tsinghua University Education Foundation", and Meituan Founder and CEO Wang Xing; heads from relevant departments of Beijing municipality and Haidian district, as well as heads of relevant faculties and administrative units of the university, attended the ceremony.

Professor Seeram Ramakrishna is a world-renowned materials scientist and a recipient of the Chinese Government Friendship Award. In 2023, he was elected as a foreign member of the Chinese Academy of Engineering. He earned his Ph.D. from the University of Cambridge and worked at the National University of Singapore (NUS) from 1996 to 2025, where he also served as the Vice President (Research Strategy) and Dean of the College of Design and Engineering, among other positions.

Professor Ramakrishna has made pioneering contributions to understanding and enhancing the biological, chemical, electrical, mechanical, and physical responses of electrospun nanofibers, earning him the title of "Father of Electrospinning" worldwide. Professor Seeram will promote the construction of a medical-engineering integration platform at Tsinghua University and carry out research related to intelligent wearables.

Internationally Renowned Materials Scientist Seeram Ramakrishna joins Tsinghua University as a full-time faculty member



On March 23, Tsinghua University held a ceremony for the conferment of Tsinghua University Chair Professorship to Professor Seeram Ramakrishna, officially welcoming the internationally renowned materials scientist to join Tsinghua University as a full-time faculty member. Qiu Yong, secretary of the CPC Tsinghua University Committee, Li Luming, president of

Qiu Yong, Li Luming, Seeram Ramakrishna and his wife pose for a group photo.



Li Luming presents a letter of appointment to Seeram Ramakrishna.

Tsinghua hosts 5th Latin American and Caribbean Ambassadors' Dialogue on China's 15th Five-Year Plan

On March 25, Tsinghua University hosted the 5th Latin American and Caribbean Ambassadors' Dialogue, centering on the theme of China's 15th Five-Year Plan (2026-30) and its economic transition.

Qiu Yong, secretary of the CPC Tsinghua University Committee; Martin Charles, ambassador of Dominica to China; and Zhang Run, director-general of the Department of Latin American and Caribbean Affairs of the Ministry of Foreign Affairs of China, attended and delivered opening remarks. Yang Bin, vice chancellor of Tsinghua University Council, delivered the closing remarks.

More than 30 diplomats and representatives from

the embassies and representative offices in China of 22 countries in the Latin American and Caribbean region participated in the activity.

Qiu Yong extended a warm welcome to the attending guests. He pointed out that the event has become an important platform for deepening exchanges and enhancing mutual trust between China and Latin America and the Caribbean.

Tsinghua University attaches great importance to cooperation with countries in the Latin American and Caribbean region. Through initiatives such as the establishment of Tsinghua University Latin America Center and the active implementation of

brand programs such as "China-Latin America Youth Responding to Global Challenges," the University has strongly promoted educational and people-to-people exchanges between China and Latin America and the Caribbean.

This year marks the opening year of China's 15th Five-Year Plan period (2026-2030). Tsinghua will further implement its Global Strategy, working with all partners to promote deeper and more substantive China-LAC relations, and write a new chapter in building a China-LAC community with a shared future.

Martin Charles stated that while promoting its own development, China has become an important strategic partner for the Latin American and Caribbean region. He noted that cooperation under the Belt and Road Initiative and other frameworks has provided strong support for the development of Latin America in fields such as infrastructure construction, technology transfer, and energy transition. In the face of global challenges, he emphasized that all parties should adhere to the philosophy of mutual benefit and win-win cooperation, ensuring that the fruits of development better benefit people's livelihoods.

Zhang Run stated that China-LAC cooperation has yielded fruitful results during the 14th Five-Year Plan period (2021-2025), and this event, held at the outset of the 15th Five-Year Plan (2026-2030), carries significant importance. China is willing to take this as an opportunity to adhere to the correct strategic direction and make synergistic efforts in the three key areas of market alignment, energy transition, and industrial upgrading. By strengthening multilateral coordination, China aims to promote the steady

and sustained development of the China-LAC comprehensive cooperative partnership.

Yang Bin stated that Tsinghua University has always been dedicated to deepening the friendship between China and Latin American and Caribbean countries. Moving forward, the Latin America Center will continue to serve as a bridge to promote people-to-people exchanges and deepen friendly cooperation between China and Latin America in such areas as economic development, youth empowerment, artificial intelligence (AI) and online education, empowering global development toward a more balanced, coordinated, and inclusive new stage.

During the event, Chen Taotao, director of the Tsinghua University Latin America Center, introduced the background, achievements, and future prospects of the "China-Latin America Youth Responding to Global Challenges—2025 Poverty Alleviation Challenge" project. Bai Chong-en, Dean of the School of Economics and Management, delivered a keynote report. He illustrated the main objectives of China's 15th Five-Year Plan (2026-2030), China's economic development milestones, and their underlying drivers. During the roundtable discussion, Martin Charles, Chen Taotao, and Bai Chong-en engaged in in-depth exchanges with envoys from multiple countries focusing on the theme of the event.

The event was hosted by Tsinghua University and organized by the University's Latin America Center, Institute for Global Development, Center for Global Competence Development, and Center for China-Latin America Management Studies at School of Economics and Management. Nearly 70 faculty members and students from relevant departments of Tsinghua University attended the event.



A group photo of all guests

GLOBAL ENGAGEMENT

Tsinghua President Li Luming visits Switzerland and Germany, strengthens global partnerships

From January 19 to 23, Tsinghua University President Li Luming visited Switzerland and Germany.

