

## **Quantum advantage and beyond**

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In the 1980s, Feynman observed that many-body quantum problems seemed difficult to solve with classical computers due to the exponentially growing size of the quantum state Hilbert space. He proposed that a quantum computer would be a natural solution. If the quantum computational speedup is so overwhelming such that no classical computer can do the same task within a reasonable amount of time, it was called quantum computational advantage. It is both of fundamental interest and is the first step toward practical quantum computing. We will describe our journey to quantum advantage and beyond.