Newsletter issue 19-2026, May 10, 2026
AI and Quantum Research Center (AIQRC), Asia University, Taiwan

Activities

[1] **2026/6/29** (coming soon) - INTERNATIONAL SYMPOSIUM ON QUANTUM AI & THE FUTURE OF LIFE (ISQAI-FoL)

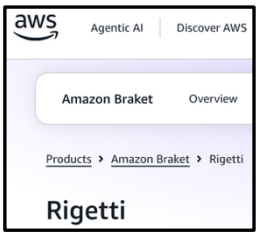
The International Symposium on Quantum AI and the Future of Life aims to create an interdisciplinary platform for thought leaders, practitioners, and researchers from diverse fields to explore the transformative potential of quantum computing and artificial intelligence (AI) in shaping the future of human well-being. This event will focus on cutting-edge applications of these groundbreaking technologies across four key domains: Biomedicine & Healthcare, Integrating Traditional Chinese Medicine and Western Medicine, Longevity and Anti-aging, and Life Optimization.

Click here for more information.

[2] **On May 7, 2026,** AIQRC published an article in the Economic Daily News; the English translation is included in the newsletter. Click here for the original contents.

[3] **On April 22, 2026,** AIQRC published an article in the Economic Daily News; the English translation is included in the newsletter. Click here for the original contents.

[4] **On April 8, 2026** AIQRC received approval to use the AWS cloud-based Rigetti Computing quantum computing system.



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[5] **Feb. 2026** - We recently secured approval for five Ministry of Education–funded programs in Taiwan, creating valuable learning pathways for young people. These programs support international exchange and advanced training at globally recognized universities, helping students build interdisciplinary knowledge, research skills, and global perspectives in fields such as artificial intelligence, quantum computing, biomedical science, systems medicine, and robotics.
Click here for more information.

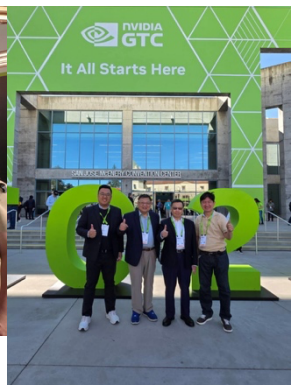
I-9-10		IBM量子夢：紐約研習營	美國紐約	(九)科技網絡及數位服務	制霸IBM量子科技巔峰	115年7月13日至7月28日，共計16日（含飛行日）
I-9-11		醫工量子：UCLA菁英計畫	美國加州洛杉磯	(九)科技網絡及數位服務	探索腦科學與量子計算	115年7月6日至9月3日，共計60日（含飛行日）
I-9-12		量子金融：赴美職涯領航	美國大紐約區	(九)科技網絡及數位服務	跨足量子與AI金融實務	115年7月6日至8月9日，共計35日（含飛行日）
I-9-13		AI與石黑浩：探索擬真界	日本大阪	(九)科技網絡及數位服務	台日共創人形機器人新未來	115年8月1日至116年1月15日，共計168日（含飛行日）
I-9-14		勇闖WVU：太空機器人實戰	美國摩根敦	(九)科技網絡及數位服務	太空採集機器人見習	115年7月6日至7月23日，共計18日（含飛行日）

[6] **From March 16 to 19**, Asia University's AIQRC is actively advancing its forward-looking strategy. President Jeffrey J. P. Tsai, Honorary Chairman of AIQRC (third from the right in the photo) and Chair Professor, K.T. Huang, Director of AIQRC (fifth from the right in the photo), recently led a delegation to the United States to visit quantum technology firm Rigetti Computing, where they were hosted by Vice President Mike Piech (fourth from the right in the photo). The visit marks an important step in strengthening the university's quantum AI strategy, fostering connections with world-class technologies, and building a solid foundation for its vision of becoming an "AI University."

Click here for more information.

The Asia University delegation conducted an in-depth visit to Rigetti's laboratories, inspecting hardware facilities and system architectures such as superconducting quantum computers (superconducting qubits), and gaining firsthand insight into the latest technological developments shaping the global quantum industry. President Jeffrey J. P. Tsai, Honorary Chairman of AIQRC (third from the left in the photo), Chair Professor, K.T. Huang, Director of AIQRC (second from the right in the photo) and Rigetti Computing Vice President Mike Piech (fourth from the left in the photo).

[7] **From March 16 to 19**, President Jeffrey J. P. Tsai, Honorary Chairman of AIQRC (second from the right in the photo), led teams in quantum AI, robotics, and intelligent healthcare to Silicon Valley to attend NVIDIA GTC 2026, the world's premier annual AI conference, and engage with the global AI and semiconductor ecosystem. Tsai emphasized that the visit aimed not only to track cutting-edge technologies, but also to mark a major milestone in advancing Asia University's AI University vision and international collaboration strategy.



