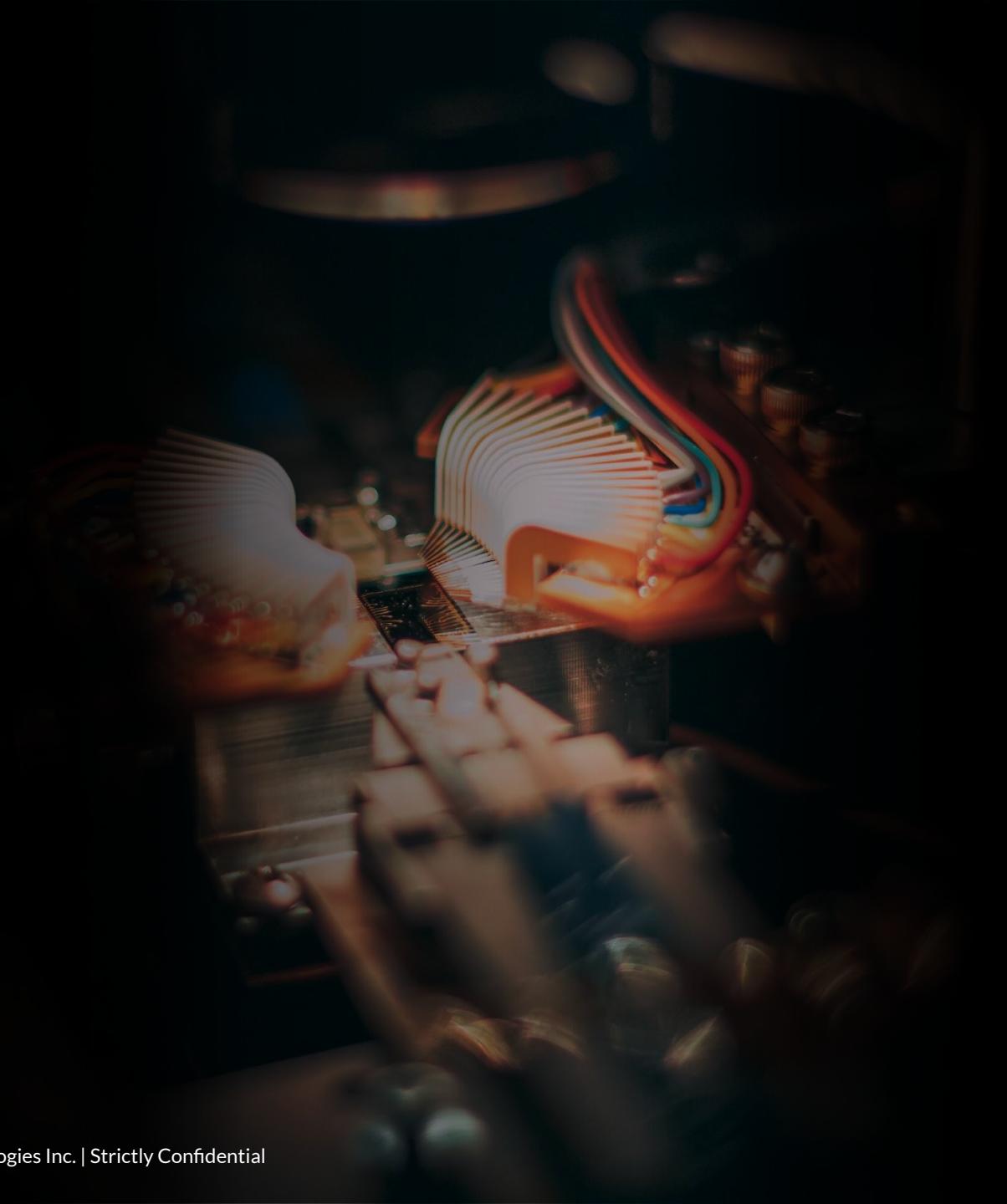


XANADU

PHOTONIC QUANTUM COMPUTERS

JULY 2020



Welcome to Xanadu!