During the visit, he attended the World Economic Forum (WEF) Annual Meeting 2026, participated in the Global University Leaders Forum (GULF) and the Board Meeting of the Global Alliance of Universities on Climate (GAUC), and visited leading local universities, research institutions, and industry leaders in both countries.

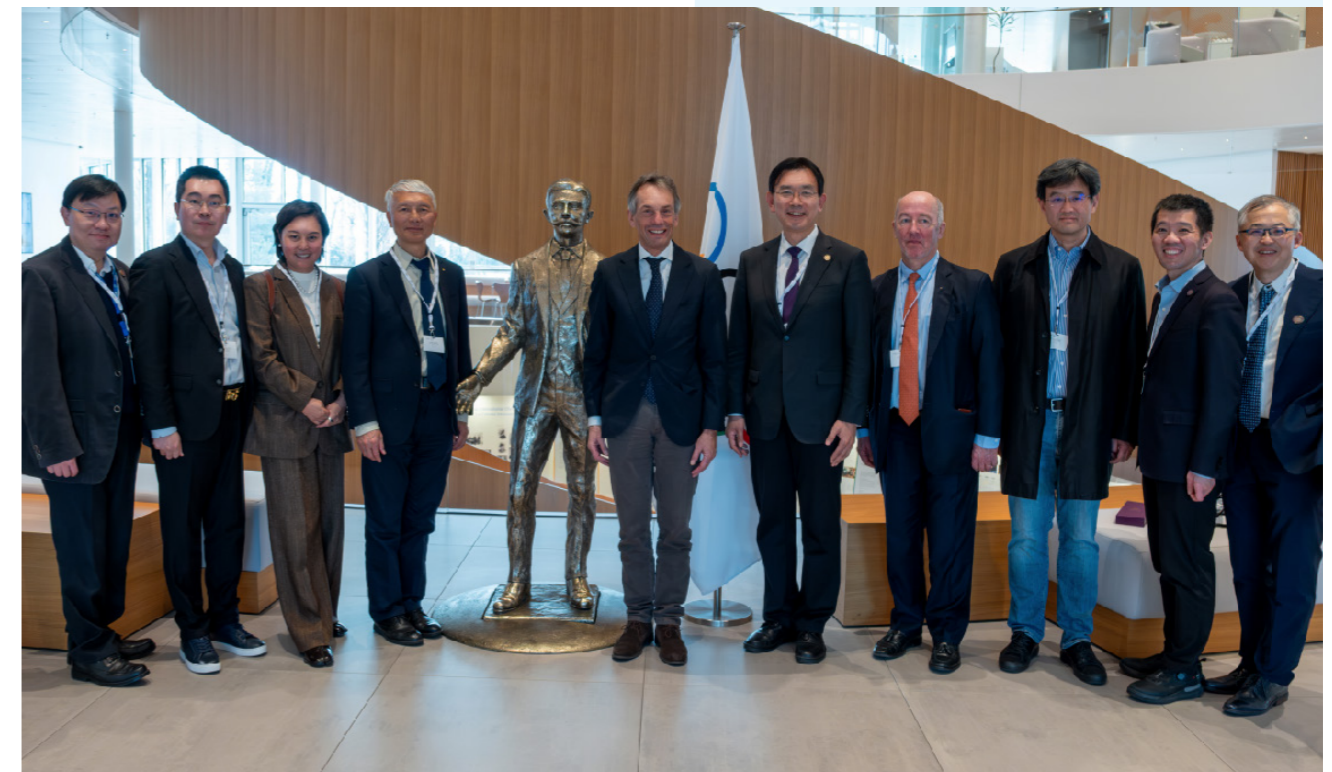
The visit aimed to enhance international cooperation in education, science and technology, talent development, and sustainable development.

On January 19 in Switzerland, Li Luming held a series of meetings and visits with academic and institutional partners.

In Geneva, he visited the European Organization for Nuclear Research (CERN), toured the Large Hadron Collider (LHC) – a flagship Large-scale Scientific Facility – with a descent to the LHCb experimental cavern, and explored opportunities for deeper collaboration between CERN and the China Jinping Underground Laboratory (CJPL), a deep underground facility led by Tsinghua University, in frontier physics research.

In Lausanne, Li Luming visited the International Olympic Committee (IOC) and held talks with its Director General, Christophe de Kepper, to explore

Tsinghua University delegation visits the International Olympic Committee.





Participants of the GAUC Board Meeting

the potential applications of emerging technologies, including artificial intelligence, in the field of sports.

Later in Davos, Li Luming attended the Davos Roundtable hosted by Gajah Tunggal Tbk, a company headquartered in Indonesia, where he delivered remarks outlining the latest progress in Tsinghua University's global strategy implementation.

During the World Economic Forum (WEF) Annual Meeting, Li Luming also participated in a series of events, engaging with leaders from across sectors to discuss pathways for cooperation and development on global issues.

On the afternoon of January 20, he attended the Global University Leaders Forum (GULF), joining leaders from renowned universities and research institutions to discuss the theme "Leadership in Transition: Universities and the World Ahead." During the forum, he highlighted Tsinghua University's innovative initiatives and achievements in leveraging artificial intelligence to empower education and science.

On the same day, Li Luming attended the Global Alliance of Universities on Climate (GAUC) Council for the 2025-2026 term.

During the meeting, he held discussions with Irene Tracey, vice-chancellor of the University of Oxford; Deborah Prentice, vice-chancellor of the University of Cambridge; Luis Vassy, president of Sciences Po; and Evelyn Wang, vice president of the Massachusetts Institute of Technology.

The discussions focused on strengthening collaboration among member universities within the alliance and deepening industry-academia coordination on climate governance. This was followed by a high-level dialogue featuring in-depth exchanges with representatives from academia and the global business community.

