

# China Launches Action Plan for AI+Education



## Policy Express

By LI Linxu

In its latest efforts to become an education powerhouse, China has launched an AI+education action plan.

The plan was jointly released by five government bodies, including the Ministry of Education, the National Development and Reform Commission, and the Ministry of Science and Technology.

By 2030, a framework for the deep integration of AI and education will be basically established. A comprehensive AI education system covering all stages of education and a general education system for the entire society — characterized by vertical continuity and horizontal connectivity — will be built.

The scale and quality of AI talent cultivation will be significantly improved, and a long-term mechanism for nurturing AI literacy will be formed.

Systemic transformation will be achieved in educational and teaching models, scientific research paradigms, and governance modes.

The capacity for education service



A teacher shows cartoon images of students generated by AI technology. (PHOTO: XINHUA)

supply and the level of modernization will be substantially elevated.

The foundational support environment will become more intensive and efficient, while the innovation ecosystem will grow more open and collaborative.

The application of intelligent tech-

nologies will become more inclusive, secure, and efficient, cultivating a batch of high-value, scalable, and replicable application scenarios.

A new form of smart education will take shape, with its global influence reaching the forefront.

To achieve such goals, efforts will be made to speed up the rollout of AI education in primary and secondary schools, citing measures such as integrating AI education into local curriculum systems, encouraging cross-disciplinary AI teaching, and building AI education bases.

Efforts will also be made to cultivate high-level talent tailored for the intelligent era, pushing for establishing AI as a basic public course in universities and developing specialized textbooks categorized by academic disciplines.

It urges efforts to accelerate the upgrading and transformation of traditional disciplines in vocational education, advance public AI awareness and literacy initiatives, and improve the AI competencies and pedagogical skills of educators across all levels.

The plan calls for leveraging AI to empower learning, teaching, educational governance, and scientific research.

It also highlights advancing research and innovation in AI+education, strengthening the enabling conditions and support systems for AI+education, and promoting international cooperation in AI+education.



# IJM: Putting Asian Math Research on Global Stage

By Yasuyuki Kawahigashi

In the late 1980s, the global mathematical community was undergoing a significant transformation. The field was moving away from a purely Western-centric focus toward a more inclusive, pluralistic era where groundbreaking research was increasingly emerging from Asia. However, a dedicated platform was missing to bridge these regional developments with the wider international audience.

It was in this environment that the *International Journal of Mathematics (IJM)* was conceived. Dr. K. K. Phua, chairman of World Scientific Publishing Company in Singapore, approached the legendary Professor Shiing-Shen Chern, a pioneer of modern differential geometry known as a "global citizen of science," with a proposal to establish World Scientific's first dedicated mathematics journal.

Professor Chern immediately recognized the potential to elevate Asian scholarship. Alongside esteemed German mathematician Friedrich Hirzebruch, who joined as an honorary editor, they lent their immense intellectual authority to ensure *IJM* would be a forum of the highest caliber. Their mission was clear: Scientific excellence knows no borders, and *IJM* would be the vehicle to prove it.

### A tradition of editorial excellence

Since its inaugural issue in March 1990, *IJM* has been guided by the distinguished minds in the field. Our "rigorous standards" are not merely a phrase; they represent a tradition of excellence where every submission undergoes stringent peer review by world-leading specialists.

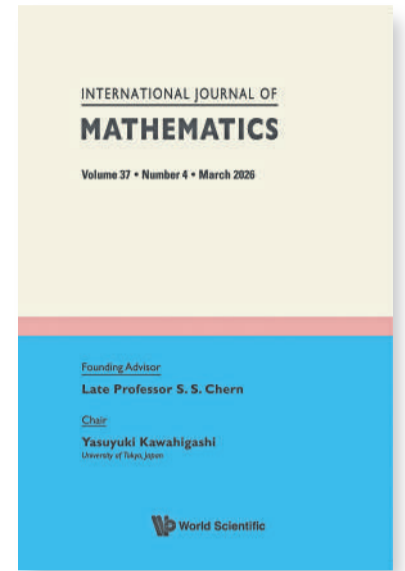
This standard was established from day one by a founding editorial board that featured giants such as Kung-Ching Chang of Peking University and Shigefumi Mori of Nagoya University — a Fields medalist whose participation ensured the journal's prestige from its inception.