CEO



Christian Weedbrook, PhD

HARDWARE



Zachary Vernon, PhD

SOFTWARE



Nathan Killoran, PhD

ARCHITECTURE



Ish Dhand, PhD

CLOUD



Rafal Janik, MSc

Team: 60+ people | 40+ PhDs | 15+ nationalities



Advisors:



Founded in **2016**

Funding: **\$45M**

Office & Hardware Lab in **Toronto**



We are full-stack quantum technology company

Quantum Technology

Quantum Photonic Hardware



Software

Quantum
Computing

Quantum
Communication

Quantum
Sensing

Machine
Learning

Simulation &
Cloud Access

Gaussian Boson
Sampling (GBS)

QRNG / QKD

Photon Detectors

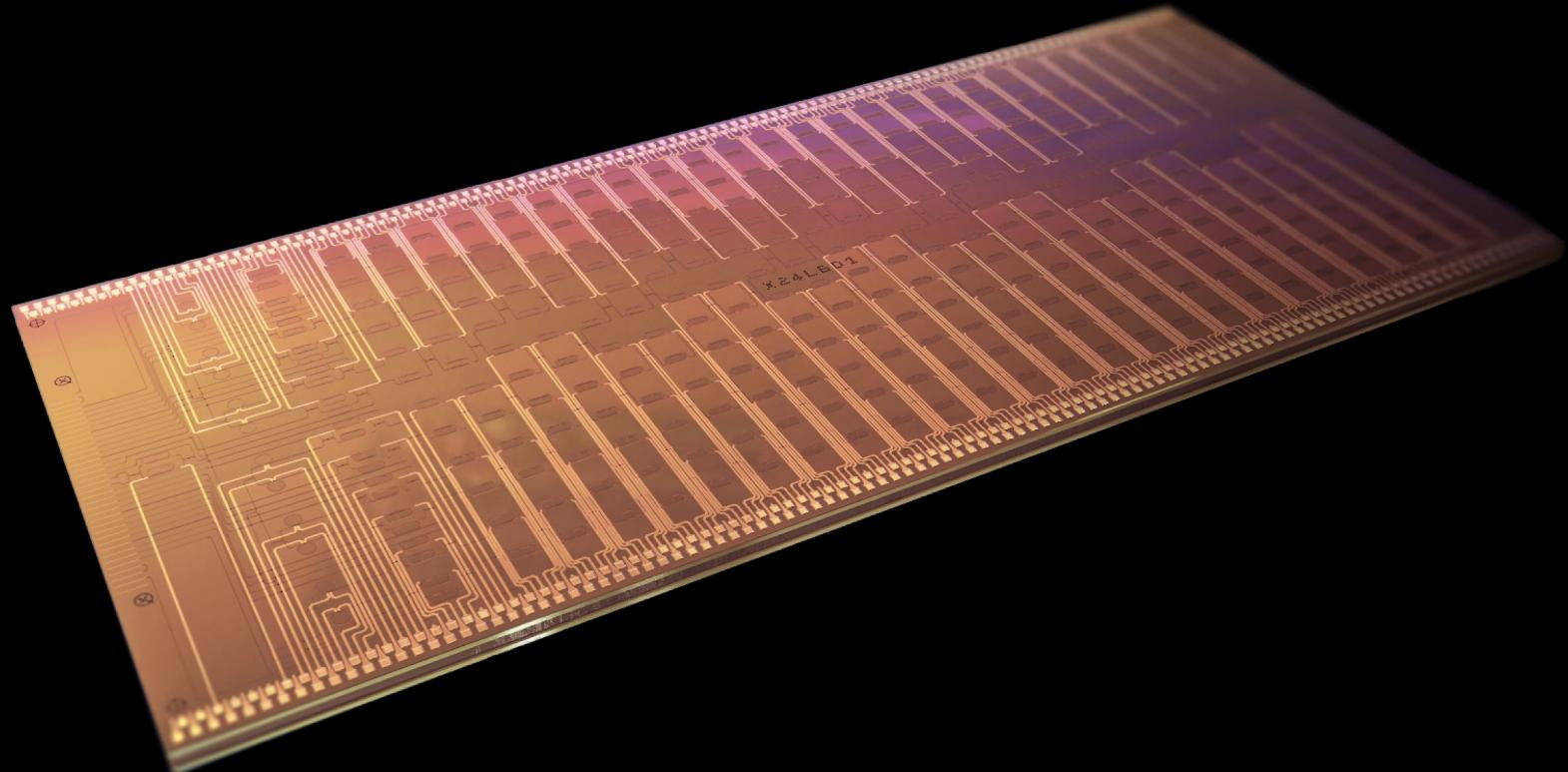
PennyLane

Xanadu Quantum
Cloud (XQC)



Photonic QPUs

We design and develop photonic quantum computers.