Click here for more information

[8] **On March 20, 2026** Deputy Director of AIQRC, Ka-Lok NG, delivered a presentation titled "Exploring the Potential Advantages of Quantum Machine Learning in Biomedical Research" at the 2026 Conference on Advanced Topics and Auto Tuning in High-Performance Scientific Computing.9Click here for more information.

[9] **Feb. 2026** - We successfully had a proposal accepted for the Fujitsu Quantum Simulator Challenge 2025–26 event.

Click here for more information.

NVIDIA Ising: AI-Enhanced Quantum Calibration and Decoding [1]

Introduction

Quantum computing is an emerging technology that leverages quantum superposition, quantum entanglement, and—in certain architectures—quantum tunneling effects to demonstrate potential advantages in classification, physical and chemical simulations, and optimization problems. However, quantum computers built with current quantum hardware remain in the NISQ (Noisy Intermediate-Scale Quantum) era. Inevitably, these systems are affected by thermal noise, charge noise, flux noise, and control errors, leading to quantum decoherence.

As a result, precise calibration of quantum processors and quantum logic gates is essential to reduce systematic errors. As circuit depth increases, errors continue to accumulate and distort computational outcomes. Therefore, the development of quantum error detection and quantum error correction technologies is regarded as a critical step toward scalable and practical quantum computing.

NVIDIA Ising and the Ising Model

In April 2026, NVIDIA released a tool named Ising. The name originates from the Ising model, a statistical mechanics model used to describe ferromagnetism. First proposed in the 1920s by Ernst Ising, the model characterizes nearest-neighbor interactions between magnetic moments (spins) on a lattice.

Because the Ising model seeks to minimize the energy of a spin system, discrete optimization problems can be transformed into energy functions with binary variables, where the ground state corresponds to the optimal solution. As such, the Ising model is widely applied to optimization problems. It is also a canonical model for understanding phase transitions and universality classes in critical phenomena.

More widely known is the fact that the Ising model was absorbed and reformulated by John Hopfield and Geoffrey Hinton as one of the theoretical foundations of artificial neural networks, a contribution for which they were awarded the 2024 Nobel Prize in Physics.

The Rise of Open-Source AI Frameworks for Quantum Error Detection and Correction

NVIDIA Ising is a suite of open-source AI models and training frameworks designed for automating quantum processor calibration and quantum error-correction decoding. At its core, it is an AI-driven quantum system control and diagnostic tool that optimizes workflows such as measurement, calibration, and decoding. It can be applied to superconducting quantum systems, although it does not directly control qubit pulses or logical gate operations.

When the number of superconducting qubits exceeds the hundred-qubit scale, system failures are often not caused by the qubits themselves, but rather by calibration drift and parameter instability that cannot be tracked in real time. NVIDIA Ising uses measurement outcomes and syndromes (measurement results indicating whether logical qubit errors have occurred) to infer internal system states that cannot be directly observed, allowing real-time estimation of the most probable system state under noisy and incomplete observations.

From an engineering perspective, this inverse inference approach is analogous to semiconductor process monitoring and yield-oriented measurement strategies, emphasizing automated testing, rapid triaging, and focused allocation of resources.

NVIDIA Ising employs a two-layer architecture. First, an AI front-end decoder rapidly processes locally identifiable errors, reducing the overall problem size. Then, a standard decoder performs global inference, improving system stability and scalability.

Hierarchical Decoding Architecture

More specifically, the NVIDIA Ising decoding framework adopts a hierarchical design:

- First Layer – AI Front-End Decoder
  Implemented using artificial intelligence and neural networks, this layer rapidly identifies and resolves easily recognizable local errors. By doing so, it reduces the density of syndromes (measurement signals indicating logical qubit errors) and significantly simplifies the subsequent decoding task.

- Second Layer – Standard Decoder
  This layer focuses on surface codes, performing global and consistent inference to ultimately produce the required logical qubit corrections.

The Era of Artificial Neural Networks Has Arrived

In recent years, applications of artificial neural networks have gradually expanded beyond traditional pattern recognition tasks (such as image and speech recognition) into domains related to modeling and controlling physical systems, including quantum computing systems.

This trend represents a shift in the role of AI—from a tool operating primarily at the application-analysis level to a participant in state inference and error correction during system operation. Taking NVIDIA Ising as an example, its approach combines measurement data with physically structured inference models to address error sources and calibration variations that are difficult to observe directly in large-scale quantum systems.

Such methods are considered an important direction for improving the scalability and stability of quantum hardware, and may therefore play a significant role in the transition of quantum computing from experimental platforms to practical technologies.

Conclusion

As quantum technology and artificial intelligence continue to converge globally, it is important for a country to continually reassess the coordination of resource allocation and development priorities across both academia and industry. Overall, this period marks a pivotal moment in the convergence of quantum technology and AI. By focusing on AI-assisted quantum systems and application-oriented domains with strong potential—such as biomedicine and materials simulation—a country may gradually establish distinctive competitive advantages in selected strategic directions.

References

[1] Translated from the Economic Daily News, click here for the original contents.

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