**Research:**

**Videos:**

<https://www.youtube.com/watch?v=QuR969uMICM>

* Controls behaviour of fundamental particles
* Qubit contains certain probability of being 1, certain probability of being 0, exists as a superposition of 1 and 0
* Allows for uncertainty
* Quantum uncertainty in private keys causes hackers to be unable to break the key without breaking laws of quantum physics
* Quantum simulations for drugs could be more accurately modelled by quantum computers
* Information can be teleported across internet without physically transporting information

<https://youtu.be/JhHMJCUmq28?si=FTiZQN_JofFA6wJZ>

* Exponential advancements of computers is reaching limit, can not get smaller than an atom so quantum is a new form of advancement
* While unobserved, qubit can be in superposition but once observed must be 1 or 0
* Entanglement allows for qubits with close connections to react to each other’s states instantaneously
  + From 1 entangled qubit, properties of partner qubits can be directly deduced
* Qubit manipulation involved qubit gates taking superpositions as inputs and returning a superposition as an output through manipulating inputs and rotating probabilities
* Allows all possible calculations to be done at the same time
  + Only 1 result can be measured and if not result desired, must try again
  + Can be exponentially more efficient than normal computers regardless
* Quantum computers use root(n) time complexity where computers use n time complexity.
* Can be used to crack public and private keys rapidly, ruining security

<https://youtu.be/e3fz3dqhN44?si=dSGT51cF3ERw_mGj>

* Kept at temperatures colder than space, 15 mK
* Consists of quantum chip + dilution refrigerator and cables carrying signals from fridge into processor + cables returning information to room temperature so humans can understand

<https://youtu.be/CMdHDHEuOUE?si=CdzRw6ntSxT9EZLs>

<https://youtu.be/-UrdExQW0cs?si=COK9I6_q2oDU_nzM>

<https://youtu.be/OWJCfOvochA?si=0Rr-i-oex_b4tUTz>

<https://youtu.be/60OkanvToFI?si=oZEp-gMvXHObg-op>

<https://youtu.be/g_IaVepNDT4?si=QO2eGBtpomU19p10>