

ECSE-4964 and ECSE-6964 Quantum Computer Programming

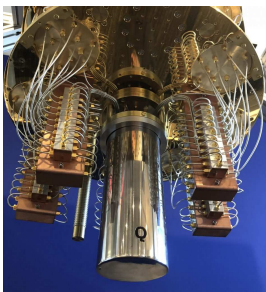
Mon & Thurs 4–5:20pm

W. Randolph Franklin

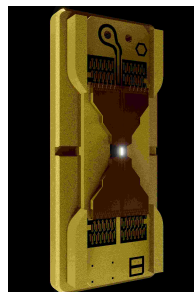
mail@wrfranklin.org, <https://wrfranklin.org>

- ???
1. If someone gives you a quantum computer, how do you program it?
 2. If you don't have a quantum computer, how can you use Amazon's cloud or IBM's free tools or simulators on github?
 3. What is spooky action at a distance? Is it an entangled mess?
 4. Is IBM the only serious quantum computing player? (ans: no).
 5. You heard that quantum computing will break existing ciphers? (ans: some, eventually, maybe). What are serious uses of quantum computing? (ans: simulate real quantum systems for designing better drugs and rechargeable batteries.)
 6. How does this course relate to RPI's physics and CS quantum courses? (ans: this an engineering course; it's not just physics and theory).
 7. How do you factor an integer with a quantum computer?
 8. Where do you get more info? (ans: my web site.)

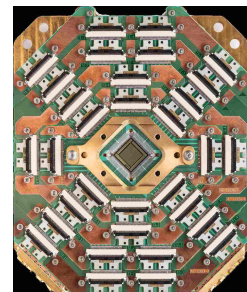
- Learning Outcomes:**
1. Demonstrate proficiency with the mathematics behind quantum computing; qubits and quantum gates.
 2. Understand important quantum computing algorithms like Grover and Shor.
 3. Understand the three main quantum platforms: transmon qubit (IBM Q), trapped ion (IonQ), and quantum annealing (D-Wave).
 4. Apply that to write and run programs on those platforms.



IBM



IonQ



D-Wave