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**BLACKTECHSTARTUP EDUCATION**

# Get Into Quantum Without Becoming a Quantum Physicist

A realistic map of the quantum supply chain—software, controls, cryogenics, photonics, cybersecurity, manufacturing, testing and business roles—so the field is not reduced to PhDs building qubits.

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## Quantum is an industry stack, not one job

Quantum information science combines physics, computing, sensing, networking and engineering, but the commercial ecosystem around it is broader than the scientist designing a qubit. Hardware companies need controls, microwave and RF systems, photonics, cryogenics, packaging, precision manufacturing, test equipment, software, cloud infrastructure, cybersecurity, technical sales, program management and supply-chain operations. NIST has emphasized that quantum technology requires cross-disciplinary capabilities and a growing supply chain. For a Black student, engineer, technician or founder, the practical opportunity is to identify where an existing skill can plug into that stack rather than assuming the only route is a doctorate in quantum physics.

## Start with the layer closest to skills you already own

A software engineer can move toward quantum SDKs, simulators, compilers, workflow orchestration or cloud interfaces. An electrical engineer can study control electronics, RF and instrumentation. A cybersecurity professional can focus on post-quantum cryptography migration, cryptographic inventory and implementation. A precision manufacturer can study components, fixtures, vacuum systems or metrology requirements. A technical salesperson can learn enough quantum vocabulary

and customer economics to sell specialized equipment. The shortest path is usually adjacent, not a complete career reset. Map your current skill, the quantum-adjacent skill and one project that proves the bridge.

## **Treat post-quantum cryptography as a near-term lane**

Quantum computing may take years to mature across many commercial workloads, but migration to post-quantum cryptography is already a concrete security program. NIST has standardized post-quantum cryptographic algorithms and continues related work. Organizations need to inventory cryptographic dependencies, understand vendor roadmaps and plan migrations. That creates work for security architects, software teams, hardware vendors, compliance professionals and consultancies. You do not need to build a quantum computer to help a bank, hospital, government contractor or software company prepare for quantum-era cryptography.

## **Use institutions as market maps**

NIST, national laboratories, NSF programs, universities, quantum consortia and industry groups reveal where capability is forming. Read funding announcements, research partnerships and workforce events to identify clusters and suppliers. Follow the equipment vendors and service companies around the headline quantum firms. When a new lab opens, it needs far more than researchers: facilities, calibration, electronics, software, fabrication, safety, data systems and specialized vendors. Emerging markets reward people who notice the enabling infrastructure early.

## **Build proof that is useful outside a classroom**

A certificate that says “quantum” is weak evidence by itself. Better proof might be a post-quantum migration assessment for an open-source project, a simulator experiment with clear documentation, a hardware-control demo, a market map of quantum suppliers, or a contribution to a relevant repository. The project should show that you can translate technical concepts into an outcome. If you are a founder, interview buyers before building a “quantum startup.” The highest-value opportunities may be boring infrastructure that the frontier labs cannot operate without.

## **The 90-day move**

Month 1: pick one quantum-adjacent lane and study ten organizations operating there. Month 2: build one proof-of-work project tied to a real need such as post-quantum inventory, control software, component sourcing or customer education. Month 3: contact labs, vendors, consortia and researchers

with a specific value proposition based on the work. Do not introduce yourself as “interested in quantum.” Introduce yourself as someone who can solve a defined problem in the quantum stack.

## Build a quantum adjacency scorecard

Score possible quantum lanes using six factors: adjacency to your existing skill, time to credible proof, number of real employers or buyers, capital required, regulatory or security barrier, and whether demand exists before fault-tolerant quantum computing arrives. Post-quantum cryptography scores differently from cryogenic hardware; quantum sensing differs from compiler research. Then choose one lane and collect 25 organizations in it—labs, vendors, suppliers, government programs and customers. Read job descriptions and procurement notices to identify repeated tools and capabilities. For a cybersecurity professional, the deliverable might be a cryptographic inventory and migration roadmap using NIST standards. For a manufacturer, it might be a capability sheet showing tolerances, materials, vacuum compatibility and quality systems relevant to precision components. For a software engineer, it might be a benchmark comparing simulator or SDK workflows on a defined problem. Interview five practitioners and ask what juniors or small suppliers misunderstand about the work. Use those answers to refine your proof. The strategy protects you from hype cycles because the project is anchored to a buyer or employer need that exists now. Emerging technology is most valuable when you can enter through an adjacent capability, learn the industry economics from inside and move closer to the core as the market matures.

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### SOURCE DESK

## Research behind this guide

Use the primary sources below to verify current rules, eligibility and program details before acting. Program terms can change.

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**NIST — Quantum Information Science**



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**NIST — Quantum industry and supply chain**



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**NIST NICE — Quantum workforce discussion**



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**NIST — Post-Quantum Cryptography**



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