During the visit, Li Luming also met separately with Stephen Schwarzman, chairman, CEO and co-founder of Blackstone; Ray Dalio, founder of Bridgewater Associates; Wu Yibing, CEO of Temasek China; Andrew Forrest, founder and executive

chairman of Fortescue; Eisaku Ito, president and CEO of Mitsubishi Heavy Industries, and Zhang Lei, CEO and founder of Envision, among other key partners.

He also met with alumni entrepreneurs, engaging in detailed exchanges on deepening university-industry collaboration, talent development, and sustainable development.

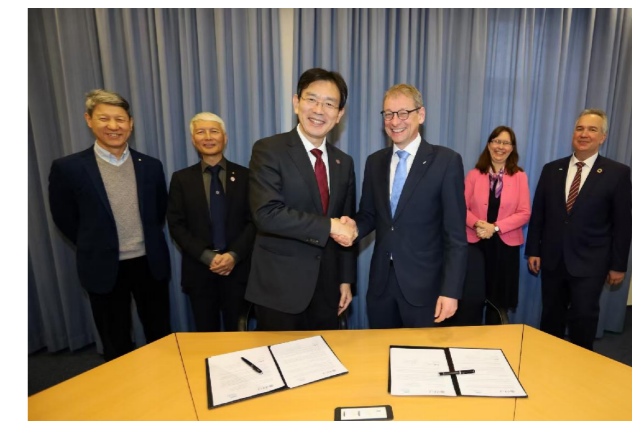
On January 21, Li Luming visited Zurich, where he met with Daniela Zetti, head of the Archives of Contemporary History at ETH Zurich. He toured the archives' exhibitions and exchanged views on academic cooperation in archival research, as well as collaboration on curating and exhibiting valuable historical image collections.

Whilst in Germany, on January 21, Li Luming met with Thomas F. Hofmann, president of the Technical University of Munich (TUM), and renewed the Memorandum of Understanding on the Establishment of a Flagship Partnership between the two universities.

The two parties reviewed the achievements of their collaboration in recent years and expressed their shared hope that the renewal of the flagship partnership memorandum of understanding would serve as an opportunity to further deepen cooperation in scientific research, innovation, and talent cultivation.



Tsinghua University signs cooperation agreement with Technical University of Munich.



Tsinghua University signs cooperation agreement with Hamburg University of Technology.

Following the meeting, Li Luming visited laboratories at TUM in the field of biomedical engineering.

On January 23, Li Luming visited Hamburg University of Technology (TUHH) and signed an Educational and Research Cooperation Agreement and a student exchange agreement with TUHH President Andreas Timm-Giel. The two sides reviewed their multiple exchanges since June last year and the progress of cooperation between the two universities, and expressed their shared expectation for deeper collaboration in the future.

During the visit, Li Luming was also invited to deliver a speech, presenting Tsinghua University's initiatives and insights on integrating artificial intelligence into education and cultivating cutting-edge, interdisciplinary innovative talent.

Li Luming also visited BMW Group and Airbus Hamburg, where he held in-depth discussions on frontier topics including AI-empowered manufacturing, green mobility, and carbon neutrality.

The discussions also explored ways to strengthen faculty and student exchanges and advance university-industry collaborative innovation as well as industry-academia-research cooperation.

Representatives from relevant departments and units of the University also participated in the related activities.