The hardware benefits of photonics

We are building quantum computers that are practical and scalable.

PRACTICAL

NO COOLING

QPU OPERATES AT ROOM TEMPERATURE

SMALL FORM FACTOR

XANADU'S COMPUTERS ARE RACK MOUNTABLE

LOWER COST

BUILDING ON TOP OF EXISTING TELECOM & OPTICS

SCALABLE

SCALABLE DESIGN

ROADMAP TO 1,000,000+ QUBITS

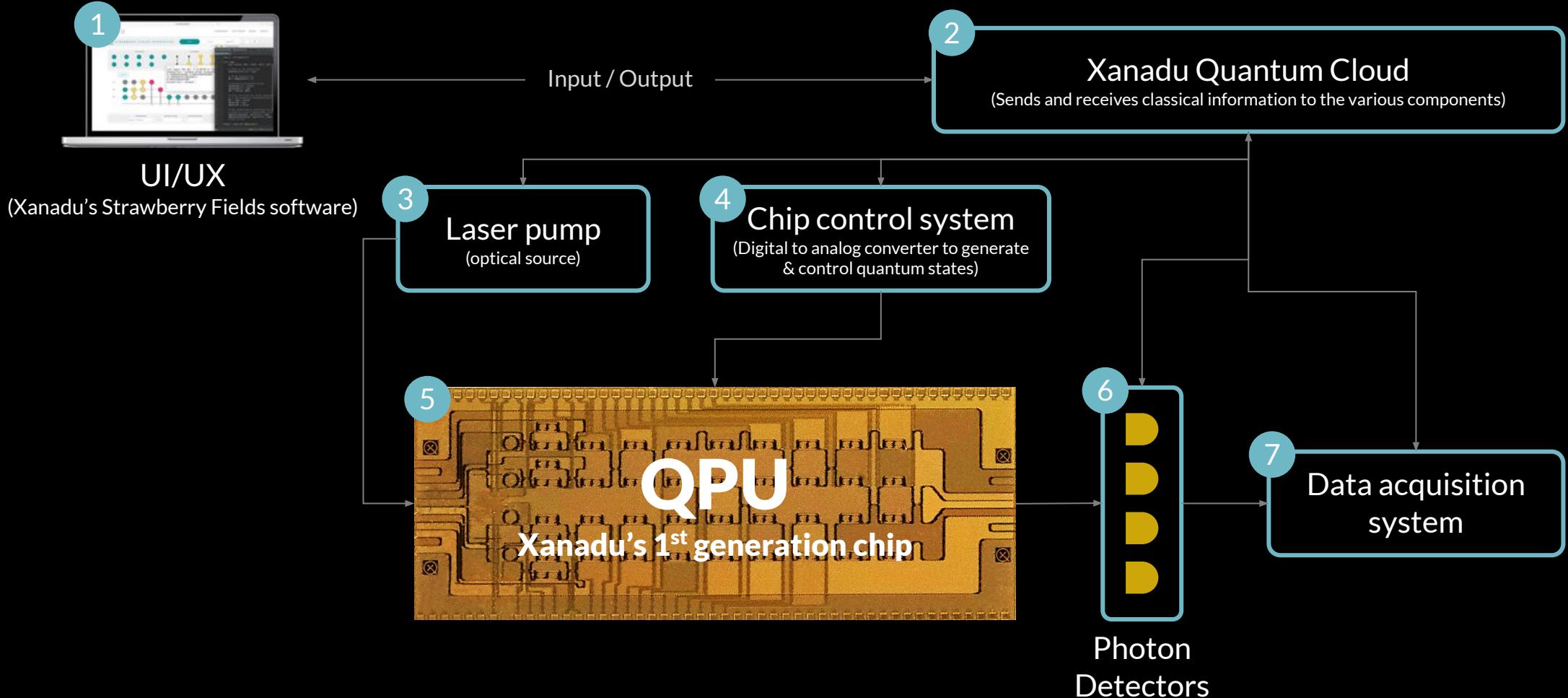
LOWER CONSUMPTION

1,000x LESS POWER

Room temperature quantum computers are simpler and do not require specialized components, enabling easier mass manufacturing and deployment

