

The State of Quantum Computing in the USA

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National Coalition of Advanced Technology Centers



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Introductions

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Making Quantum Technology a Reality

Chicago Quantum Exchange

Founded 2017



**Bridging Academia,
Industry, and Government**



**Advancing Research,
Discovery, and Impact**



**Training Quantum
Scientists and Engineers**



**Driving the Local and
National Quantum Economy**

124 miles

Length of Chicago-region
Quantum Network

210+

Researchers

7

Member Institutions Across
the Chicago Region

50+

Corporate, Nonprofit,
International, and Regional
Partners



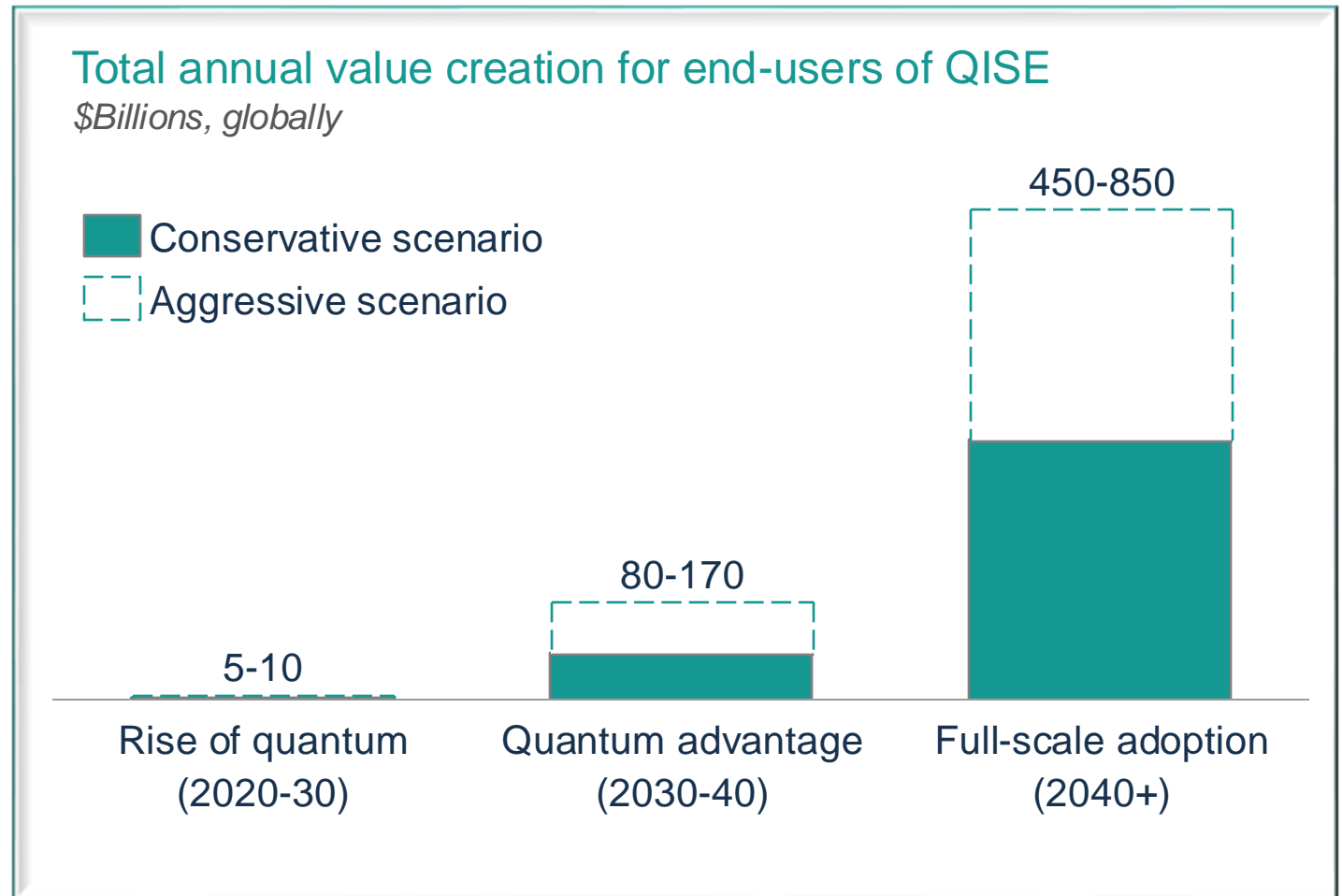
What is quantum?



1. **Quantum physics** is the study of how matter behaves at the smallest possible levels, where the rules of classical physics shift.
2. Utilizing these features of nature is called **Quantum Information Science and Engineering (QISE)**.
3. Quantum Information Science and Engineering will impact the way we **communicate**, **compute**, and **sense information**.



