AI risks leading humanity to 'extinction,' experts warn

"We must slow down the race to God-like AI"

AI could be a critical tool to help save the planet

A.I. Poses 'Risk of Extinction,' Industry Leaders Warn

How can AI help save the planet?

Are Nanoweapons Paving the Road to Human Extinction?

NANOTECHNOLOGY ENHANCED WEAPONS AND NANOWEAPONS ARE GROWING GLOBAL SECURITY THREAT WITH POTENTIAL TO CAUSE HUMAN EXTINCTION

Saving the Planet with Robots, Microbes, and Nanotechnology

HOW ROBOTS ARE HELPING SAVE THE PLANET

Top U.S. Intelligence Official Calls Gene Editing a WMD Threat

How Biotechnology Can Save the Planet

3D-printed weapons: Interpol and defense experts warn of 'serious' evolving threat

How gene editing could be used as a weapon, and what to do about it

How 3D Printing is Saving Our Planet

Biden: Nuclear 'Armageddon' risk highest since '62 crisis

Energy breakthrough: Can nuclear fusion help fuel the world?

Quantum Computing Strategies for An Over Hyped World

David Rejeski

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Environmental Law Institute
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Berlin, Germany

AUSTRIAN ACADEMY OF SCIENCES
INSTITUTE OF TECHNOLOGY ASSESSMENT

ETAC6

Practical Questions for Technology Assessment

- If practical quantum computers emerge, exactly what could they accomplish for the planet that existing supercomputers, or other competing technologies (even outside of the IT sector), could not accomplish?

- Can quantum computing provide these solutions in a timely and equitable fashion, overcoming multiple scaling challenges to address near-term and time-urgent environmental problems?

- Could quantum computing exacerbate existing energy and resource use and associated environmental damages?

- What policies might be put in place to advance the technology, its positive environmental impacts, and its global access?

Rejeski, D. 2022. “An Environmentalist’s Guide to Quantum Computing.” https://drive.google.com/file/d/19kBbi3kVQEZdd0DvIY0ZAuRQS0MLJxHV/view

Too Good to Be True?

Quantum computers could change the world — provided they can work

Qubits, decoherence, and superposition: a guide to the weird and revolutionary world of quantum computers.

By Bryan Walsh | @bryanrwalsh | May 24, 2022, 7:00am EDT

Vox

Is Quantum Computing An Unlikely Answer To AI's Looming Energy Crisis?

Forbes

Quantum Computing Will Be Bigger Than the Discovery of Fire!

Quantum computing is the most underrated, most transformational technological breakthrough since the internet

AI

The Quantum Era Is Arriving, And It Will Be Transformational !

Chuck Brooks Contributor ⓘ
Global Thought Leader in Cybersecurity and Emerging Tech