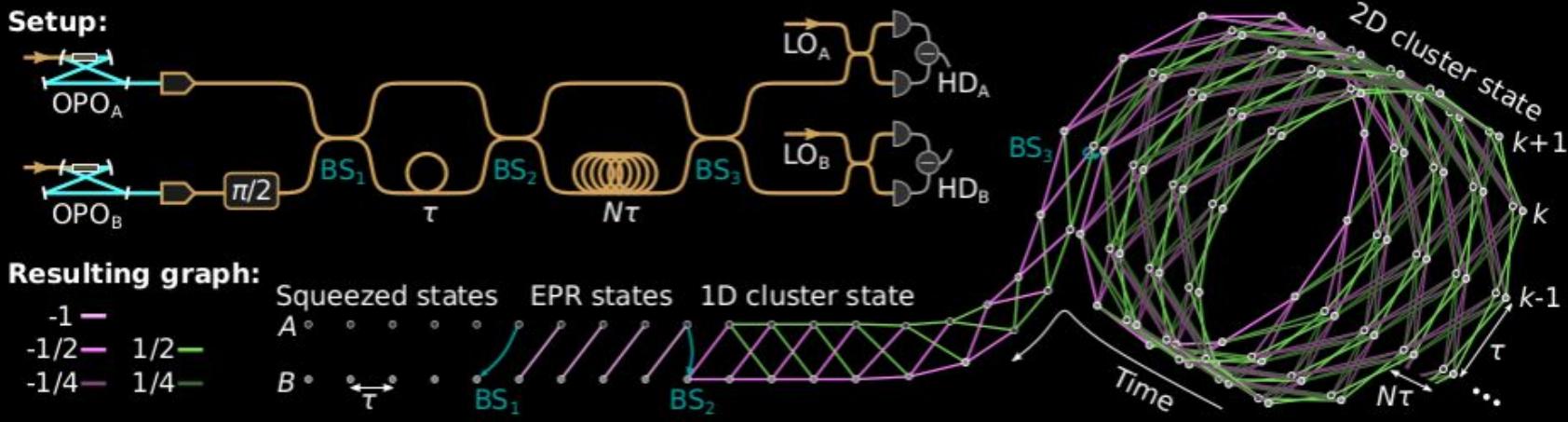
Photonics is the only approach with a clear roadmap to universal quantum computers

Photonic quantum computers are more practical



Scalability advantages

Can **multiplex quantum information** in space, frequency, time, etc.



Source: "Deterministic generation of a two-dimensional cluster state", M.V. Larsen et al., Science 366, 369 (2019)



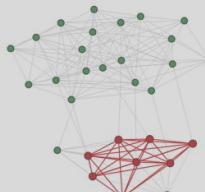
Can also **easily network photonic quantum computers**: optical telecom and fiber optics
(also a major enabler for rapid advancement of quantum photonics: can borrow a lot from existing telecom tools)



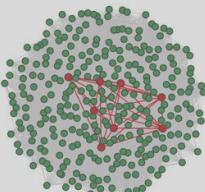
The software benefits of photonics

Xanadu's photonic quantum computers have unique business applications.

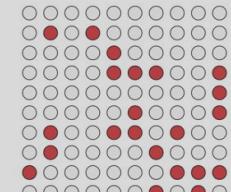
DENSE
SUBGRAPH



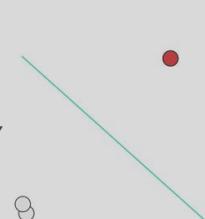
MAXIMUM
CLIQUE



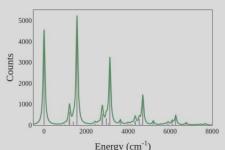
POINT
PROCESSES



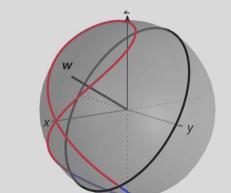
GRAPH
SIMILARITY



VIBRONIC
SPECTRA



QUANTUM
ENHANCED
FEATURES



TUTORIALS AVAILABLE AT [STRAWBERRYFIELDS.AI](https://strawberryfields.ai)

Our quantum products

*We offer both hardware/software for a **full-stack quantum computing** experience.*

PRODUCT

1

PennyLane
(Quantum Machine Learning)

WHAT IS IT?

