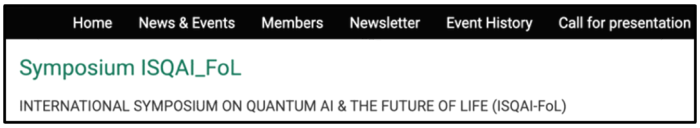
Newsletter issue 17-2026, April 26, 2026
AI and Quantum Research Center (AIQRC), Asia University, Taiwan

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 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.

[3] **Feb. 2026** - We successfully had a proposal accepted for the Fujitsu Quantum Simulator Challenge 2025–26 event. Click here for more information.

[4] **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.

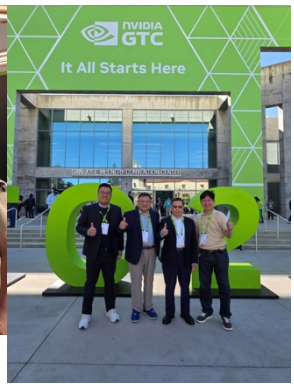
I-9-10		IBM量子夢：紐約研習營	美國紐約	(九)科技網絡及數位服務	制霸IBM量子科技巔峰	115年7月13日至7月28日，共計16日（含飛行日）
I-9-11		醫工量子：UCLA菁英計畫	美國加州洛杉磯	(九)科技網絡及數位服務	探索腦科學與量子計算	115年7月6日至9月3日，共計60日（含飛行日）
I-9-12		量子金融：赴美職涯領航	美國大紐約區	(九)科技網絡及數位服務	跨足量子與AI金融實務	115年7月6日至8月9日，共計35日（含飛行日）
I-9-13		AI與石黑浩：探索擬真界	日本大阪	(九)科技網絡及數位服務	台日共創人形機器人新未來	115年8月1日至116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

[5] **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.

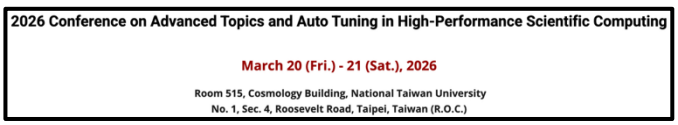
The Asia University delegation conducted an in-depth visit to Rigetti's laboratories, inspecting hardware facilities and system architectures such as superconducting quantum computers (superconducting qubits), and gaining firsthand insight into the latest technological developments shaping the global 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).

[6] **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.



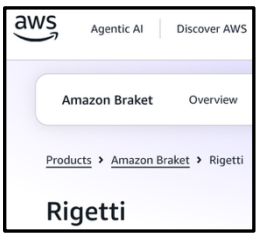
Click here for more information

[7] **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.



Click here for more information.

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



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Trends and Prospects of Quantum Technology Development from the Perspective of Post-Quantum Cryptography

Introduction: A Paradigm Shift in Digital Trust

With technology giants such as Google and IBM successively claiming to have achieved *quantum advantages*, humanity now stands at the threshold of the second quantum revolution. By leveraging physical phenomena such as superposition and entanglement, quantum computers demonstrate computational efficiencies that far exceed those of classical binary systems. However, this leap in computational power also poses a profound threat to the digital world: the asymmetric cryptographic systems currently underpinning global finance, healthcare, national defense, and e-commerce—such as RSA and elliptic curve cryptography (ECC)—are, in theory, vulnerable to quantum algorithms, particularly Shor's algorithm.

Notably, within less than a year, three separate studies have indicated that the number of physical qubits required to break encryption may decrease significantly [1]. In 2025, Gidney estimated that breaking RSA-2048 would require approximately one million physical qubits. By February 2026, Iceberg Quantum, through a novel architecture incorporating quantum low-density parity-check (QLDPC) codes, reduced this requirement to below 100,000. Furthermore, a March 2026 study conducted by Google Quantum AI, the University of California, Berkeley, the Ethereum Foundation, and Stanford University demonstrated that breaking 256-bit ECC requires approximately two orders of magnitude fewer Toffoli resources than RSA-2048, with execution time potentially reduced to mere minutes. Although this study did not directly address RSA-2048, its findings imply a substantial and rapidly escalating threat that could soon extend to related systems.

It is important to note that many of these approaches are based on idealized quantum circuit assumptions, and significant engineering challenges remain in practice. Nevertheless, these developments suggest that further efficiency breakthroughs are likely, potentially accelerating the timeline for practical quantum attacks.

This challenge extends beyond a purely technical issue; it represents a crisis in the sustainability of digital trust. In response to the emergence of this "ultimate spear," both academia and industry have turned their attention to the "ultimate shield": post-quantum cryptography (PQC). PQC refers to cryptographic algorithms designed to resist quantum attacks while remaining compatible with existing network infrastructures. The evolution of PQC not only reflects a transformation in cybersecurity defense mechanisms but also offers insight into how quantum technologies may reshape global industrial competition over the next decade.

Global Development of Quantum Technology: From Laboratories to Geopolitics

The global race in quantum technology has evolved from academic inquiry into a matter of national strategic importance. Current developments exhibit characteristics of "tripartite dominance" and "standards-first competition":

1. **United States: Standard-Setting and Ecosystem Leadership**
   The National Institute of Standards and Technology (NIST) initiated the PQC algorithm standardization process in 2016 and announced its first set of standardized algorithms in 2022. Through this effort, the United States has effectively shaped the foundational protocols of future global secure communications. Additionally, the National Quantum Initiative Act integrates the innovation capacity of Silicon Valley with the research capabilities of national laboratories.
2. **China: Leadership in Quantum Communication and Satellites**
   China holds a competitive advantage in quantum key distribution (QKD). Through the "Micius" satellite and the Beijing–Shanghai backbone network, it has established long-distance quantum communication experimental infrastructures, emphasizing absolute security at the physical layer.
3. **European Union: Sovereignty and Collaborative Research**
   The EU's Quantum Flagship program prioritizes technological autonomy and digital sovereignty. By focusing on areas such as quantum sensing and high-energy material simulation, the EU seeks to establish a third technological ecosystem alongside the U.S. and China.

These trends indicate that quantum technology is no longer solely about computational advancement but also about the contest for digital sovereignty. The entity that successfully completes PQC migration first will gain a decisive advantage in the future data landscape.

References

[1] click here for more details

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