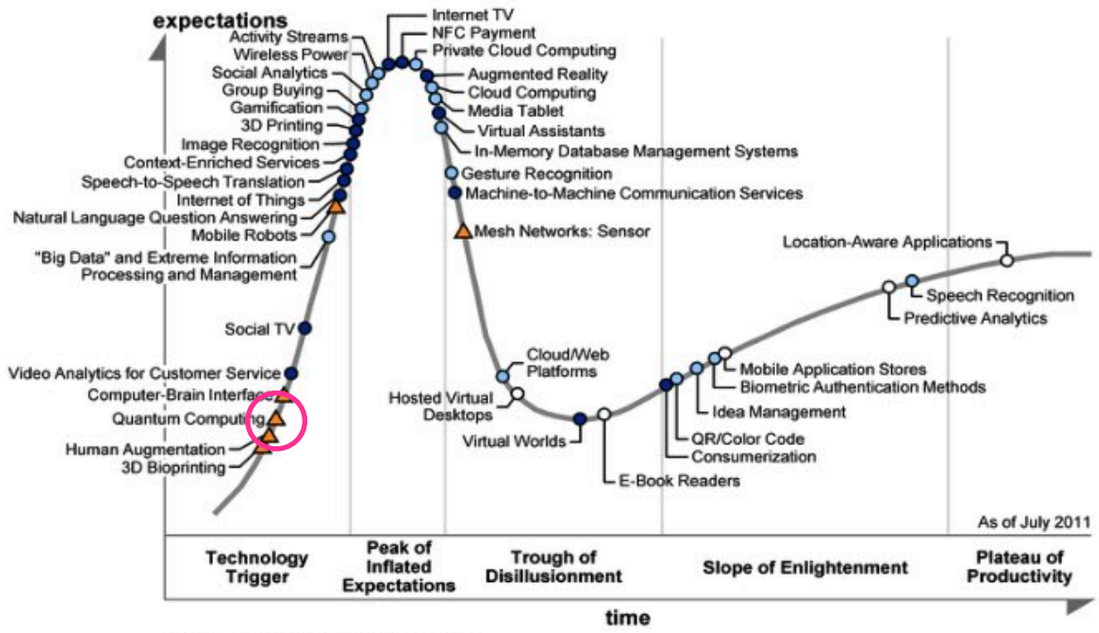
Forbes

Jul 20, 2022, 03:03pm EDT

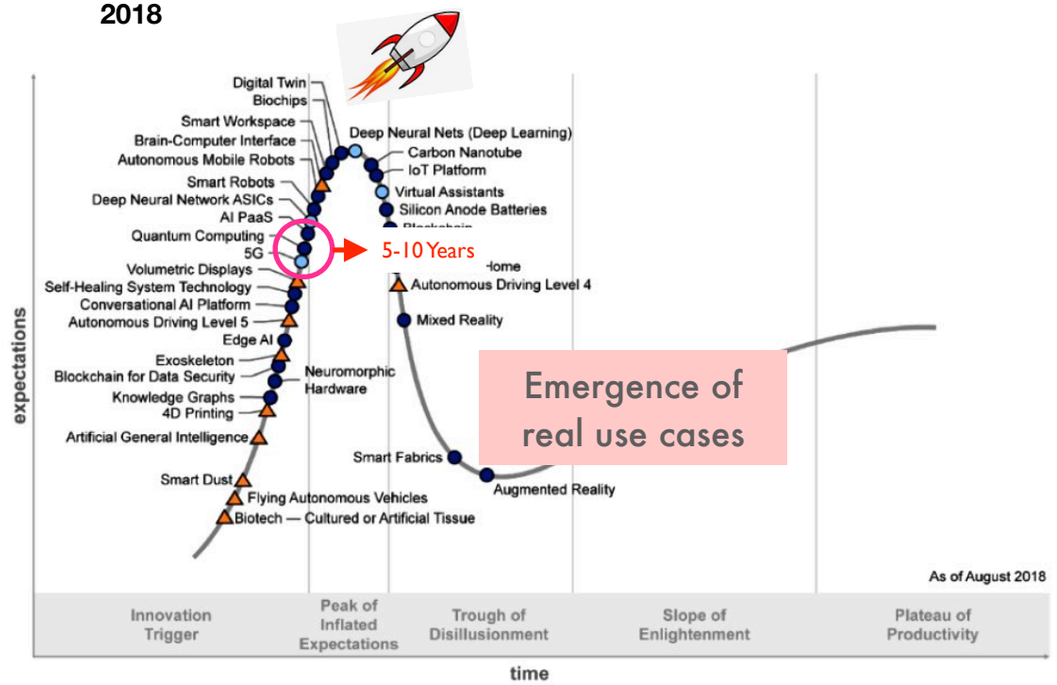
Up, and Down, the Hype Curve

*ALWAYS GOOD FUN for a look.

2012

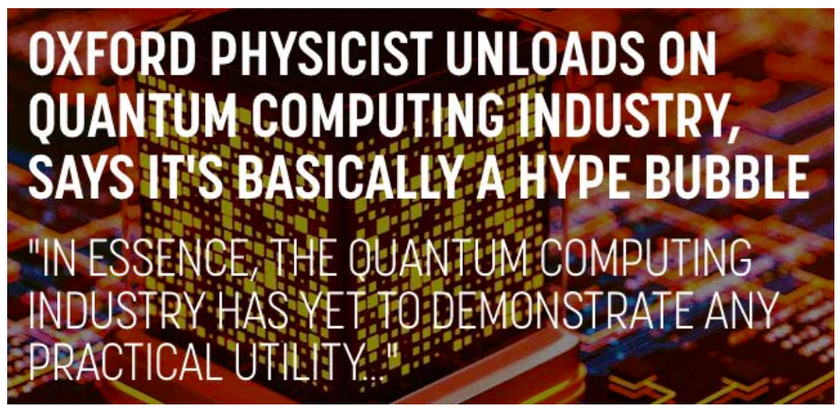


2018



"I'm disturbed by some of the quantum computing hype I see these days, particularly when it comes to claims about how it will be commercialized…quantum-computing hype has apparently convinced people that these systems already exist or are ***just around the corner***." Sankar Das Sarma, University of Maryland

"Academic scientists, medical researchers and technological entrepreneurs are taught to avoid extravagant claims and to rely instead on sober peer review. Yet they are also aware that hype can help win research grants and capital funding and can affect share prices." Ed Tenner