Cross-platform **software library for quantum machine learning** and optimization of hybrid algorithms

2

XQC
(Xanadu Quantum Cloud)

VALUE PROPOSITION

Integrates with a variety of available quantum hardware, **enabling broad research into the benefits of quantum computing**



XANADU



Google



TensorFlow



IBM



Microsoft



rigetti



PyTorch

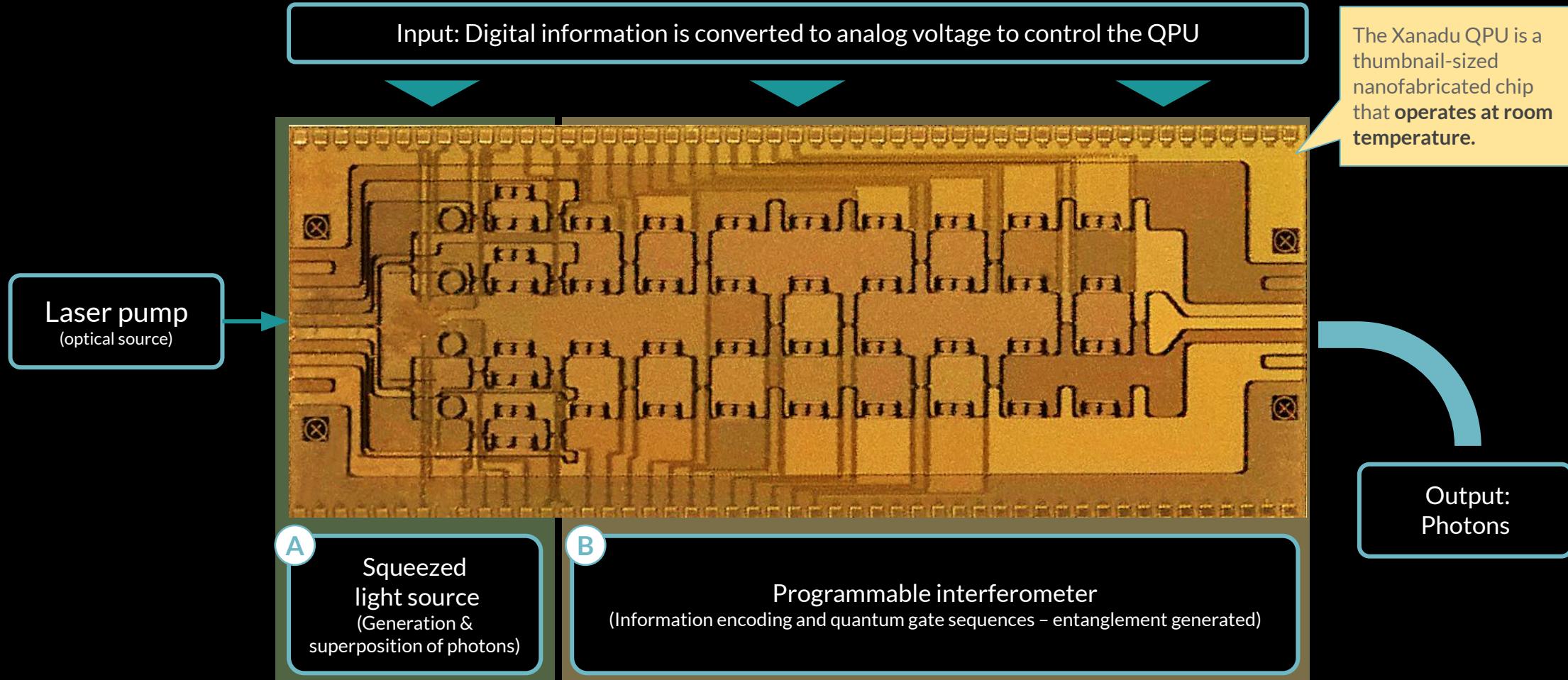
Cloud-access to **the world's first photonic quantum computer** designed for users focused on developing state-of-the-art quantum algorithms

Easy to use cloud platform, including dedicated software, for the development of unique quantum applications while **taking advantage of the power of quantum photonics**



XANADU
Thank you.

Building blocks of integrated quantum photonics



How we work with customers

CONTEXT



Duration: 6 months

Objective: Evaluate the impact of quantum computing on financial derivatives pricing

Stakeholders:
SVP & CIO
Chief Architect

PROCESS

Research cutting-edge techniques

Develop proof-of-concept solution

Simulate solution using Xanadu's software

Benchmark quantum speedup and accuracy improvement

RESULTS

- Development of a proprietary quantum Monte Carlo algorithm
- Illustrating speedup from hours to minutes

"This collaboration gave us the opportunity to explore using next-gen quantum computing to optimize what we are able to offer our global customer base."

- SVP & CIO of Scotiabank Global Banking & Markets