Rapid progress is being made worldwide in device implementations for quantum information processing, including superconducting circuit qubits, trapped ion qubits, semiconductor donor/dot spin qubits, and others. I will describe an approach to spin qubits based on metal-oxide-semiconductor quantum dots in silicon that brings the advantage of compatibility with conventional CMOS circuits and has good prospects for scaling to very large arrays. The state of the art, as well as experimental results from my own group and a vision for scaling up, will be discussed. I will also present preliminary work towards topological qubits in superconductor/semiconductor hybrid nanostructures, and recent work on carbon nanotube mechanical resonators for magnetic force sensing down to the single Bohr magneton regime.