

# NTU Q

## IBM PREPARES EDUCATORS FOR A QUANTUM-READY FUTURE

IBM Quantum — a leader in open-access quantum education — continues its years-long tradition of offering free and accessible content and tools to students, researchers, and educators. The IBM Quantum Educator Summit is back for its second year, with an expanded array of professional development sessions aimed at teachers and professors. The summit will take place virtually on Wednesday, August 3, 2022.

The [Educator Summit](#) will introduce educators to the learning tools and resources offered by IBM Quantum, and guide them on getting set-up to use these tools and resources with their students. The summit will also include networking sessions and panel discussions, and will highlight educators who will share their experiences in teaching quantum computing and providing their students with access to quantum devices.

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## IBM SCIENTISTS HELP DEVELOP NIST'S QUANTUM-SAFE STANDARDS

The US National Institute of Standards and Technology (NIST) announced the first quantum-safe cryptography protocol standards for cybersecurity in the quantum computing era.

In 2016 contenders from all over the world submitted 69 cryptographic schemes for potential standardization. NIST later narrowed down the list of candidates over three stages, eventually shortlisting seven finalists — four for public key encryption and three for digital signatures.

At the end of a six-year-long process, three of the four chosen standards were developed by our team at IBM, in collaboration with a number of industry and academic partners. They include the CRYSTALS-Kyber public-key encryption and the CRYSTALS-Dilithium digital signature algorithms, which were chosen as primary standards. The Falcon digital signature algorithm was chosen as a standard to be used in situations where the use of Dilithium would be space-prohibitive.

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## INTRODUCING THE QISKIT PROVIDER FOR AMAZON BRAKET

Amazon now share a solution to one of our most frequent customer requests: a [Qiskit provider for Amazon Braket](#). Users can now take their existing algorithms written in [Qiskit](#), a widely used open-source quantum programming SDK and, with a few lines of code, run them directly on Amazon Braket. The qiskit-braket-provider currently supports access to superconducting [quantum processing units \(QPUs\)](#) from Rigetti and Oxford Quantum Circuits, an ion trap QPU from IonQ, as well as Braket's on-demand simulators: SV1, TN1, and DM1.

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## AHEAD OF THE GAME: D-WAVE DELIVERS PROTOTYPE OF NEXT-GENERATION ADVANTAGE2 ANNEALING QUANTUM COMPUTER

D-Wave Systems Inc. (“D-Wave”), a leader in quantum computing systems, software, and services, and the only company building both quantum annealing and gate-based quantum computers, today announced that it is showcasing an experimental prototype of the next-generation Advantage2™ annealing quantum computer in the Leap™ quantum cloud service. The quantum prototype is available for use today.

The Advantage2 prototype has 500+ qubits, woven together in the new Zephyr topology with 20-way inter-qubit connectivity and enabled by an innovative new qubit design. The Advantage2 prototype represents a version of the upcoming full-scale product with all core functionality available for testing. In early benchmarks, the reduced scale system demonstrates more compact embeddings; an increased energy scale, lowering error rates; and improved solution quality and increased probability of finding optimal solutions. By making the Advantage2 prototype available in the Leap quantum cloud service today, the company is providing an early snapshot for exploration and learning by developers and researchers.

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