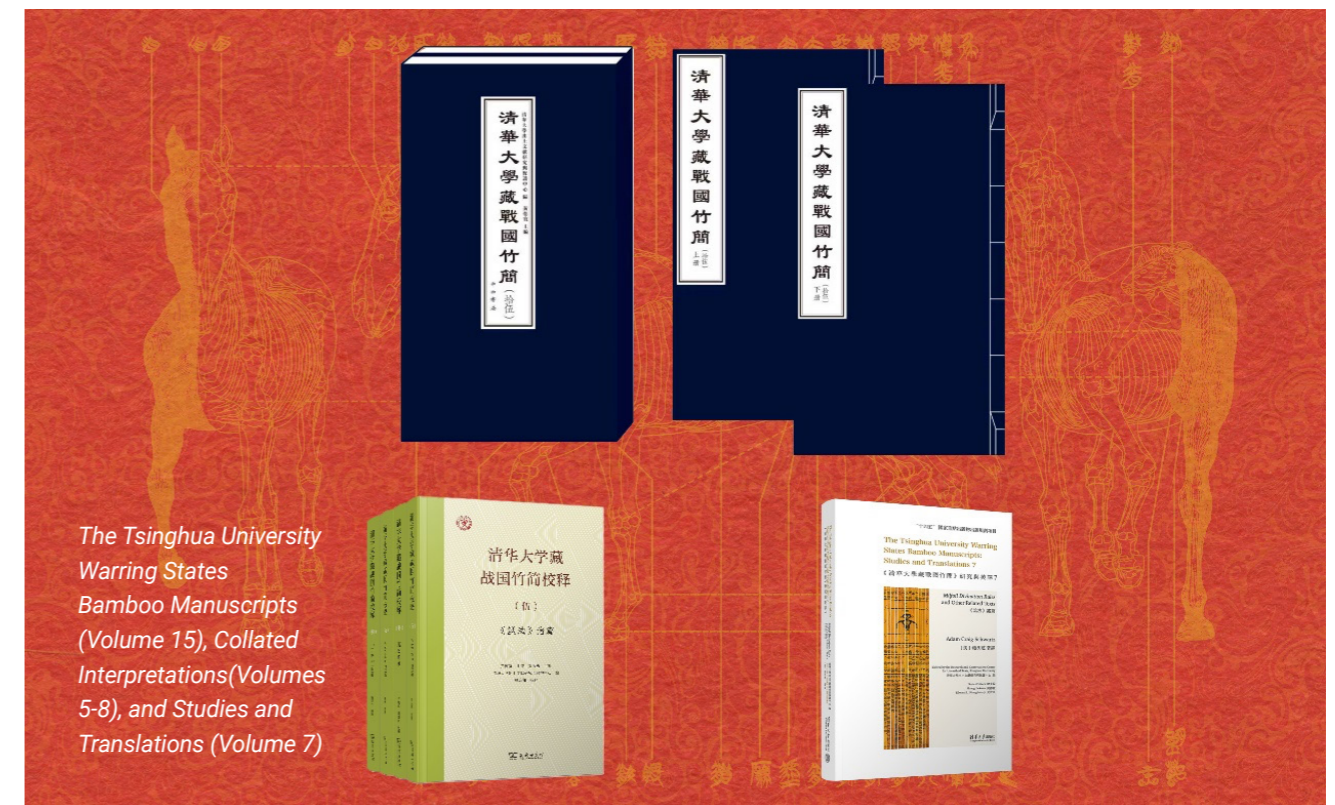
RESEARCH

Tsinghua University Warring States Bamboo Manuscripts (Volume 15), Collated Interpretations, and Studies and Translations book launch held in Beijing

On January 19, the book launch for *The Tsinghua University Warring States Bamboo Manuscripts (Volume 15), Collated Interpretations, and Studies and Translations*, was jointly hosted by the Research and Conservation Center for Unearthed Texts of Tsinghua University, Zhongxi Book Company, The Commercial Press, and Tsinghua University Press. As the Chinese Lunar Year of the Horse approaches, volume 15 presents a compilation of previously unseen documents on horse administration, which holds significant importance for the study of pre-Qin technological and cultural history.

The Tsinghua University Warring States Bamboo Manuscripts collects five bamboo manuscripts: *Xu ma* 胥马 "Observing Horses," *Fan ma zhi ji* 凡马之疾 "All Horse Ailments," *Xun ma* 驯马 "Taming Horses," *Yu shu* 驭术 "Art of Driving Horses," and *Yu ma zhi dao* 驭马之道 "The Way of Driving Horses." These documents are the earliest known specialized materials in China discussing horse appraisal, horse treatment, horse taming, and horse driving.

The launch also featured the release of the 2nd series, volumes 5-8, of the *Collated Interpretations*, and volume 7 of the *Studies and Translations*.



The Tsinghua University Warring States Bamboo Manuscripts (Volume 15), Collated Interpretations (Volumes 5-8), and Studies and Translations (Volume 7)

Dong Jiahong's team at Tsinghua Changgung Hospital achieves breakthrough in neural-tumor interactions in distal cholangiocarcinoma

The intricate interplay between tumors and the immune system has not only deepened our understanding of cancer biology but has also driven a paradigm shift from fundamental research to clinical immunotherapy, marking a milestone in modern oncology. As research continues to advance, accumulating evidence highlights the critical role of neural signaling in tumor initiation, progression, and invasion. Tumor neurobiology has thus emerged as a frontier field with significant implications for both basic research and clinical translation.

Perineural invasion (PNI), a pathological hallmark of aberrant tumor-nerve interactions, represents a key indicator of aggressive behavior in multiple solid tumors, including cholangiocarcinoma and pancreatic cancer. Clinically, PNI is closely associated with local recurrence, distant metastasis, and poor prognosis, making it one of the major pathological factors limiting long-term survival. Despite its clinical importance, the spatial organization and molecular regulatory mechanisms underlying PNI have remained poorly understood.

Recently, a research team led by Academician Dong Jiahong at the Hepatopancreatobiliary Center, Beijing Tsinghua Changgung Hospital, in collaboration with the Department of Pathology headed by Dr. Hongfang Yin, achieved a major breakthrough in the study of neural-tumor interactions in distal cholangiocarcinoma (dCCA). For the first time, the team applied Xenium subcellular-resolution spatial transcriptomics to systematically dissect the cellular and molecular architecture of the PNI microenvironment in dCCA, generating the first high-resolution spatial cellular atlas of perineural invasion in dCCA.

By integrating spatial transcriptomics with high-resolution pathological morphology, the study constructed a comprehensive PNI spatial atlas

encompassing over 350,000 spatially resolved single cells across 20 major cell types. Within a unified tissue framework, the researchers achieved precise spatial registration of H&E staining, immunofluorescence imaging, and spatial transcriptomic signals, enabling an accurate reconstruction of key cellular interactions and molecular events within the perineural invasion niche.

Building on this atlas, the team systematically annotated all PNI-positive regions across pathological sections for each patient and introduced a patient-level Perineural Invasion Density Index (PNI density index) normalized to tumor size. This quantitative metric enabled refined stratification of patients based on PNI burden. Comparative analyses revealed that tumors with high PNI density exhibited significant upregulation of pathways related to neurogenesis, axon regeneration, extracellular matrix remodeling, and Schwann cell differentiation, compared with tumors showing low PNI involvement.

These findings suggest that tumor cells do not merely spread passively along nerve fibers but actively acquire neurotropic invasive capabilities through a process of "neural education," providing new mechanistic insights into the aggressive behavior of distal cholangiocarcinoma and opening avenues for targeted therapeutic intervention.

