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Quantum Computing | NEWS

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SEP 23, 2025 7:08 PM IST

Why the World's Most Valuable Company Is Buying Into Quantum Computing

TECH AI

by Nikita Ostrovsky

The Nvidia logo outside the company's offices in Shanghai, China, on Monday, Sept. 22, 2025. Qilai Shen—Bloomberg/Getty Images

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Science

NEWS / SCIENCE NEWS / What's Really Inside A Black Hole? Quantum Computing Sheds ...

What's really inside a black hole? Quantum computing sheds new light

TOI Science Desk / TIMESOFINDIA.COM / Feb 15, 2025, 08:00 IST

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BUSINESS INSIDER

TECH

Satya Nadella explains why Microsoft's quantum 'breakthrough' is so important

By Katherine Tangalakis-Lippert

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TECHNOLOGY

Inside The Quantum Computing Crash Triggered By Nvidia CEO — And What His Upcoming 'Quantum Day' May Bring

An AI-generated image illustrates the typical "chandelier" design of a quantum computer. (Spaveesone/Shutterstock)

Forbes

Massive Quantum Computing Breakthrough: Long-Lived Qubits

1 day ago

HSBC

HSBC demonstrates world's first-known quantum-enabled algorithmic trading with IBM

2 days ago

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Job Vacancies in Different Job Portals

01

Naukri.com
https://www.naukri.com › ... › Quantum jobs

22586 Quantum Job Vacancies In Hyderabad Secunderabad

02

LinkedIn
https://www.linkedin.com › jobs › quantum-jobs-worldw...

10000+ Quantum Jobs in Worldwide (451 new)

03

Indeed
https://www.indeed.com › q-quantum-computing-jobs

Quantum Computing Jobs, Employment

1059 **Quantum Computing jobs** available on Indeed.com. Apply to Senior Scientist, Software Engineer, Research Scientist and more!

04

Dice
https://www.dice.com › jobs › q-quantum+computing+r...

quantum computing research - software engineer iii Jobs

Browse 325 available **quantum computing** research - software engineer iii **jobs** on **Dice**.com. Employers are hiring right now for quantum ...

05

Glassdoor
https://www.glassdoor.com › Job › quantum-computing...

567 Quantum computing jobs in United States

Search **Quantum computing jobs**. Get the right **Quantum computing job** with company ratings & salaries. 567 open **jobs** for **Quantum computing**.

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Career Opportunities

Quantum Hardware Engineer
(Physics, EE) Designs & builds qubits.

Quantum Applications Scientist
(Chemistry, Finance, Biology) Finds real-world uses.

Quantum Algorithm Developer
(CS, Math) Designs & codes quantum algorithms.

Quantum Error Correction Scientist
(Math, CS) Fights decoherence.

Quantum Software Engineer
(CS) Builds SDKs and software tools.

Quantum Product Manager
(Business, Tech) Guides strategy.

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Chapter 1

Foundations of Classical Computing

- Introduction to Computing Paradigms
  a. Classical vs Quantum computing overview.

- Bits & Binary Representation
  a. Bits, bytes, binary addition.
  b. Boolean logic & truth tables.

- Transistors & Logic Gates
  a. Single-bit gates: AND, OR, XOR, NAND.
  c. Circuit construction from logic gates.

- Hands-On Coding
  a. Implementing Boolean functions in Python.
  b. Challenge: iterative XOR function.

Chapter 2

Mathematical Foundations: Linear Algebra

Chapter 3

Quantum Mechanics Primer

- Wave–Particle Duality
- Qubits & Quantum States
  a. |0⟩, |1⟩, superposition.
- Probability Amplitudes & Measurement
  a. Born rule, normalization.
- Phase & Bloch Sphere
- Multi-Qubit Systems & Entanglement

Chapter 4

Single & Multi-Qubit Gates

- Pauli Gates (X, Y, Z)
- Special Gates (H, S, T, R)
- Controlled Gates (CNOT, Toffoli)
- Superposition & Phase Control
- Entanglement Generation (Bell States)
- Qiskit Implementation &
  Bloch Sphere Visualization

Chapter 5

Quantum Randomness & Probability

- Pseudorandom vs. True Random Numbers
- Quantum Coin Flip Experiment
- Quantum Random Number Generator in Qiskit

Chapter 6

Quantum Algorithms I: Deutsch's Algorithm

- Oracles & Black Box Functions
- Classical vs Quantum Query Complexity
- Deutsch's Algorithm & Circuit
- Qiskit Implementation

Chapter 7

Quantum Algorithms II: Grover's Algorithm

- Big O Notation & Search Problems
- Oracle Construction for Grover's Search
- Phase Inversion & Amplitude Amplification
- Qiskit Coding

Chapter 8

Quantum Computing: Past, Present & Future

- History of Quantum Mechanics
- Evolution of Quantum Computing
- Current Technologies (IBM Q, Google, D-Wave)
- Future Research & Career Paths

Chapter 9

Final Beginner Projects & Presentations

- Mini-Projects:
  a. Quantum coin flip with visualization.
  b. 2-qubit entanglement generator.
  c. Simple Grover search application.
- Presentation & Peer Review

Chapter 10

Advanced Quantum Algorithms

- Quantum Fourier Transform (QFT) — theory, matrix form, circuit
- Phase Estimation & Applications
- Shor's Algorithm — factoring & modular exponentiation
- Variational Algorithms (VQE, QAOA) — hybrid approaches
- Hands-on: QFT, VQE, QAOA in Qiskit