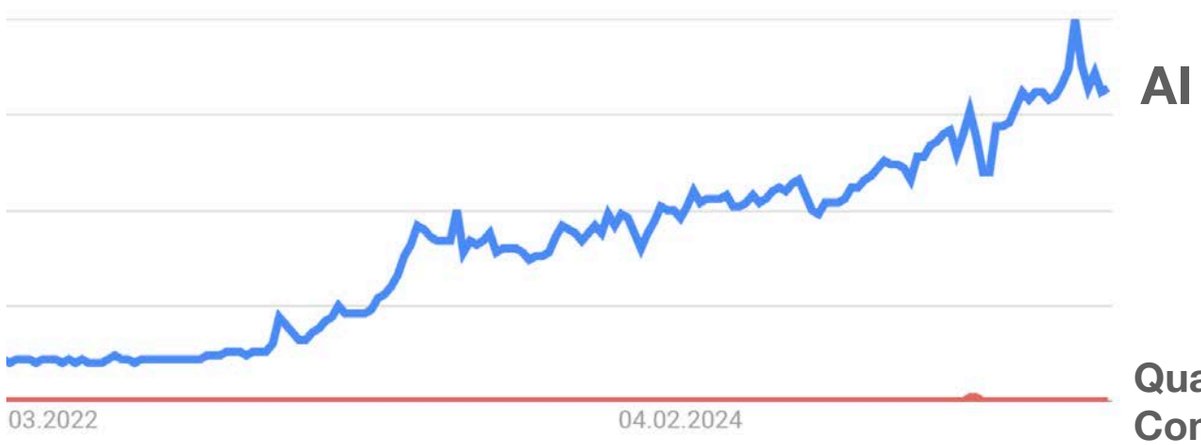
Das Sarma, S. 2022. "Quantum Computing Has a Hype Problem," MIT Technology Review, March 28.

Tenner, E. 2007. "A Place for Hype," *London Review of Books*, May 10. Vol. 29, No. 9.

Quantum Computing: Another Over-Hyped Technology?

1. Generative AI
2. General Artificial Intelligence
3. AI in general
4. AI PC's
5. Next Gen Everything and Anything
6. **Quantum Computing**
7. Fusion Power
8. Avatars
9. Metaverse and Spatial Computing
10. Humanoid Robots

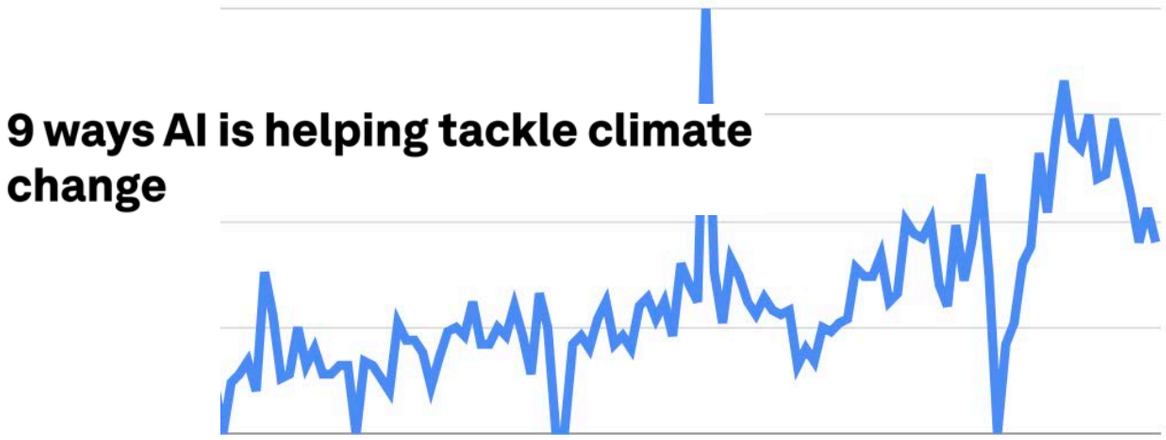
Will Quantum Computing Turn Out Just Like Nuclear Fusion? Always 50 Years Away?



Hype Shadow

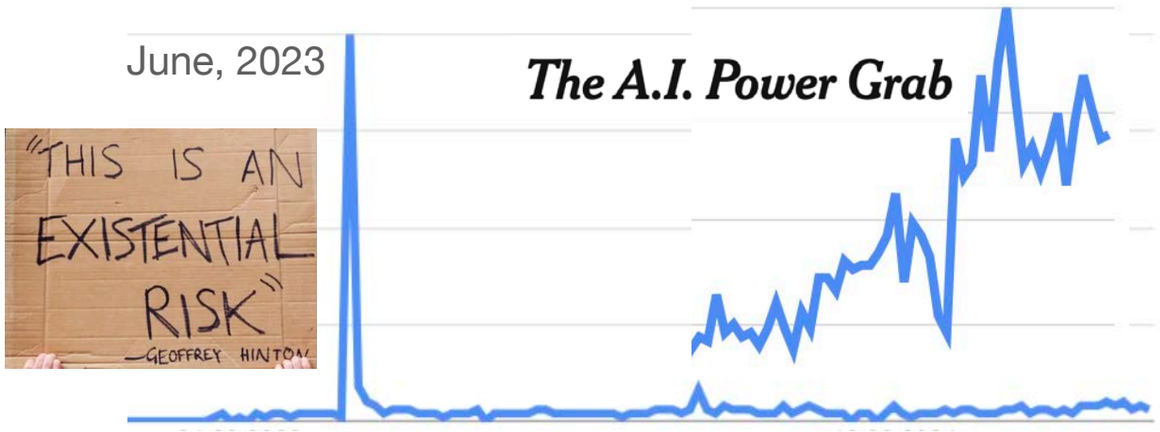
Pratt, M.K. 2024. The Ten Most Over-hyped Technologies in IT, CIO, July 15. https://www.cio.com/article/405106/the-6-most-overhyped-technologies-in-it.html