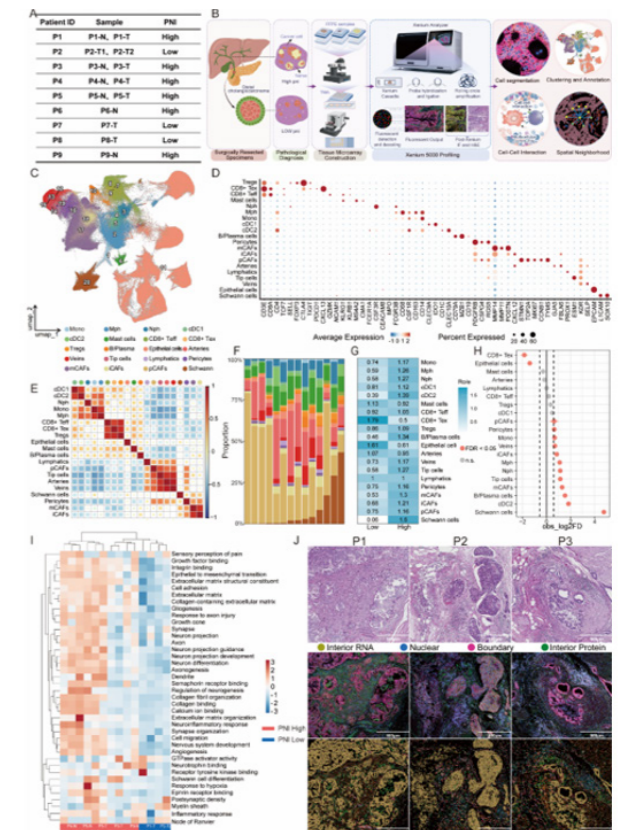
Meanwhile, the tumor microenvironment of patients with a high degree of perineural invasion exhibited significant enrichment of cDC2s, M2-polarized macrophages, myofibroblastic CAFs (mCAFs), and exhausted CD8⁺ T cells, indicating that perineural invasion is not an isolated pathological event but is accompanied by pronounced fibrotic remodeling and immunosuppressive states. At both spatial and cellular levels, these findings reveal the fundamental biological nature of perineural invasion as a driver of tumor immune evasion and stromal reprogramming.

Beyond advancing the mechanistic understanding of perineural invasion in dCCA from a spatial multi-omics perspective, this study also identifies potential molecular markers with clinical relevance for patient stratification, surgical navigation, and margin assessment. Several molecules, including CLDN18, ANXA5, MUC1, and CD59, were found to be significantly upregulated within perineural invasion lesions, highlighting their strong translational potential and providing a molecular basis for the visualization and targeted management of perineural invasion in biliary tract malignancies.

From study design to clinical translation, the project embodies the concept of "Precision Surgery," originally proposed by Academician Dong Jiahong, representing another important example of the precision surgery paradigm applied to basic and translational research in hepatobiliary and pancreatic tumors.

The study, entitled "A Subcellular Spatial Atlas Illuminates the Microenvironmental Remodeling of Perineural Invasion in Distal Cholangiocarcinoma," was published in the internationally renowned oncology journal *Journal of Hematology & Oncology*. Fansen Ji, a research-oriented postdoctoral fellow at the Hepatopancreatobiliary Center, Beijing Tsinghua Changgung Hospital; Hao Chen, a PhD candidate at the same center; and Huan Li, a pathologist, are co-first authors of the paper. Jiahong Dong, Xuedong Wang, Hongfang Yin, and Bingjun Tang serve as co-corresponding authors. The entire technical team of the Department of Pathology also made important contributions to this work.

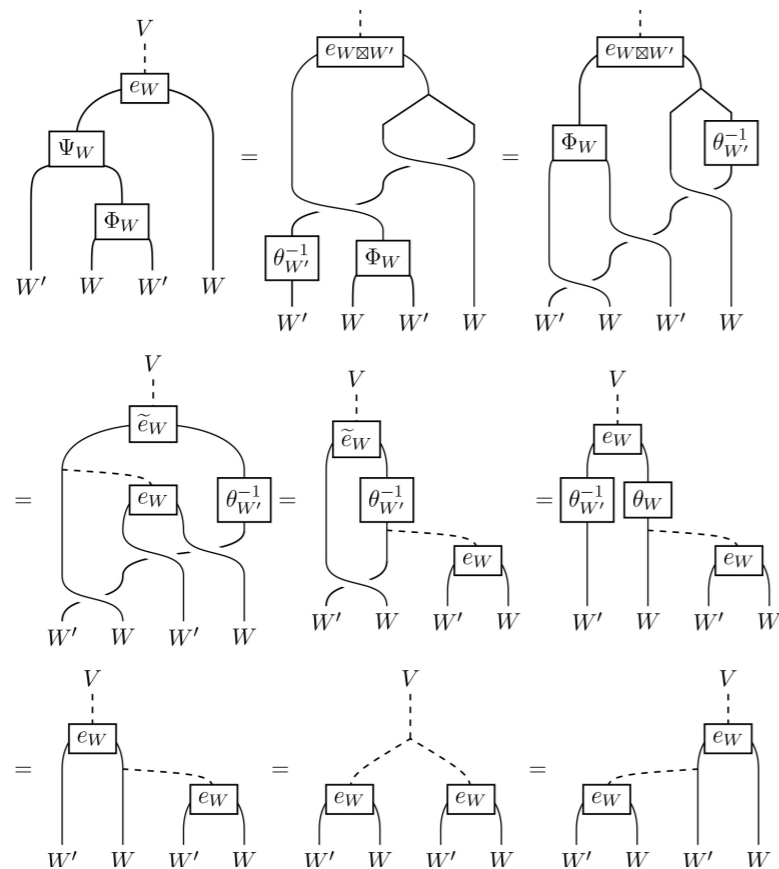
This research was supported by the National Natural Science Foundation of China (NSFC) Integrated Project entitled "Visualization-Guided Precision Surgery Based on Key Molecular Functions of Perineural Invasion in Biliary Tract Malignancies."