Chapter 11

Quantum Error Correction & Fault Tolerance

- Quantum noise & decoherence sources
- Error models: bit-flip, phase-flip, depolarizing
- Simple codes: 3-qubit repetition, Shor code
- Logical qubits & fault-tolerance threshold

Chapter 12

Quantum Cryptography & Communication

- BB84 protocol & no-cloning theorem
- E91 entanglement-based QKD
- Quantum teleportation & superdense coding
- Quantum secure direct communication
- Qiskit implementation of BB84 & teleportation

Chapter 13

Quantum Machine Learning (QML)

- Introduction & motivation for QML
- Data encoding strategies
- Quantum feature maps & kernels
- Quantum classifiers (QSVM, VQC)
- Hands-on: Qiskit Machine Learning library
- Classical vs quantum ML model comparison

Chapter 14

Professional Capstone Project

- Choose an advanced project
  a. QML model implementation.
  b. QEC code simulation.
  c. Quantum chemistry simulation.
  d. Quantum cryptographic protocol.

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Minimum Recommended Specs

- Processor (CPU): Intel i5/Ryzen 5 (quad-core or higher)
- RAM: 16 GB (8 GB works but simulators for >20 qubits eat memory fast)
- Storage: 512 GB SSD (for faster I/O, Jupyter notebooks, libraries, datasets)
- GPU: Not mandatory (unless you're doing ML + quantum hybrid work; then NVIDIA CUDA GPU helps)
- OS: Linux (Ubuntu), macOS, or Windows (for better Python/conda environment management)
- If you're serious and want future-proofing: i7/Ryzen 7 + 32 GB RAM is ideal.

Certifications in Quantum Computing

There is no single mandatory certification to enter the field, but many platforms and universities offer programs. Most are paid, but some have free options:

Popular Certifications & Courses

- IBM Quantum Developer Certification (paid, ~$200, but prep material is free via IBM Quantum Learning)
- Qiskit Global Summer School (free, but competitive to get in)
- Microsoft Azure Quantum learning paths (free, via Microsoft Learn)
- edX / Coursera quantum computing courses (mostly paid, but financial aid often available)
- MIT xPRO / Caltech / Harvard quantum courses (paid, premium programs)
- So — certification is not required, but it helps showcase credibility.

Tools to Practice Quantum Computing (Free & Paid)

Free Tools (cloud + local simulators):

- Qiskit (IBM, Python library) → free, with access to IBM Quantum devices in the cloud.
- Cirq (Google) → free, simulates Google's quantum processors.
- Q# and Azure Quantum (Microsoft) → free tier for experimentation.
- PennyLane (Xanadu) → free for quantum machine learning.
- ProjectQ, QuTiP → open-source frameworks for simulation.
- Jupyter Notebooks → free, great for practicing.

Paid Tools / Platforms:

- AWS Braket (Amazon) → pay-per-use to run circuits on real hardware.
- D-Wave Leap → limited free credits, then paid.
- Premium edX/Coursera/MIT xPro tools → bundled with their courses.

Summary

Free Tools (cloud + local simulators):

- Any decent modern laptop (16 GB RAM preferred/8 Gb is also ok) is fine.
- Certifications exist (IBM, Microsoft, Coursera) → mostly paid, but optional.
- Tools: Mostly free (Qiskit, Cirq, PennyLane, Azure Quantum). Paid tools come in when you want advanced access.

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Google

Quantum Computing Job Postings

IBM USA
Yorktown Heights, NY, United States • via Prosple
1 day ago | $99,840–$1,83,040 a year | Internship

IBM USA
San Jose, CA, United States • via Prosple
1 day ago | $99,840–$1,83,040 a year | Internship

IBM
California, United States (+2 others) • via Job Board
3 days ago | Internship

Quantum Computing Inc.
Hoboken, AL, United States • via Recruit.net
12 hours ago | Full–time

Argonne National Laboratory
Illinois, United States • via Postdoc Jobs.com

Visa
Foster City, CA, United States • via Smart Recruiters Jobs
16 days ago | Internship

Atlantic Quantum
Massachusetts, United States • via Polymer
Full–time

Google
San Francisco, CA, United States • via Interviewplus
20 days ago | Full–time

Google India Pvt Ltd
Seattle, WA, United States (+2 others) • via TimesJobs
30 days ago | Full–time

UCF
Orlando, FL, United States • via UCF Jobs - University Of Central Florida
Full–time

PsiQuantum
Milpitas, CA, United States • via Dice
$2.6L a year | Full–time

JRG Partners LLC
Nashville, TN, United States • via JRG Partners
Full–time

QuEra Computing, Inc.
Boston, MA, United States • via Greenhouse
Full–time

Google
Goleta, CA, United States • via Karkidi
$1.57L–$2.35L a year | Full–time

QuEra Computing, Inc.
Boston, MA, United States • via Greenhouse
Full–time

Leidos
Arlington, VA, United States • via Karkidi
$85,150–$1,53,925 a year | Full–time

IBM
San Jose, CA, United States • via JobzMall
$95K–$1.6L a year | Full–time

Amazon
Seattle, WA, United States • via Dr. Job
$1.04L–$1.85L a year | Full–time

Workforce & Community Enablement Advocate Intern
IBM
Bengaluru, Karnataka • via WIZBII Jobs
Internship

Product Architect – Quantum Safe
IBM
Bengaluru, Karnataka • via JobzMall
Full–time

IBM | Research Intern-Quantum, Apply Now!
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Indian Icon Award - 2023

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We Are Honored as

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EduTech | FinTech | HealthTech

TRAINING | INTERNSHIP | PLACEMENTS

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Students Trained	Students Placed	Placement Companies	of Student Trust

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