Hype Taxonomy



Positive Hype

Address climate change
Medical breakthroughs



Negative Hype

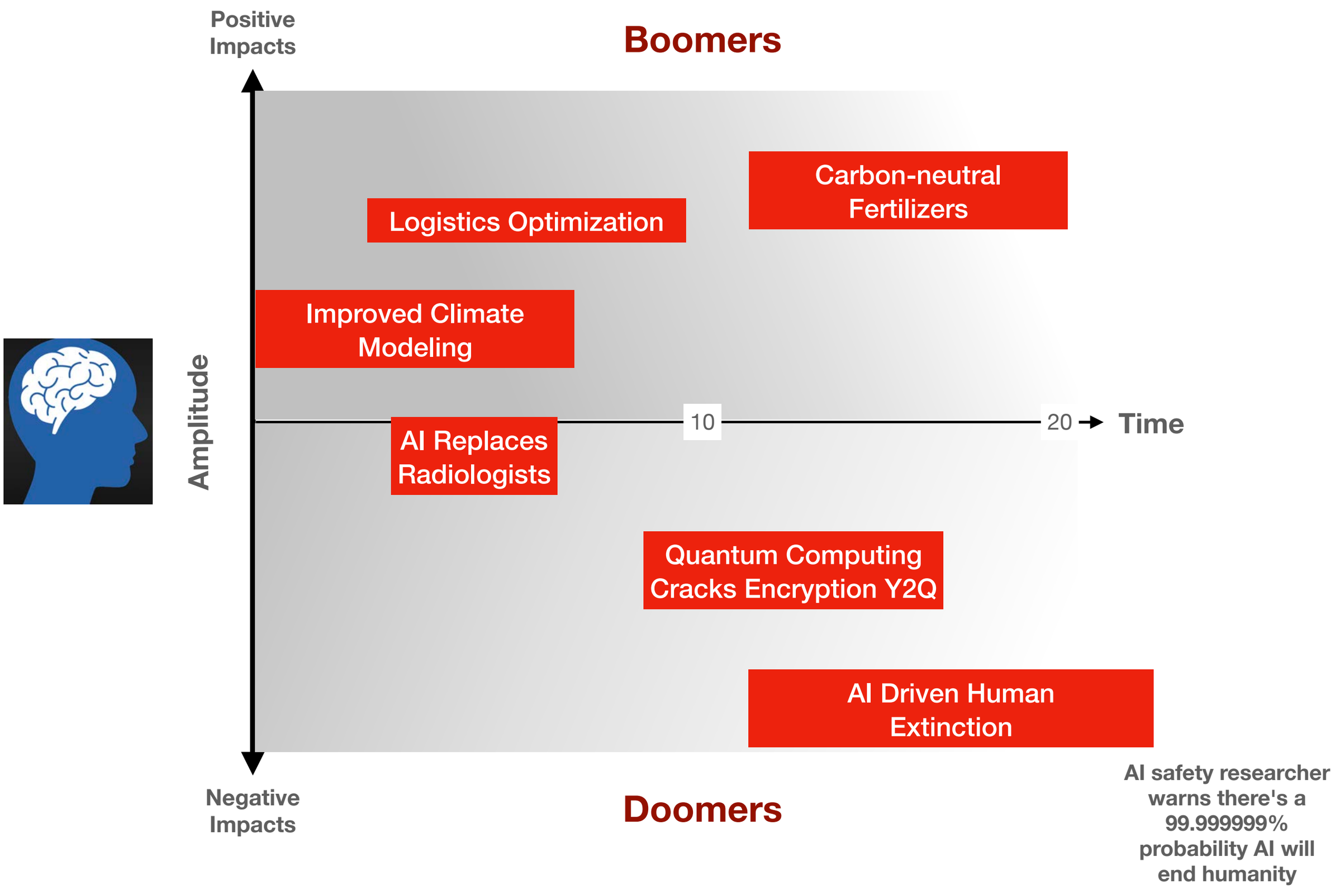
Existential risks to humanity
Energy/Water Use

Comparative Hype

The 'Arms Race'

Loss of market advantage
National security concerns

Hype Scenario Space



100 YEARS OF QUANTUM IS JUST THE BEGINNING

2025

Up the Hype Curve Again?

The United Nations Proclaims 2025 as the International Year of Quantum Science and Technology

Quantum science and technology is poised to help address the world's most pressing challenges — including the need to rapidly develop renewable energy, improve human health, and create global solutions in support of the U.N.'s Sustainable Development Goals.

