Our new collaboration with Maryland will accelerate scalable quantum computing

Sep 17, 2025 | Dr. Charles Tahan - Partner, Microsoft Quantum



When I gave testimony to the House Science Committee earlier this year, I spoke about how quantum technology has the potential to reshape innovation, enhance our national security, and drive economic growth. As we get closer to bringing this technology to life, clear leadership from the United States is critical to ensuring that our nation remains at the forefront of this transformative field. Maryland Governor Wes Moore's "Capital of Quantum" Initiative does exactly this.

Today, as part of that vision, Microsoft is proud to announce the opening of a new quantum research center at the University of Maryland's Discovery District. This lab is the result of a deep collaboration between Microsoft, the University of Maryland Enterprise Corporation (UMEC), and the State of Maryland. Microsoft will bring our advanced quantum capabilities to this new center, and with it, create a powerful opportunity to unite

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state and federal leadership on quantum in the DC capital region.

Microsoft's collaboration with Maryland

Maryland has long been a national hub for quantum research, home to top physics programs and federal agencies like the National Institute of Standards and Technology (NIST), the National Security Agency (NSA), and the pioneering Joint Quantum Institute, which has spawned over a dozen other quantum institutes at the University of Maryland. Governor Moore's leadership in launching the state's "Capital of Quantum" Initiative is only accelerating these efforts, further cementing Maryland as an epicenter for quantum development.

We are excited to now be part of Governor Moore's vision. Microsoft's newest quantum research lab in Maryland's Discovery District will be a unique, cutting-edge space. It will support collaborative hardware and software development as we work alongside government agencies, academic institutions, and other quantum companies. It will also feature one of the first prototypes of Microsoft's topological quantum computer, affording easy access to our technology to the Defense Advanced Research Projects Agency (DARPA) and its world-class test and evaluation team.

By providing dedicated spaces for Microsoft's proprietary work as well as our broad cross-industry engagements, the center will embody Microsoft's core ethos as a platform company. The lab will ensure that we work together with partners in industry, academia, and government to design, build, and deploy quantum computers that will shape the future. It is more than an infrastructure investment. It is a shared environment that will uplift partners at all layers of the computing stack, and also encourage joint research, outreach, and ecosystem-building efforts.

One platform, many technologies

At Microsoft, we believe in the power of platforms, and quantum computing is no exception. The Microsoft Quantum compute platform is designed to detect and correct errors during computation in multiple types of quantum hardware to ensure we provide our customers and partners with the most capable quantum computers available. This architecture brings

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together high-performance computing and AI for speed, as well as quantum technologies for accuracy, and it will continue to improve as the field evolves and as new capabilities emerge.

By fostering an environment where multiple technologies and approaches coexist, Microsoft is building a foundation for innovation and scale. This approach allows us to respond quickly to advances across the quantum landscape, continually optimizing our offerings for end users and partners, and ensuring that the path to quantum advantage is open and inclusive.

A seminal year

This past year has been historic for quantum computing, marked by the first substantive demonstrations of quantum error correction. Microsoft's quantum error correction team, in partnership with Atom Computing, validated some of the key premises of quantum error correction not only for memory but for logical computation. By adapting the Microsoft Quantum compute platform to Atom Computing's neutral-atom qubits, we are co-designing the world's most powerful quantum machines. We successfully demonstrated that our quantum error correction works as anticipated in neutral-atom systems, and it can be customized to improve other qubit technologies as well.

A particularly exciting milestone for Microsoft was the demonstration of the first physics validating a topological qubit design—Majorana 1—an achievement that can pave the way for scaling quantum computers to hundreds of thousands of qubits. We continue to demonstrate progress along this path and share technical results with DARPA, which selected Microsoft as one of two companies to advance to the final phase of its rigorous benchmarking program known as Underexplored Systems for Utility-Scale Quantum Computing (US2QC)—one of the programs that makes up DARPA's larger Quantum Benchmarking Initiative (QBI). During this phase, Microsoft intends to build a fault-tolerant prototype based on topological qubits.

Working together to make advances in quantum

Developing scalable quantum computers will require combining forces, not only across different skill sets, but also from various

missions, problem spaces, investment approaches, and funding mechanisms. It will require new types of public-private partnerships across state and federal governments, nonprofit research organizations, higher education institutions, and small and large companies.

We are excited and grateful to collaborate with the State of Maryland on this groundbreaking quantum research center. This partnership exemplifies what is possible when state and federal leaders, academia, and industry unite to accelerate U.S. leadership in science and innovation. At Microsoft, we are committed to empowering our partners to build the future so that we can succeed together.

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