Robert McRae of YMSC publishes major results on rationality of vertex operator algebras

Vertex operator algebras form a rigorous mathematical framework for two-dimensional conformal field theory and have deep connections with representation theory, low-dimensional topology, and quantum physics. A central goal in the field is to understand when a vertex operator algebra is strongly rational—a property ensuring that its category of representations forms a modular tensor category, a structure with important applications in topological quantum field theory and quantum computation.

Robert McRae, an associate professor in the Yau Mathematical Sciences Center (YMSC), has published a research article entitled “On rationality for C2-cofinite vertex operator algebras” in the *Cambridge Journal of Mathematics*. The paper establishes new structural results in the theory of vertex operator algebras (VOAs), resolves long-standing conjectures, and provides powerful new criteria for determining rationality.



Proof of a key identity for showing rigidity, using graphical calculus from braided tensor category theory

Establishing Structural Criteria for Rationality

In this work, McRae studies a broad class of VOAs known as C2-cofinite vertex operator algebras. While C2-cofiniteness guarantees certain finiteness and analytic properties, determining when such algebras are rational has remained a challenging problem.

The paper proves three main results. First, McRae shows that if the module category of a simple, self-contragredient, C2-cofinite vertex operator algebra is rigid as a tensor category, then it is automatically a factorizable finite ribbon category—that is, a (possibly non-semisimple) modular tensor category. This partially confirms a widely anticipated structure theorem in logarithmic conformal field theory.

Second, the paper establishes a modularity criterion for rigidity. If the modular S-transformation of the vacuum character can be expressed purely as a linear combination of ordinary characters (without pseudo-trace contributions), then the module category is rigid. This result connects modular invariance of characters with categorical duality.

Third, McRae proves that if the Zhu algebra of a C2-cofinite vertex operator algebra is semisimple, then the algebra itself is rational. This provides a practical and internally verifiable criterion for rationality, significantly simplifying the process of proving strong rationality in many cases.

Resolving a Long-Standing Conjecture on Affine W-Algebras

An important application of these results is the resolution of the Kac–Wakimoto–Arakawa conjecture concerning exceptional affine W-algebras. These algebras arise from quantum Drinfeld–Sokolov reduction of affine Lie algebra vertex operator algebras at admissible levels and play a central role in representation theory and conformal field theory.

Using recent results showing that the relevant Zhu algebras are semisimple, McRae’s theorem implies that all such C2-cofinite exceptional affine W-algebras are strongly rational. This completes the proof of the conjecture in full generality.

The paper also advances the long-standing coset rationality problem. Given a strongly rational vertex operator algebra containing a strongly rational subalgebra, it has been unclear when the corresponding coset (or commutant) algebra inherits rationality. McRae proves that if the coset algebra satisfies the C2-cofiniteness condition, then it is strongly rational. This reduces the problem to verifying C2-cofiniteness and clarifies the structural behavior of such subalgebras.

The work combines advanced techniques from tensor category theory with analytic methods involving genus-one correlation functions and modular transformations. By bridging analytic and categorical approaches, the paper unifies several strands of research in vertex operator algebras and provides new tools for the study of both rational and logarithmic conformal field theories.

TSINGHUA COMMUNITY

Tsinghua team wins 2025 IEEE ComSoC Stephen O. Rice Prize

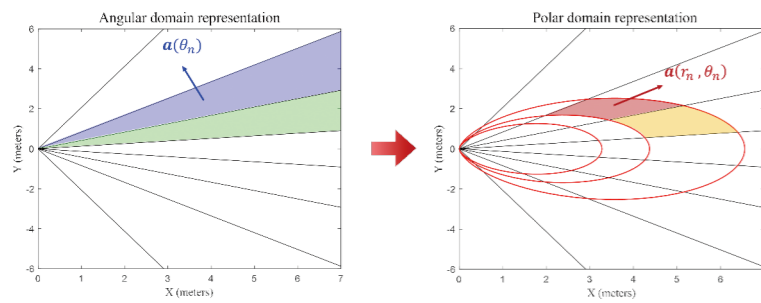
During the IEEE Global Communications Conference 2025, the IEEE Communications Society (ComSoc) presented its annual awards. A research team from the Department of Electronic Engineering at Tsinghua University was awarded the 2025 IEEE ComSoc Stephen O. Rice Prize. The winning paper, "Channel estimation for extremely large-scale MIMO: Far-Field or near-field?", was authored by Mingyao Cui, a master's student enrolled in 2020, and his supervisor, Prof. Linglong Dai. Published in *IEEE Transactions on Communications* (IEEE TCOM) in April 2022, this work marks the first time in the award's 50-year history that Tsinghua University has been honored as the lead institution.

The traditional 1G to 5G systems are built on far-field communication principles, which rely on a planar electromagnetic wavefront model and utilize only the angular-domain degrees-of-freedom (DoFs) of wireless channels. This design presents a fundamental bottleneck for further

performance enhancement. The award-winning paper is among the first seminal works exploring *near-field* communications in 6G systems. In near-field scenarios, electromagnetic waves behave as spherical wavefronts. This property unlocks an additional *distance-domain DoFs* alongside the angular dimension, opening a new pathway to significantly improve 6G spectral efficiency. Near-field technology is now widely recognized as a potential key air-interface innovation in 6G systems. In March 2025, China's IMT-2030 (6G) Promotion Group established the Near-Field Communications Task Group, with Tsinghua University serving as the leading institution, to steer the 6G standardization of near-field communications. In August 2025, the international standardization organization 3GPP formally adopted the near-field channel model for new 6G mid-band frequencies (7-24 GHz), paving the way for further research and application of near-field communications for 6G.



