**Leveraging Modern CMOS Technology for Quantum Computing**

Quantum computing is a critical technology to enable the next generation of computation power. There are many different hardware platforms being developed to create qubits for a quantum computer, including systems within solid materials – such as superconducting qubits, spin qubits and color centers – and systems exploiting natural particles such as photonic qubits, trapped ions and neutral atoms.

Regardless of the hardware, making a quantum computer that is powerful enough to solve useful problems is extremely difficult. It requires building a system that contains many qubits while maintaining extremely low gate error rates. Both attributes require orders of magnitude improvements beyond what is currently possible today. Additional hardware improvements are needed. Improved materials are required to reduce the errors further to create powerful systems. Concurrently, larger quantum computers that employ advanced packaging and modular architectures using quantum interconnects will be needed. Both these areas offer exciting opportunities for new technologies to take quantum computing to the next level.

Innovations in Materials engineering, state-of-the-art semiconductor processes and advanced packaging techniques will be critical to develop the next generation of quantum technologies. Applied Materials with the CMOS experience, is well positioned to leverage its vast array of materials engineering expertise and capabilities to address challenges in quantum computing. We believe that open collaboration among quantum computing specialists from different backgrounds is critical to allow quantum computing to reach its potential.