TIME

MAY 4, 2025 1:15 PM CET

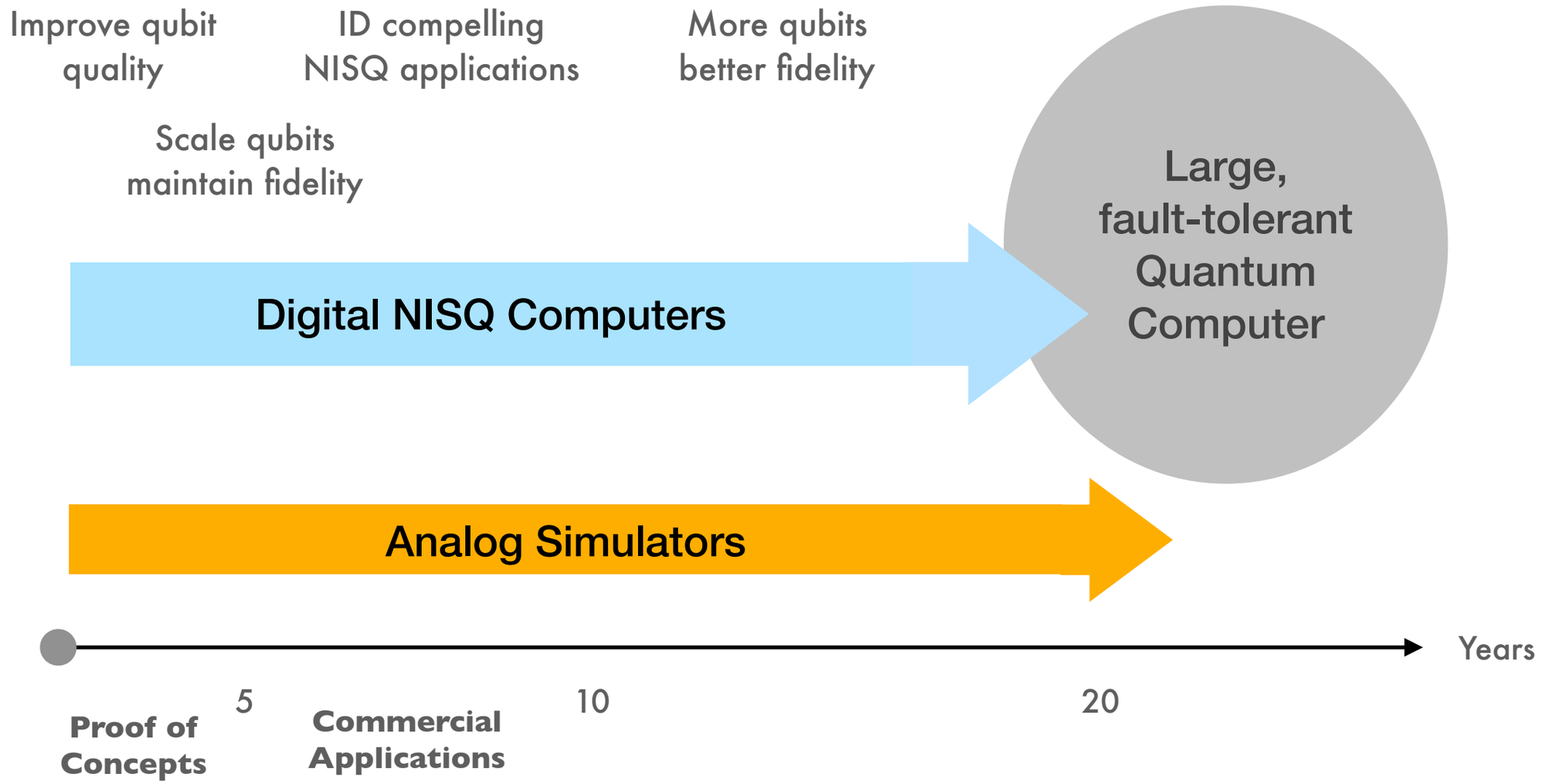
The Quantum Era has Already Begun

…**the quantum train is leaving the station**…
Quantum computing is not just a tool—it is a **national capability**. **Countries that lead** will attract the talent, secure the data, and define how this new technology is regulated, protected, and deployed.