The strength of our current board is further evidenced by the inclusion of 12 invited speakers of the International Congress of Mathematicians. These invitations are among the highest honors in mathematics, and having such representation from China, Japan, South Korea and India ensures that *IJM* maintains a deep connection with the Asian community while preserving a truly international outlook.

### A catalyst for Asian mathematical science

*IJM* has been a powerful springboard for Asian mathematicians, providing a platform where work is judged solely on its scientific merit. The publication records tell the story of a thriving regional community that has gained global visibility through our pages.

Leading our list of prolific contributors is Indranil Biswas from the prestigious Tata Institute of Fundamental Research in Mumbai, India. With



Front cover of International Journal of Mathematics, Volume 37, Issue 4. (COURTESY PHOTO)

an extraordinary 45 papers published in *IJM*, his work has significantly influenced the global research landscape in algebraic geometry and related fields.

The journal has been a vital venue for Chinese scholars such as Lin Huaxin, winner of the Frontiers of Science Award at the 1st International Congress of Basic Science. His work in operator algebras, along with contributions from Shen Zhongmin (13 papers) and Daniel Zhuang-Dan Guan (10 papers), Wang Youde (nine papers) has helped solidify China's reputation as a mathematical powerhouse.

*IJM* continues to attract the world's most recognized leaders, such as Fields medalist Ngo Bao Chau from the University of Chicago. His 2024 publication, "The companion section for classical groups," reinforces *IJM*'s role as a bridge linking the most established world leaders with emerging Asian scholars.

### Our future: Linking generations and continents

Looking to the future, *IJM* remains committed to nurturing the next generation of talent. We are expanding our regional editorial networks and encouraging submissions from the rapidly growing number of young research groups across Asia.

We believe that mathematics is a universal language shared across cultures, regions and generations. Unlike other disciplines, mathematical truths are absolute and unchanging, providing a unique common ground for dialogue between nations.

By upholding the rigorous scholarly standards, we aim to remain the key bridge linking Asian research with the global stage. In doing so, we ensure that this universal language continues to flourish, connecting the brilliance of the past with the innovations of the future.

The author is the editor-in-chief of *International Journal of Mathematics*, and a professor at The University of Tokyo.

## Journal Review

*IJM*, the flagship mathematics journal of World Scientific, has long been committed to academic excellence and global vision. With rigorous peer-review standards ensuring its high quality, the journal has been advancing academic exchange and frontier exploration in mathematics worldwide.

*IJM* boasts an international and high-level editorial board, upholding the philosophy of originality first and depth priority. It is dedicated to publishing high-quality work with independent insights and forward-looking value.

Based in Asia and open to the world, the journal has developed dis-

tinctive strengths across core mathematical fields. It serves as a platform for global mathematicians to exchange ideas and share achievements, as well as a vital bridge connecting Eastern and Western mathematics and empowering Asian mathematics to reach the international stage.

*IJM* will continue to nurture young talent, drive academic innovation, and contribute enduringly to the long-term development of global mathematics.

— Bai Chengming, vice president of Nankai University, and a recipient of the National Science Fund for Distinguished Young Scholars

# Landmark Yardstick for Embodied AI Released

By Staff Reporters

China has officially released its first industry standard for embodied AI, establishing a unified benchmark testing framework and marking a new phase where embodied AI can now be evaluated.

Drafted jointly by the China Academy of Information and Communications Technology (CAICT) and over 40 other organizations, the standard focuses on key foundational AI technologies and benchmark testing methods for embodied AI, while also clarifying system frameworks and capability requirements. It is scheduled to take effect on June 1.

"Embodied AI is at a critical stage of transitioning from laboratory research to commercial application," said Wei Kai, director of the Artificial Intelligence Institute of CAICT.

According to CAICT data, the number of domestic humanoid robot manufacturers exceeded 140, with over 330 humanoid robot models launched.

However, Wei said that the industry is currently confronted with two major challenges: a "workshop-style" research and development model, and a "fragmented" ecosystem landscape.

The "workshop-style" model relies heavily on the experience of algorithm engineers for model tuning and deployment. This means data is scattered among various collection factories, making integration and reuse difficult. Meanwhile, hardware is often assembled without uniform standards, requiring "nanny-style" maintenance from manufacturers after delivery, hindering large-scale deployment.

