DECEMBER 05, 2022

# Readout: National Quantum Initiative Centers Summit

On December 2, 2022, the White House Office of Science and Technology Policy (OSTP) hosted the thirteen National Quantum Initiative (NQI) and National Defense Authorization Act (NDAA) research centers to discuss the most pressing scientific and workforce challenges affecting quantum information science (QIS), as well as the impacts and benefits of the field for all of society. QIS and its enabling technologies remain a priority for the Biden-Harris administration, with the potential to profoundly impact our understanding of the physical world and provide economic and scientific benefits to humanity.

The attendees were welcomed with opening remarks from Dr. Alondra Nelson, Deputy Assistant to the President and Deputy Director for Science and Society for OSTP, who noted that "From magnetic resonance imaging (MRI) that improves health and saves lives, to the global positioning systems (GPS) that have revolutionized how we move in the world, quantum science and technology has already yielded major benefits to society. An inclusive approach to the development of this field, including broadening access to educational and employment opportunities, will ensure that all of society equitably shares in its benefits, especially those that have been historically underrepresented in STEM." These remarks were followed by Dr. Charles Tahan, Assistant Director for QIS for OSTP and Director of the National Quantum Coordination Office, who emphasized "The most challenging problems in quantum information science are vast, requiring concerted efforts with expertise from many fields.  I am delighted by these centers' work to expand and broaden access to training opportunities in quantum science, investigate the quantum frontiers, and stimulate use-case development for quantum technologies."

The summit convened three roundtables. During the first, each center described their mission, major scientific impacts, as well their approaches to

building multi-disciplinary research teams, engagement with industry, and education and outreach. Two themes emerged from this roundtable, (1) a science-first approach to QIS is still paramount, and (2) the importance of growing and diversifying the quantum workforce.

The dialogue during the second roundtable focused on the centers' science-first approach to QIS, where they discussed the Quantum Frontiers that have seen the most advancement, how the centers are accelerating progress toward these Frontiers, and the most pressing scientific challenges for the next five years. The participants also described infrastructure needs to advance the Frontiers, including reliable access to components for quantum systems and increasing and modernizing laboratory space for leading-edge research and development.  They noted that improving infrastructure is a necessary component of supporting a quantum-capable workforce.

The third roundtable continued the discussion on workforce and centered on the challenges facing not only QIS, but STEM more broadly. It is a priority to not only build a quantum-capable workforce, but one that is diverse and inclusive, with the opportunities that are offered by this emerging field accessible to all of society. The participants discussed mechanisms for achieving an inclusive workforce and how best to broaden participation from communities that are traditionally underrepresented in STEM. Through partnerships, centers are investing in building a community that empowers teachers and families to learn about QIS by ensuring equitable access to training, tools, and resources that increase the capabilities, diversity, and number of students ready to engage in tomorrow's technologies today.

Dr. Charles Tahan closed the summit remarking that, although major challenges are in front of us, there has been great progress since the passage of the NQI Act in 2018. These centers compliment the broad and coordinated U.S. efforts from academia, federally funded research and development centers, and U.S. Government departments and agencies, which are accelerating American leadership in QIS and making progress on the six policy pillars laid out by the National Strategic Overview for QIS: choosing a science first approach to QIS, creating a quantum-smart workforce for tomorrow, deepening engagement with industry, providing critical infrastructure, maintaining national security and economic growth, and advancing international cooperation.

**About the participating centers**: Authorized by the NQI Act, the Department of Energy (DOE) and the National Science Foundation (NSF) each established five national research centers and institutes to accelerate breakthroughs in QIS, while the NDAA of Fiscal Year 2020 authorized the Department of Defense (DOD) and Intelligence Community (IC) to establish three QIS research centers to advance research, development, and deployment of QIS and QIS-enabled technologies. The summit hosted representatives from the following centers and institutes:

1. Co-design Center for Quantum Advantage (DOE)
2. Next Generation Quantum Science and Engineering (DOE)
3. The Quantum Science Center (DOE)
4. Quantum Systems Accelerator (DOE)
5. Superconducting Quantum Materials and Systems Center (DOE)
6. Air Force Research Laboratory Quantum Information Science Center (DOD)
7. Naval Research Laboratory Quantum Information Science Center (DOD)
8. Laboratory for Physical Science Qubit Collaboratory (IC)
9. Institute for Hybrid Quantum Architectures and Networks (NSF)
10. Institute for Quantum Computation (NSF)
11. Institute for Quantum Sensing and Biophysics and Bioengineering (NSF)
12. Institute for Quantum Systems through Entangled Science and Engineering (NSF)
13. Institute for Robust Quantum Simulation (NSF)

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