The Long-Term Forecast for Quantum Computing Still Looks Bright BCG

just as everyone starts to wrap their heads around AI, **Quantum Computing is on the horizon, threatening to rewrite the entire playbook of technological progress.**

1. Develop/Update A Realistic Timeline for Quantum



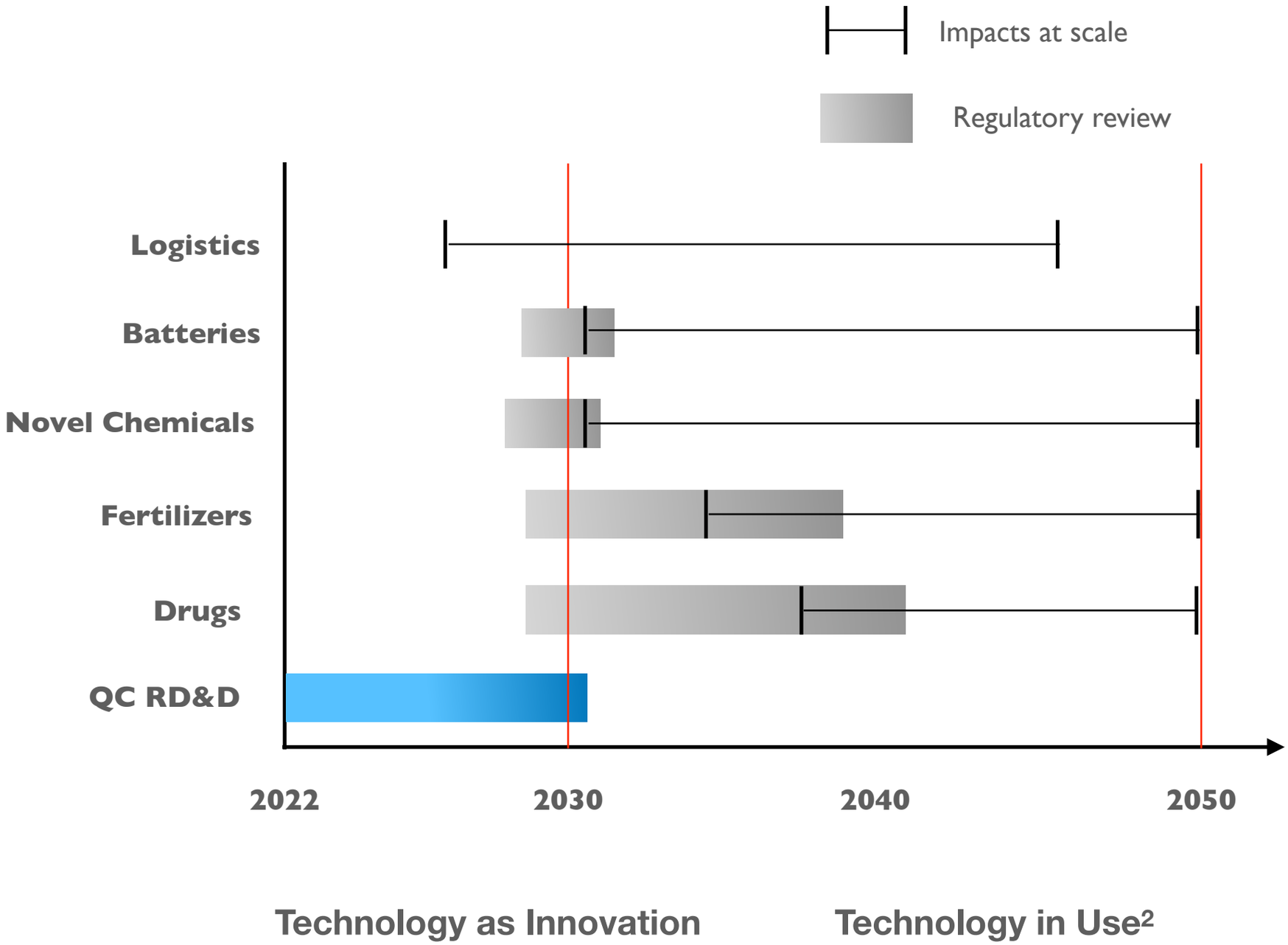
Quantum Supremacy Test: computational tasks are executed exponentially faster on a quantum processor than on a classical processor

Quantum Computers Just Outsmarted Supercomputers – Here's What They Solved

DARPA's Utility Scale Challenge: Quantums's computational value exceeds the cost to build and operate it by 2033

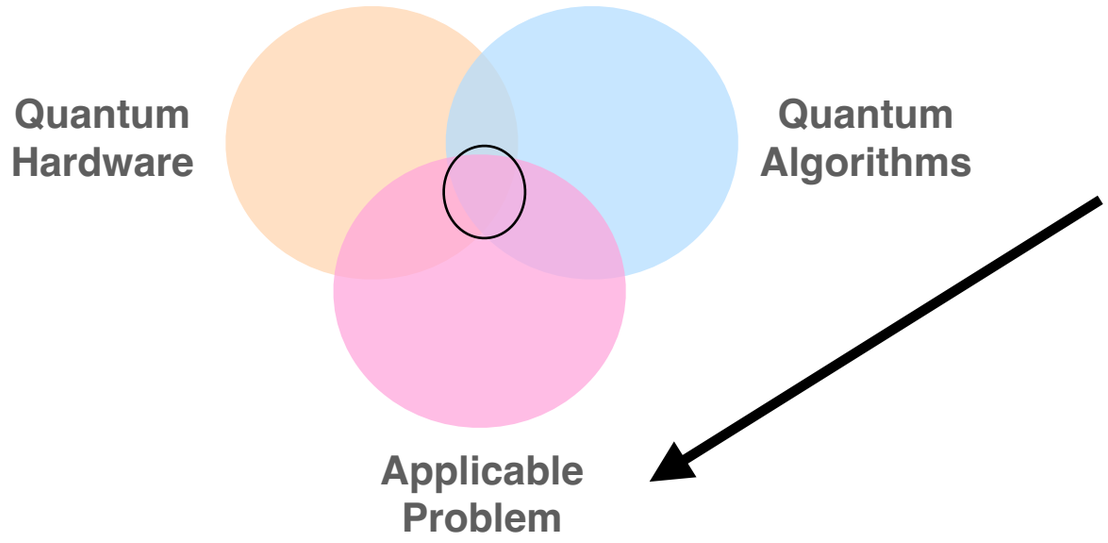
2. Consider Time to Take Solutions to Scale

