PRESS RELEASE · FOR IMMEDIATE RELEASE

Distributed by Vernewell Group on behalf of Merlin Quantum

Dubai's Merlin Quantum named global runner-up in Mitsubishi Chemical and AIST quantum materials challenge

Second place worldwide in the Advanced Materials track of the 2026 Global Industry Challenge, for carrying an industrial chip-making material from classical computers to IBM quantum hardware, and ranking candidate formulations correctly before any were made.



Merlin Quantum receives the runner-up award, Advanced Materials track, Global Industry Challenge 2026, Quantum World Congress, University of Maryland, 24 September 2026.



Eng. Hamad Al Ali (left), who leads the regional commercialisation of Merlin's quantum technology, at the Merlin Quantum stand, Quantum Innovation Summit, Dubai, September 2026.

DUBAI, United Arab Emirates, [DATE] 2026 – Merlin Quantum, the quantum applications division of Dubai-based Merlin Digital, has been named runner-up, second worldwide, in the Advanced Materials track of the 2026 Global Industry Challenge (GIC). The track was set by Mitsubishi Chemical Group and Japan's National Institute of Advanced Industrial Science and Technology (AIST). The challenge is organised by Connected DMV through the Potomac Quantum Innovation Center, and the award was presented at Quantum World Congress 2026 at the University of Maryland, USA.

The Advanced Materials track asked teams to scale the Generative Quantum Eigensolver (GQE), an approach in which an AI model writes the quantum circuits used to calculate a molecule's properties, using NVIDIA CUDA-Q, on problems that matter for materials discovery. Teams progressed through three phases, from concept to execution, between January and July 2026.

Merlin chose a real industrial target rather than a textbook molecule: the tin-oxo cluster at the core of metal-oxide photoresists, the light-sensitive materials used in extreme-ultraviolet (EUV) lithography to print

the world's most advanced chips. How sensitive and how sharp a resist is depends on the behaviour of its electrons, a problem whose cost on classical computers grows exponentially with size. Merlin carried this one material end to end, from CPU to GPU to quantum processor, running the challenge method at 40 qubits, about twice the size previously published, and reported five results:

- **Accuracy that improves with scale.** As the calculation grew from 12 to 40 qubits, accuracy rose from 74.0% to 90.4% of the target, while the quantum circuits stayed shallow enough (three entangling layers) to run on today's hardware.
- **The bottleneck found and removed.** Merlin showed that the limit was the AI's search strategy, not the circuits, and removed it by training the model up a ladder of problem sizes, lifting results from 40.9% to 62.2% and reaching quality with 7 to 14 times fewer evaluations.
- **Quantum hardware that improves the answer.** Sampling on IBM quantum processors lifted the result further, to 71.4% at 40 qubits and from 60.4% to 76.5% at 56 qubits, and the same workflow ran at 72 qubits, beyond the reach of exact classical checking.
- **Cheaper to run.** Training the AI circuit-writer took minutes on one GPU, against a published 173 hours, and the encoding avoids thousands of extra two-qubit operations that the standard mapping needs.
- **A formulation screen, end to end.** Merlin ranked four resist formulations by EUV sensitivity in advance, then ran the same screen on IBM quantum hardware, which reproduced the predicted order within 0.3%: the screening workflow a resist developer would use, ready to test against laboratory data.

"Materials companies do not buy qubits; they buy better decisions about what to make next. In this challenge we took a real photoresist material and built the whole screening workflow around it, from classical computers to a quantum processor, with every number predicted in advance and checked. That is the shift from demonstration to practical work."

– Sharad Bachani, Chief Executive, Merlin Quantum and Merlin Digital

Why it matters for practical quantum computing

The result shows three things the industry needs before quantum computing becomes routine in materials R&D. First, the target was an industrial material tied to a real design decision, not a benchmark molecule. Second, every hardware result was checkable: about 45 hardware jobs on four vendors' machines, each predicted with error bars before it ran and graded against that prediction, using minutes of quantum processor time in total, the cost profile of a screening workflow rather than a one-off experiment. Third, it identified where quantum hardware has a natural advantage of route: calculating how the material absorbs light by evolving it in real time on the processor, a step the classical route can only approximate through a mathematically unstable conversion. That advantage is stated and bounded: at the sizes run, classical computers still reproduce the answers, which is how every result was checked; on a 143-qubit film model, one standard classical simulator had not settled after an hour per step, while the quantum processor ran the series in a single job.

"To be recognised in a track set by Mitsubishi Chemical and AIST, two organisations that know this chemistry better than almost anyone, is a strong signal of what a Dubai-based quantum team can deliver. We are now taking the same workflow to semiconductor, chemicals and energy-materials companies."

– Sharad Bachani

Merlin Quantum exhibited the result at the Quantum Innovation Summit in Dubai (28–30 September 2026), hosted by the UAE Cyber Security Council and organised by Vernewell Group. The company now offers the workflow as a service for materials and formulation screening to semiconductor, chemicals and energy-

materials companies. Commercialisation of the technology across the UAE and the wider region is led by Eng. Hamad Al Ali of the Merlin team.

– ENDS –

About Merlin Quantum

Merlin Quantum is the quantum applications division of Merlin Digital, headquartered in Dubai, UAE. It turns quantum computing into verified answers for industrial problems in materials, chemistry, energy and security, running hybrid workflows across classical, GPU and quantum hardware from multiple vendors, with every hardware result predicted in advance and graded against that prediction. merlinquantum.app

About the Global Industry Challenge

The Global Industry Challenge is organised by Connected DMV through the Potomac Quantum Innovation Center, with Aqora and qBraid as platform partners. The 2026 edition ran tracks set by Mitsubishi Chemical Group and AIST (Advanced Materials), Quantum Computing Inc. and a U.S. federal agency (Energy Infrastructure), and qBraid, MITRE and JonesTrading (Dynamic Systems Forecasting). It launched at CES 2026 and presented its awards at Quantum World Congress, 23–25 September 2026.

Media contacts

Vernewell Group Media (organiser of the Quantum Innovation Summit): info@vernewellgroup.com · +971 58 540 1480 · quantuminnovationsummit.com

Merlin Quantum: Sharad Bachani · sharad.bachani@merlin-me.com

Photos, visuals and the full media kit accompany this release.