The fragmented ecosystem is evident in the strong coupling between model performance and hardware, where a change in components can easily lead to system failure. System capabilities are heavily reliant on the results of scenario-specific training, and a change in environment can easily lead to a malfunction. A lack of uniform standards across the supply chain makes it difficult to replicate technological achievements and leads to low coordination efficiency.

"A trusted evaluation system for embodied AI serves as a bridge connecting technological research with large-scale industrial application," Wei said. "It provides the industry with a unified technical specification framework, establishes a foundation of mutual trust, and

promotes the shift of embodied AI from workshop-style development to industrial development."

On the one hand, the standard helps users distinguish genuine intelligence from technological stunts by verifying a model's generalization ability and deployment effectiveness in real-world scenarios. Companies are therefore encouraged to develop truly scalable and replicable foundation models for embodied AI.

Conversely, the standard clarifies what qualifies as a product, reducing the costs associated with technology selection and adaptation, and optimizing resource allocation across the entire industry chain.

"A comprehensive assessment of the stability and reliability of embodied AI in complex environments can also provide a safety guarantee for large-scale product deployment," Wei said. "More importantly, with this trusted yardstick, all links in the industry chain, from upstream to downstream, have a common basis for collaboration. This enables the effective integration of technology R&D, hardware manufacturing, and scenario application," he added.

The newly released document stan-

dardizes the framework, methods, and metrics for benchmarking embodied AI systems in both simulation and real-world environments. The evaluation system it introduces supports testing of basic capabilities, cognitive reasoning abilities, and full-chain closed-loop capabilities, covering four methods: static simulation testing, dynamic simulation testing, real-environment testing, and combined testing.

"As the first officially released industry standard in the field of embodied AI, the introduction of this benchmark testing method is of great significance for promoting technological progress, application implementation, and industrial development. It charts a clear direction for the industry's growth," Wei said.

Wei also noted that the establishment of an independent evaluation standard will help channel national innovation resources toward directions aligned with China's industrial advantages and technological trajectories.

Furthermore, once the evaluation standard matures and is adopted internationally, it will support the global expansion of Chinese embodied AI products, solutions, and platforms, further cementing the "Chinese model" in this field.

# Powerful TBM: Digging Deep into the Earth

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Following a series of computational simulations and adaptations, the team significantly improved uneven wear on the cutting tools and optimized the overall stress distribution. This effectively resolved the challenges posed by deep-earth hard rock.

### Removing muck

Once the excavation problems were solved, removing the rubble and excavated soil became the second major hurdle. Removing muck from a 1000-meter-deep shaft is like collecting garbage from the roof of a 300-floor building without a lift, Ding Zhangfei, chief designer of Gangtie Jiliang, said.

Due to the influence of gravity, the excavated soil falls behind the cutterhead of a horizontal TBM, but in front of the cutterhead of a vertical shaft TBM, like Gangtie Jiliang. Excavating muck for the latter is therefore much more difficult.

The research team initially chose

the direct excavation approach, but the technical challenges made it impossible. Inspired by the traditional Chinese chain pump, which lifts water step by step via circulating paddles, the team developed an intelligent vertical muck removal system and installed a 25-meter-long conveying pipe extending into the cutterhead of Gangtie Jiliang.

In practical application, the intelligent vertical muck removal system achieves a removal rate of 120 cubic meters per hour, equivalent to the hourly transport capacity of approximately 10 conventional municipal dump trucks.

At the tail end of the system, the innovative team also developed a ring-shaped muck collection device, enabling 360-degree, dead-angle-free muck collection at the system's rear, and precise transfer to the storage silo, followed by hoisting via a skip to the shaft head for discharge.

Support crucial for excavation  
Underground tunnels extending

over a kilometer are often subject to high ground stress and water pressure, while the surrounding rock is highly prone to stress release after excavation. Without timely support, the tunnel walls will deform immediately after excavation, and there is even a risk of collapse.

The research team collaborated with several other research institutes to develop a support system. Three mainstream support schemes — rock bolts and shotcrete, formwork with cast-in-place concrete, and prefabricated steel plates combined with concrete — were systematically evaluated through repeated testing and analysis.

The team conducted a comprehensive assessment of the structural configurations of these three methods, comparing support efficiency, construction convenience, and strength and safety performance, Ding said.

The second option formwork with cast-in-place concrete was selected, but proved unsuccessful.