About the Company

A Canadian based company founded in 2016 by Christian Weedbrooke. Xanadu focuses on creating Quantum computing hardware and software. Their mission is to “build quantum computers that are useful and available to people everywhere.” They want to make it accessible to the general public for everyday use.

Silicon **Photonic** Chip that Powers a Room Temperature Quantum Computer

Recently: PennyLane

Recently there has not been any major changes in the company.

The newest update was published December 2021 regarding their open source software for programming Quantum Computers called PennyLane

PennyLane v0.20 they added

- New graphical circuit drawer
- New quantum-aware optimizers
- Faster performance
- Smarter circuit decompositions
- General hardware gradient support... and more!

```
import pennylane as qml
from pennylane import numpy as np

# create a quantum device
dev = qml.device("default.qubit", wires=1)

# a quantum node
@qml.qnode(dev)
def circuit(phi1, phi2):
  qml.RX(phi1, wires=0)
  qml.RY(phi2, wires=0)
  return qml.expval(qml.PauliZ(0))

# classical processing
def cost(x, y):
  return np.sin(np.abs(circuit(x, y))) - 1

# calculate the gradient
dcost_fn = qml.grad(cost)
```

Physics Principles

Xanadu uses modern **photonic chips** and core fundamentals of **quantum physics** in order to create quantum computers that are scalable, robust, and practical.

Three main units of Photonic Chip:

1. **The Squeezers** compress laser light into “squeezed states.”
2. **The Interferometer** where the squeezed states are converted into electrical voltages based on the user’s instructions.
   - The qubits interact with each similar to entanglement; and lastly, the
3. **Transition Edge Sensor** detects the number of photons which then translate into integers