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Intel Collaborates with Argonne National Laboratory, DOE in Q-NEXT Quantum Computing Research

SANTA CLARA, Calif.--(BUSINESS WIRE)-- **What's New:** Intel today announced that it is among the leading U.S. quantum technology companies included in Q-NEXT, one of five new national quantum research centers established by the White House Office of Science and Technology Policy (OSTP) and the U.S. Department of Energy (DOE). Q-NEXT, National Quantum Information Science Research Center, is led by Argonne National Laboratory and brings together world-class researchers from national laboratories, universities and leading technology companies to ensure U.S. scientific and economic leadership in this advancing field. The collaboration will enable Intel to actively contribute to the industry's efforts on quantum computing.

This press release features multimedia. View the full release here: https://www.businesswire.com/news/home/20200826005282/en/

A photo shows the inside of a quantum computing refrigerator in Intel´s Quantum Computing Lab in Hillsboro, Oregon. (Credit: Walden Kirsch/Intel Corporation)

"Advancing quantum practicality will be a team sport across the ecosystem, and our partnership with Argonne National Laboratory on Q-NEXT will enable us to bring our unique areas of expertise to this cross-industry effort to drive meaningful progress in the field. At Intel, we are taking a broad view of quantum research that spans hardware and software with a singular focus on getting quantum out of labs and into the real world, where it can solve real problems."
–James Clarke, director of Quantum Hardware at Intel

Why It Matters: Quantum computing has the potential to tackle problems beyond the

capabilities of conventional systems today by leveraging a phenomenon of quantum physics that exponentially expands computational power. This could dramatically speed complex problem-solving in a variety of fields such as pharmaceuticals, telecommunications and materials science, accelerating what today could take years to complete in only a matter of minutes.

To speed the discovery and development in this promising emerging field of computing, the DOE and the OSTP have created five new quantum information science research centers across the country, with Q-NEXT being one of them.

The Q-NEXT facility will create two national foundries for quantum materials and devices, and leverage the strength of private-public partnership to focus on the advancements of three core quantum technologies:

- **Quantum networks:** Development of communications networks and interconnects for the transmission of quantum information across long distances, including quantum repeaters that enable the establishment of "unhackable" networks for information transfer.
- **Quantum-enabled sensing:** Development of sensor technologies that can leverage the exponential power of quantum computing to achieve unprecedented sensitivities for data capture, which would have transformational applications in physics, materials and life sciences.
- **Quantum test beds:** Ongoing research utilizing quantum test environments, including both quantum simulators and future full-stack universal quantum computers, with applications in quantum simulations, cryptanalysis and logistics optimization.

Q-NEXT will additionally seek to train a next-generation, quantum-ready workforce to ensure continued U.S. scientific and economic leadership in the rapidly advancing field of quantum information sciences.

"We are excited to have Intel's expertise and partnership, along with numerous technology leaders, as part of the new Q-NEXT center. Intel will help us to drive discoveries and technical progress in quantum computing that will advance both known and yet-to-be discovered quantum-enabled applications," said David Awschalom, Q-NEXT director, senior scientist at Argonne, Liew Family professor of Molecular Engineering at the University of Chicago and director of the Chicago Quantum Exchange. "Q-NEXT and its partners will enable unprecedented innovation, enhancing U.S. competitiveness by accelerating technology commercialization for the emerging quantum economy."

About Quantum Computing Research at Intel: Intel's research efforts in quantum span the entire quantum system – or "full-stack" – from qubit devices to the hardware and software required to control these devices, to quantum algorithms that will harness the power of quantum technologies. All of these elements are essential to advancing quantum practicality, the point at which quantum computing moves out of research labs and into real-world practical applications.

Intel is committed to developing a large-scale quantum computing system, which will require thousands of quantum bits, or qubits, working reliably together with limited error and information loss. The company is focused on overcoming the key bottlenecks preventing researchers from moving beyond today's few qubit systems, including qubit operation at

slightly higher temperatures, and elegant control systems and interconnects to facilitate the design of quantum systems at scale.

Earlier this year, Intel demonstrated progress in “hot qubit” performance, leveraging its leadership in silicon spin qubit research, and continues to advance its research on customized cryogenic control chips for quantum systems like Horse Ridge.

More Context: Quantum Computing at Intel (Press Kit) | Intel Labs (Press Kit)

About Intel

Intel (Nasdaq: INTC) is an industry leader, creating world-changing technology that enables global progress and enriches lives. Inspired by Moore’s Law, we continuously work to advance the design and manufacturing of semiconductors to help address our customers’ greatest challenges. By embedding intelligence in the cloud, network, edge and every kind of computing device, we unleash the potential of data to transform business and society for the better. To learn more about Intel’s innovations, go to newsroom.intel.com and intel.com.

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Supriya Venkat
503-320-8024
supriya.venkat@intel.com

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