Research team from Tsinghua wins 2025 IEEE ComSoc Stephen O. Rice Prize



Angular domain representation vs. polar domain representation

The core innovation of the paper is a novel *polar-domain* channel representation method tailored for near-field communications. While existing 5G massive MIMO systems use an *angular-domain* representation method that uniformly divides the angular space, the proposed approach introduces *non-uniform sampling in the distance-domain*. This dual focus efficiently captures the full spatial characteristics of the near-field channel. Based on the Fresnel approximation, the proposed framework is proven to be applicable to both near-field and far-field propagation environments. The research team then integrated this near-field channel representation with advanced sparse signal recovery algorithms to achieve highly accurate channel estimation. Numerical results demonstrate

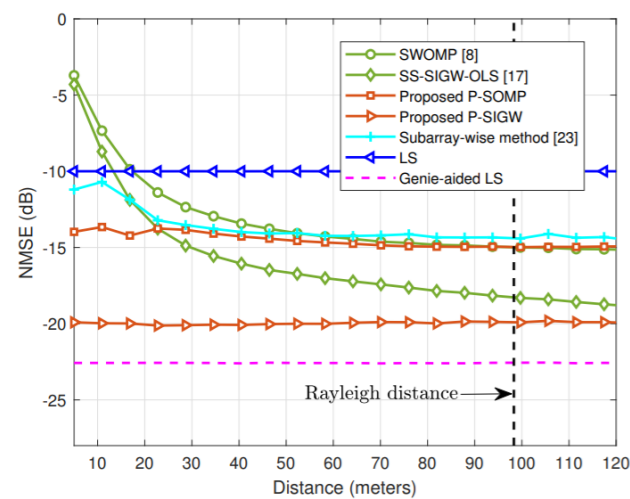
significant accuracy gains in near-field scenarios, while the method naturally specializes to the conventional far-field estimation when applied in far-field environment.

The awarding paper has received 776 Google Scholar citations since its publication, ranking second in terms of citations among over 1,800 articles published in IEEE TCOM from 2022 to 2024. The proposed polar-domain representation method has been directly adopted or extended by more than 100 research teams from over 30 institutions worldwide, with applications spanning near-field communications, near-field localization, integrated sensing and communications, physical-layer security, wireless power transfer, and reconfigurable intelligent surfaces.

IEEE ComSoC Stephen O. Rice Prize

Established in 1975, the IEEE Communications Society Rice Award is named after Dr. Stephen O. Rice from Bell Laboratories, who introduced the Rician distribution in statistical theory. This prize is one of the highest honors in the field of communication theory. It is awarded annually to the single best paper published in *IEEE Transactions on Communications* in the past three years, selected based on academic quality, originality, utility, and timeliness.

Channel estimation error vs. communication distance.



Breakthrough cybersecurity research earns Distinguished Paper Award at NDSS 2026



The Distinguished Paper Award certificate presented at NDSS Symposium 2026

Two PhD students from Tsinghua University's Department of Computer Science and Technology, High Performance Computing Institute, have been honored with the Distinguished Paper Award at the 33rd Network and Distributed System Security Symposium (NDSS). Rong Kaiyuan and Fang Junqi's paper, titled "OCCUPY+PROBE: Cross-Privilege Branch Target Buffer Side-Channel Attacks at Instruction Granularity," stood out among the conference's rigorous selections, highlighting a significant advancement in cybersecurity research. The work was supervised by Professor Dongsheng Wang.

The award-winning work delves into the vulnerabilities of Intel Core processors from the 9th to 14th generations, specifically targeting the Branch Target Buffer (BTB). Through meticulous reverse engineering, the researchers uncovered security flaws in the BTB's update mechanisms. They introduced a novel side-channel attack named Occupy+Probe, which enables user-space detection of whether kernel branch instructions are taken or

not, potentially leaking sensitive data. Unlike existing BTB side-channel attacks, Occupy+Probe can bypass hardware isolation mechanisms deployed in Intel's 11th–14th generation Core processors. It also achieves the highest spatial resolution to date, allowing attacks at an instruction-level granularity. By integrating this side-channel with unprivileged interrupt control techniques, the team successfully extracted an RSA private key from the Linux Kernel Crypto API, achieving a remarkable 98% recovery accuracy. Furthermore, the attack proved effective in breaching Kernel Address Space Layout Randomization (KASLR) on 11th-generation Core processors, demonstrating its real-world threat potential.

Held from February 23 to 27 in San Diego, California, NDSS is one of the top four conferences in the field of network and system security. Recommended as an A-class conference by the China Computer Federation (CCF), this year's edition marked its 33rd installment with an acceptance rate of 17.89%.

Tsinghua earns Distinguished Artifact Award at FAST 2026

Tsinghua University's Storage Research Group from the Department of Computer Science and Technology has been honored with the Distinguished Artifact Award at the 24th USENIX Conference on File and Storage Technologies (FAST 2026). The accolade recognizes their pioneering paper, "GPU Checkpoint/Restore Made Fast and Lightweight," which introduces a novel scheme to enhance GPU efficiency in modern computing environments.

