

## Activity

[1]

Time/Place: Nov. 13-14, 2025, Asia University, Taichung

Title: INTERNATIONAL SYMPOSIUM ON QUANTUM AI &amp; THE FUTURE OF LIFE

[2]

Time/Place: Oct. 21, 2025, 10 am, Room M003, Asia University, Taiwan

Title: Building robust, reliable, and reproducible bioinformatics pipelines for medical research

Speaker: Dr. Wei-Hung Pan, Senior Data Scientist, *Silence Therapeutics, Berlin, Germany*

[3]

Time/Place: Oct. 20, 2025, 15 pm, Room A101, Asia University, Taiwan

Title: Quantum meet AI: The Rise of a New Civilization

Speaker: Chair Professor Ching-Ray Chang, Director, Chung Yuan Christian University  
Quantum Information Center and National Taiwan University, Taiwan

[4]

Time/Place: Oct. 17, 2025, begin at 14:00 pm, Room A115 &amp; A110, Asia University, Taiwan

Title: Introduction to the Quantum AI Research Center (QAIRC)

Speaker: Vice Director, Ka-Lok Ng, QAIRC, Department of Bioinformatics and Medical Engineering, Asia University, Taiwan

Visitors: FPT University, Vietnam



[5]

Time/Place: Oct. 13 - 15, 2025, Splendor Hotel, Taichung

Title: 2025 Second International Conference on Artificial Intelligence for Medicine, Health, and Care (AIxMHC)

[6]

Time/Place: Sep. 25, 2025, 13:10 -14:00 pm, Room i221, Asia University, Taiwan Title: Fundamentals of Quantum Computing

Speaker: Vice Director, Ka-Lok Ng, QAIRC, Department of Bioinformatics and Medical Engineering, Asia University, Taiwan

### ***Nobel prize in physics 2025***

The Nobel Prize in Physics 2025 was awarded jointly to John Clarke, Michel H. Devoret, and John M. Martinis "for their groundbreaking discovery of macroscopic quantum mechanical tunneling and energy quantization in Josephson junctions." Through their pioneering experiments, they provided definitive proof that a superconducting circuit, though large enough to be physically manipulated, could be precisely isolated to observe two extraordinary quantum phenomena: the quantization of energy in a macroscopic degree of freedom and macroscopic quantum tunneling from a metastable state.

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### ***Research News in Quantum***

In a recent study, a Harvard-MIT research team tackled the challenge of atom loss in neutral atom quantum computing. Atom loss refers to the physical escape of qubits (neutral atoms) from the quantum system, which results in the loss of the stored quantum information entirely. This issue is primarily about maintaining the physical presence of qubits in the system, rather than the preservation of their quantum states.

In their new study, the team developed a system capable of continuously and efficiently replenishing qubits by utilizing “optical lattice conveyor belts” (laser waves that move atoms) and “optical tweezers” (laser beams that capture individual atoms and organize them into grid-like patterns). This innovative approach allows the system to reload up to 300,000 atoms per second and capable of continuous operation for two hours.

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### ***Recent progress in QAI research***

In their study titled "*Data Augmentation in Cancer Image Classification Problem with Quantum GAN*", the authors propose a novel approach leveraging quantum generative adversarial networks (QGANs) to address data imbalance in medical imaging datasets. Using the HAM10000 dataset, a diverse collection of dermatoscopic images for skin lesion analysis, they demonstrated how QGANs can generate synthetic images that closely mimic real skin lesions. These augmented datasets effectively mitigate data imbalance, a common challenge in training accurate classification models.

The QGAN architecture integrates quantum circuits for the generator and classical neural networks for the discriminator. When applied to a convolutional neural network (CNN) classifier, the augmented dataset significantly improved performance metrics. Additionally, segmentation-based QGAN training reduced computational demands, with training completed in 1 hour and inference times under a second per image, showcasing both accuracy and efficiency improvements.

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Prepared by Professor Ka-Lok Ng, Vice Director, QAIRC & Department of Bioinformatics and Medical Engineering, Asia University.

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