It has been jokingly said that computer scientists, looking at new markets, count "1, 2, 3, . . . a million."[1]



1 Brown, John Seely & Duguid, Paul, 2000. The Social Life of Information (Cambridge, MA: Harvard Business School Press
2 See: Edgerton, David 2006. *The Shock of the Old:Technology and Global History Since 1900*, London: Profile Books

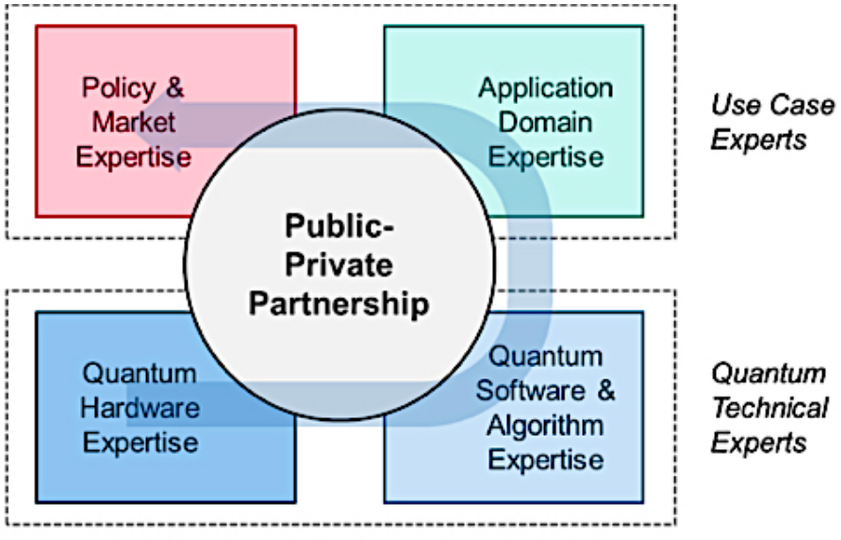
3. Focus on Practical Quantum Solutions



Focus on ***Practical Quantum Advantage***

Quantum outperforms classical computing for real applications that matter and can scale.

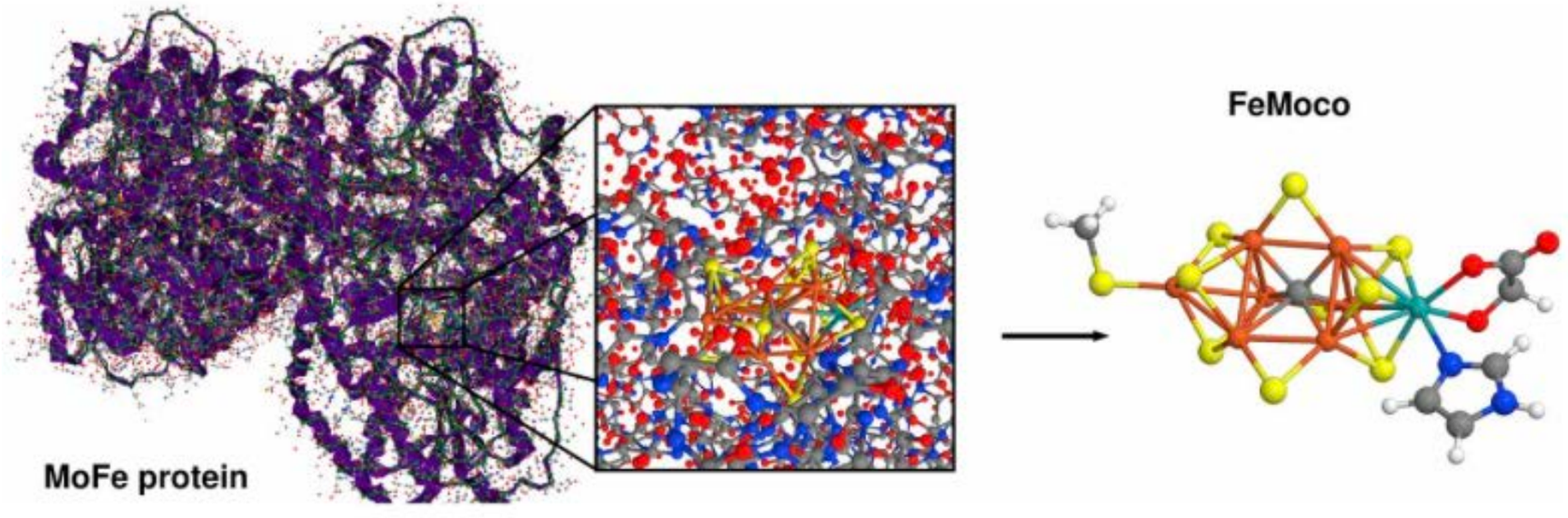
Bring together quantum technical experts with use case experts to develop a portfolio of environmental problems where quantum computing could provide significant and measurable improvements over other options and design ways to accelerate their deployment and commercial adaption.