Quantum is expected to reach \$450-850B in annual value creation in the coming decades





How might quantum be used?



Industry	Applications	Current Companies
Finance	<ul style="list-style-type: none">• Fraud detection• Complex derivatives pricing• Portfolio optimization	<ul style="list-style-type: none">• JPMorgan Chase• State Farm• Discover
Biotech	<ul style="list-style-type: none">• Carbon reduction• Drug discovery	<ul style="list-style-type: none">• AbbVie• Eli Lilly
Manufacturing	<ul style="list-style-type: none">• Catalyst & material discovery	<ul style="list-style-type: none">• Dow• Boeing
Logistics	<ul style="list-style-type: none">• Optimization problems	<ul style="list-style-type: none">• ExxonMobil• Volkswagen





There will be roles available at every level of education in our quantum ecosystem.



Non-Exhaustive

Category	Role type	Description	Education level	Current industry representation	Proportion of future roles vs. today
R&D	Quantum scientist	Performs R&D in academia, national labs, or industry	PhD	High	Lower
	Quantum engineer (hardware/software)	Designs, tests, builds, and implements quantum hardware and software components and systems	PhD or MS	High	Lower
	Quantum technician	Performs quantum-related technical tasks (e.g., soldering wires, aligning lasers)	AA or technical training	Low	Higher
Business / translation	Quantum consultant	Provides advisory services for quantum technologies across various use-cases	MA or BA	Low	Higher
	Business support	Enables quantum team success (e.g., sales, project management)	BA or AA	Low	Higher
Adjacent roles	Manufacturing technician	Performs technical tasks to make quantum supplies (e.g., semiconductors)	AA or technical training	Low	Higher
	Construction	Performs technical tasks to build quantum infrastructure (e.g., fiber optic network)	AA or technical training	Low	Higher

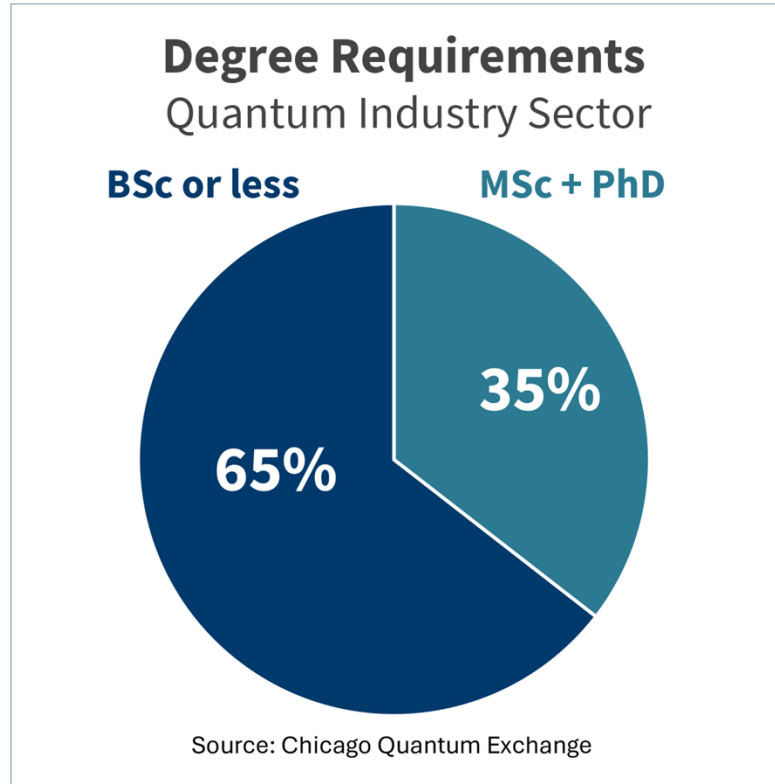
Source: Summary of quantum job posts on LinkedIn, QED-C job board, Indeed, and company websites between June and July 2024; BCG analysis



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Changing Degree Requirements for Quantum Jobs

Data on nationwide job postings from 2021-2023 reflect that many quantum jobs no longer require a Ph.D. and highlight the importance of experience.



1. Industry jobs tended to post lower degree requirements compared to jobs in universities or national labs.
2. Most jobs required 5-6 years of experience in an adjacent field (e.g., computer science, engineering).
3. Anecdotal evidence that technician roles call for specific skills earned by experience.
4. Majority of quantum jobs do not have quantum in the title.

First-of-its-kind quantum campus

Illinois Quantum and Microelectronics Park



- **128-acre campus** with shared cryogenic facilities, equipment labs, and research spaces on Chicago's South Side.
- Anchor tenant **PsiQuantum** — 300K-sq-ft site
- **DARPA-Illinois Quantum Proving Ground**

