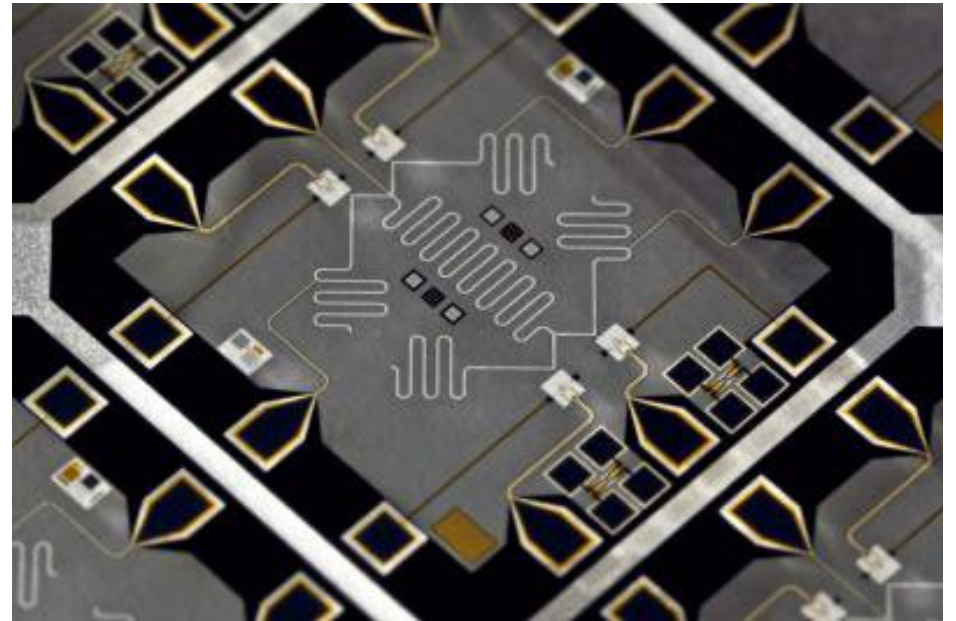# Quantum Computing

Justin Baran

Overview

- Bits & Qubits

- Logic Gates

- Shor's Algorithm

- Making it happen

Bits & Qubits

Superposition
Entanglement
Reading qubits destroys their state

Logic Gates

Quantum Logic gates are rotations
(Reversible unitary transformations if you want to use big words)

Some gates

Hadamard
Pauli gates
Controlled XOR

Shor's Algorithm

Reduces problem of factoring a large number to finding the period of a function.
Finding this period can be done quickly on a quantum computer.

Actually doing this

Decoherence is a big problem.

System must stay coherent for the duration of the computation.

Shor's algorithm has been successfully demonstrated on a 4-qubit machine.

The end.

Thank you for your patience.