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The Global Race for Quantum Supremacy in the Asian 21st Century

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Abstract

"China's rise is the story of the century in science," *Nature Index* declared in 2018. China is now competitive with the U.S. in many areas of science and technology, including 5G, artificial intelligence, high-speed rail, renewable energy, robotics, nanotechnology, quantum technologies, and even space. South Korea's rapid developments in science and technology make it "one of the world's most innovative nations," *Nature Index* concluded in 2020. Japan continues to lead in many areas, including building the world's fastest supercomputer. Taiwan is emerging as a leader in the Fourth Industrial Revolution, including its domination of semiconductor manufacturing. This presentation focuses on quantum communication, an important area in which China is currently ahead. In 2017 Dr. Jianwei PAN of the University of Science and Technology of China (USTC) created the first quantum-encrypted intercontinental video conference using a Chinese satellite called Micius. This stunning achievement marked one of the first milestones in the Second Quantum Revolution (technologies comprising quantum communication, quantum computation, and quantum sensing), and spurred a global race for quantum supremacy. By 2018, the oft-fractious U.S. government passed with overwhelmingly bipartisan support the "National Quantum Initiative Act," investing $1.2 billion in quantum technologies. Similarly, the United Kingdom, Germany, France, Japan, Korea, and Russia all have important quantum initiatives. I argue that it appears likely that U.S. legacy Cold War policies will cede the economic and technological windfall of quantum communication technologies to China. I conclude with observations about the implications of the tectonic shift in the geopolitics of science and technology in the Asian 21st century, in which science, technology, and policy are no longer dominated by the West.

Presenter

Roger Hart is a Professor of History and Director of the China Institute at Texas Southern University, a U.S. Fulbright Scholar (2021, Korea), and a Fellow at the Kissinger Institute on China and the United States, Woodrow Wilson International Center for Scholars (2021-2022). His current research project studies the Second Quantum Revolution, focusing on quantum communication and quantum computing in the U.S., China, Japan, and Korea. His previous appointments include Seoul National University, University of Texas at Austin, University of Chicago, Institute for Advanced Study (Princeton), Stanford, University of California at Berkeley, and Harvard. His previous awards include American Council of Learned Societies (ACLS), National Endowment for the Humanities (NEH), and Andrew W. Mellon Foundation. His previous two research monographs are published by Johns Hopkins University Press. He earned his B.S. in mathematics from MIT and M.S. in mathematics from Stanford, and his M.A. in Chinese Literature and Ph.D. in Chinese history and history of science from UCLA. He lived in China for six years, and has near-native fluency in modern Chinese and excellent classical Chinese. His website is www.rhart.org.

Thursday, November 18, 7:30 PM KST via Zoom
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