The award-winning research, whose first author is Shaoxun Zeng, PhD student (2021 cohort), and supervised by Associate Professor Youyou Lu, addresses critical challenges in GPU management. Their proposed solution, named GCR (GPU Checkpoint/Restore), separates data and control paths to speed up saving and restoring GPU states, and enables efficient incremental checkpointing. This innovation supports key applications in high-demand GPU workloads, such as rapid scaling of elastic tasks, multi-task switching, and fault-tolerant computing. By boosting overall GPU cluster utilization, GCR holds

substantial promise for data centers and AI-driven systems. Compatible with popular frameworks like vLLM, DeepSpeed, and Transformers, as well as various GPU models, the scheme minimizes average performance interference to under 1% while slashing checkpoint save times to at most 28% of traditional methods and restore times to at most 13%. The Distinguished Artifact Award highlights the paper's exceptional open-source implementation, praised for its completeness, reproducibility, and high standards in functionality and performance.

Tsinghua's Storage Research Group has a longstanding reputation for advancing storage technologies through innovative research and international accolades. In recent years, the lab has emphasized open-source contributions, fostering a vibrant ecosystem in the storage community.

Held annually, FAST is a premier academic forum in file and storage systems, established over two decades ago and classified as a Class-A conference by the China Computer Federation (CCF).



The Distinguished Artifact Award certificate

DIVERSES CAMPUSES

DIVERSE CAMPUS

Tsinghua launches Center for Life Sciences and Artificial Intelligence



The School of Life Sciences recently inaugurated the Center for Life Sciences and Artificial Intelligence.

The School of Life Sciences recently inaugurated the Center for Life Sciences and Artificial Intelligence. Wang Hongwei, vice president of Tsinghua University, presided over the event.

In his address, Wang highlighted the critical convergence of life sciences and artificial intelligence. He described the center's establishment as a strategic initiative designed to foster interdisciplinary collaboration and enhance scientific and technological self-reliance. Wang endorsed the center's dual-focused strategy—“AI empowering life sciences and life sciences inspiring AI”—and pledged the University's full support for its development. He expressed the hope that the center will address major challenges in the field and contribute Tsinghua's expertise to the advancement of global science.

Shi Songhai, Dean of the School of Life Sciences and a CAS Member, formally announced the center's launch. He appointed Zhang Qiangfeng as Director and Jia Xiaoxuan as Deputy Director, presenting them with their letters of appointment.

Xie Wei, vice dean of the School, unveiled the center's Academic Advisory Committee. Chaired by Zhang Zemin, president of Chongqing Medical University, the committee comprises distinguished experts



Director Zhang Qiangfeng introduces the center at the inauguration event.

including Chen Runsheng of the CAS Institute of Biophysics; Cai Xiujun, president of Sir Run Run Shaw Hospital, School of Medicine at Zhejiang University; Huang Tiejun of the Beijing Academy of Artificial Intelligence; Shi Songhai; Wang Zhixin of the School of Life Sciences at Tsinghua University; and Zhang Yaqin, dean of Tsinghua's Institute for AI Industry Research (AIR).

The inauguration ceremony featured keynote speeches by Chen Runsheng (CAS Member); Xu Jinbo, founder of Molecular Heart and ISCB International Fellow; Zhang Chenyu, dean of the

School of Life Sciences at Nanjing University; and Zhang Xuegong, professor at Tsinghua's Department of Automation and School of Life Sciences.

Co-chaired by Xie Wei and Zhang Qiangfeng, the event was attended by representatives from universities, research institutes, and enterprises.

Participants assemble for a group photo.



DIVERSE CAMPUS

Tsinghua SEA hosts Mechano-X Workshop 2026: global scholars converge for cross-disciplinary innovation



Group photo of Mechano-X Workshop 2026

The Mechano-X Workshop 2026, held from January 5 to 7 at Tsinghua University Southeast Asia Center (Tsinghua SEA), Bali, Indonesia, brought together distinguished scholars from around the world for three days of invited lectures, poster presentations, and interactive discussions. The workshop enabled intensive knowledge exchange at the frontiers of mechanics, materials science, biology, and their intersections. Participants shared their research, insights, and ideas on Mechano-X, highlighting how mechanics provides an important and inspiring framework for understanding, proactive design, and the rational regulation of complex material and biological systems across diverse disciplines.

Gao Huajian, Tsinghua University Professor and director of the Mechano-X Institute at Tsinghua University, chaired the event. In his remarks, he outlined the emerging Mechano-X research paradigm, articulated the vision and mission of the workshop, and introduced the newly established Mechano-X Institute at Tsinghua University. He highlighted the Institute's role in advancing global engagement and announced its long-term mission to host a rotating series of international workshops, aimed at strengthening cross-regional and interdisciplinary collaboration. Prof. Gao emphasized Mechano-X as a growing, globally connected platform and noted that The Tsinghua University



Conference Chair, Prof. Gao Huajian, Tsinghua University



Recipients of the Best Poster Award

Southeast Asia Center here in Bali is an important part of Tsinghua's global engagement strategy.

The program featured a sequence of invited talks and extensive exchanges on topics ranging from Xmechanics and metastructures to mechanobiology and AI-assisted materials. Notable sessions covered AI+ materials and AI+ mechanics, mechanobiology, metamaterials, shale fracture, and mechanomedicine, with discussions extending into practical applications and future directions.

Internationally renowned experts who delivered keynote talks and presentations included Prof. Yang Wei from Zhejiang University, Prof. Eduard Arzt from Nanyang Technological University, Prof. Taher Saif from University of Illinois at Urbana-Champaign, Prof. Lu Jian from City University of Hong Kong, Prof. Zhang Tongyi from Shanghai University, Prof. Guo Wanlin from Nanjing University of Aeronautics and Astronautics, and Prof. Lim Chwee Teck from National University of Singapore. The workshop also included an evening banquet with three best poster awards.



participants in the workshop



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