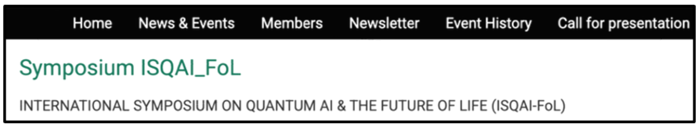
Newsletter issue 13-2026, Mar. 29, 2026

AI and Quantum Research Center (AIQRC), Asia University, Taiwan

Activities

[1] **2026/6/29 – 30** (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.

Under construction.

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

[3] **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.

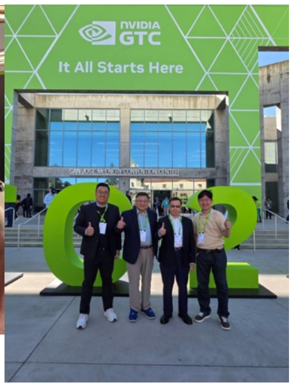
I-9-10	IBM量子夢：紐約研習營	美國紐約	(九)科技網絡及數位服務	制霸IBM量子科技巔峰	115年7月13日至7月28日，共計16日（含飛行日）
I-9-11	醫工量子：UCLA菁英計畫	美國加州洛杉磯	(九)科技網絡及數位服務	探索腦科學與量子計算	115年7月6日至9月3日，共計60日（含飛行日）
I-9-12	量子金融：赴美職涯領航	美國大紐約區	(九)科技網絡及數位服務	跨足量子與AI金融實務	115年7月6日至8月9日，共計35日（含飛行日）
I-9-13	AI與石黑浩：探索擬真界	日本大阪	(九)科技網絡及數位服務	台日共創人形機器人新未來	115年8月1日至116年1月15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

[4] **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).

[5] **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

Advancing Quantum Machine Learning Toward Scalable Applications

Research in **Quantum Machine Learning (QML)** has increasingly shifted from purely theoretical exploration toward the development of practical and scalable methodologies that can be implemented on real quantum hardware. A central challenge in this transition lies in reproducing the expressive power and scalability of classical machine learning (CML) models—particularly deep neural networks (NN)—within the constraints of current and near-term quantum devices.

Scalability Through Gaussian Processes

A significant step forward in this direction has been achieved by researchers at **Los Alamos National Laboratory (LANL)**, who have identified a novel pathway for QML by introducing **Gaussian processes** into the quantum computing framework. This approach addresses one of the long-standing obstacles in quantum AI: how to scale learning models efficiently without relying on large, resource-intensive quantum circuits.

Historically, Gaussian processes had largely escaped practical use in quantum computing, despite their foundational role in CML theory. In the classical domain, it was discovered that **large NNs tend to converge to Gaussian processes, meaning that as the number of neurons grows, the network's behavior can be described statistically rather than deterministically**. This insight was pivotal in understanding why NNs are so powerful and reliable, enabling robust prediction, uncertainty quantification, and generalization across tasks.

Building on this principle, the Los Alamos team developed a method to **realize genuine quantum Gaussian processes, thereby transferring this powerful mathematical framework into the quantum regime.** According to Marco Cerezo, the project's lead scientist, the primary goal was to determine whether such quantum Gaussian processes truly exist and can be harnessed effectively. Demonstrating their existence opens the door to new quantum learning paradigms that mirror the strengths of NNs while leveraging uniquely quantum features such as superposition and entanglement.

Implications for Quantum AI

The importance of this development lies in its potential to make QML **more scalable, interpretable, and hardware-efficient**. Instead of constructing deep quantum NNs—often plagued by issues such as barren plateaus and noise sensitivity—the Gaussian-process-based approach offers a statistically grounded alternative that can achieve comparable expressive power with fewer quantum resources.

By enabling quantum models to approximate the behavior of large NNs without explicitly implementing millions of parameters, this work brings QML closer to practical applications. In the long term, it may allow quantum systems to tackle complex tasks—such as pattern recognition, optimization, and probabilistic inference—that are currently dominated by CML.

Click here for more details.

Algorithmic Advancements in Quantum Machine Learning (QML)

In parallel with progress in quantum hardware and theoretical frameworks, **algorithmic advancements** have played a crucial role in pushing QML toward practical applicability. A growing body of work focuses on **adapting CML algorithms for execution on quantum computers**, with particular emphasis on **data-intensive scientific domains** where quantum advantages may be most impactful, such as materials science, chemistry, and large-scale data analysis.

Quantum-Adapted Machine Learning Algorithms

Recent studies have introduced **novel algorithms that modify CML pipelines to be compatible with quantum computational principles**, rather than simply encoding classical data into qubits. A notable example is research reported by Andrey Feldman, which presents an algorithm designed to unlock the potential of QML by targeting **feature selection**, a fundamental step in machine learning.

Feature selection determines which components of high-dimensional input data are most relevant for making accurate predictions. In CML, this step is essential both for improving model performance and for reducing computational complexity. Translating this process into the quantum setting is non-trivial, as quantum data may exist in superposition and cannot always be accessed or measured directly without collapse.

The proposed algorithm addresses this challenge by enabling **training directly on quantum data**, rather than on classical data represented as binary sequences of 0s and 1s. This distinction is significant: many early QML approaches relied on classical data encoding, which often negated potential quantum advantages due to costly state preparation. By contrast, quantum-native training techniques allow learning algorithms to operate on data generated or stored within quantum systems themselves.

Experimental Validation and Implications

To validate their approach, the research team tested the algorithm on simplified benchmark tasks. Even though these tasks were intentionally limited in scope, the results demonstrated that the algorithm behaved as theoretically expected. This successful proof-of-concept suggests that the methodology can be extended to more complex scenarios as quantum hardware continues to mature.

As Yudai Suzuki, one of the study's authors, explains, *QML seeks to exploit the intrinsic properties of quantum mechanics—such as superposition and entanglement—to enhance machine learning performance and computational efficiency*. These quantum features provide opportunities for representing and processing information in ways that are fundamentally inaccessible to classical systems, potentially enabling speedups or improved learning capacity.

Broader Context: When Quantum Computing Meets Machine Learning

Machine learning has already transformed classical computing, enabling machines to analyze complex data, recognize patterns, and generate predictions without explicit, rule-based programming. Its success underpins a wide range of applications, including facial recognition, natural language processing, autonomous systems, drug discovery, and materials design.

By integrating machine learning with quantum computing, QML aims to extend these capabilities even further. Algorithmic innovations such as quantum-enhanced feature selection represent a critical step in this direction, bridging the gap between abstract quantum advantage and real-world impact. As these algorithms mature, they are expected to play a central role in realizing **quantum-accelerated learning systems** capable of addressing problems that are currently intractable for classical approaches.

Click here for more details

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