John Russell 2022."Quantum Computing Needs More Public-Private Collaboration Says QED-C." https://www.hpcwire.com/2022/10/04/quantum-computing-needs-more-public-private-collaboration-says-qed-c/

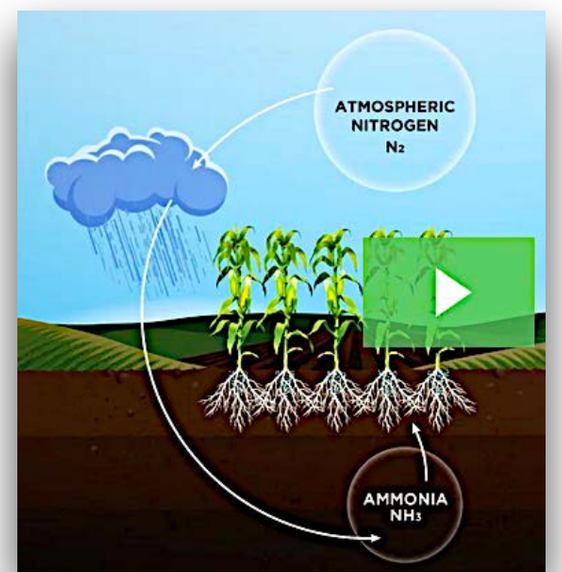
Create and update an inventory of practical quantum computing applications that address key environmental and sustainability challenges and share this information widely (horizon scanning).

4. Evaluate Other Approaches (Combinatorial Innovation)



Reiher, M. et al. 2017. “Elucidating Reaction Mechanisms on Quantum Computers,” *PNAS*, July 3, Vol. 114, No. 29

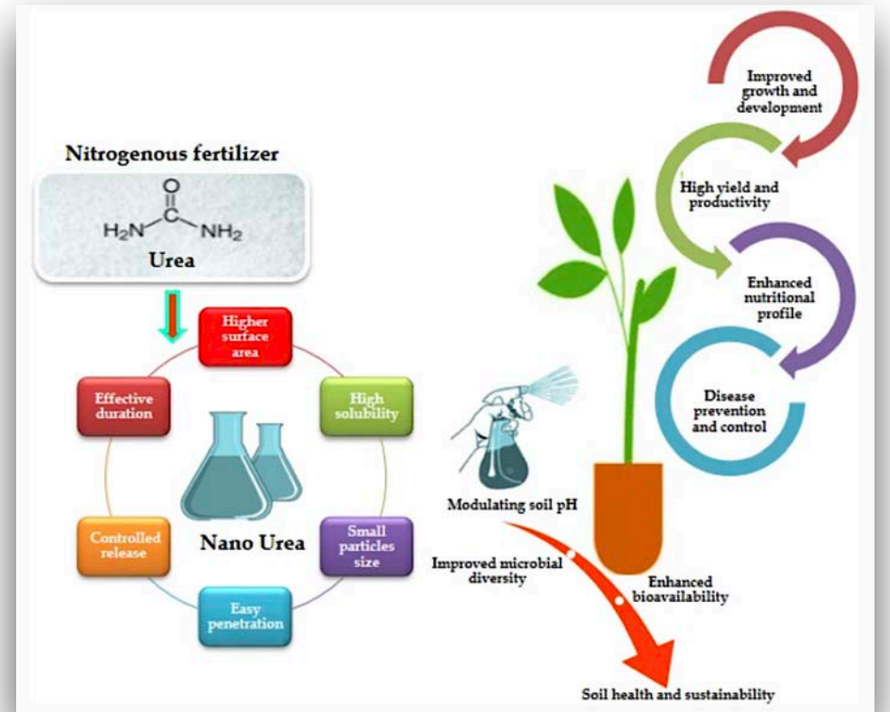
Info Improve understanding of nitrogen chemistry to improve fertilizer production efficiencies



https://www.pivotbio.com/

Bio
Enable/improve
plant nitrogen fixation
using biotechnology

Nano
improve fertilizer
use efficiency
using nano-scale
fertilizers

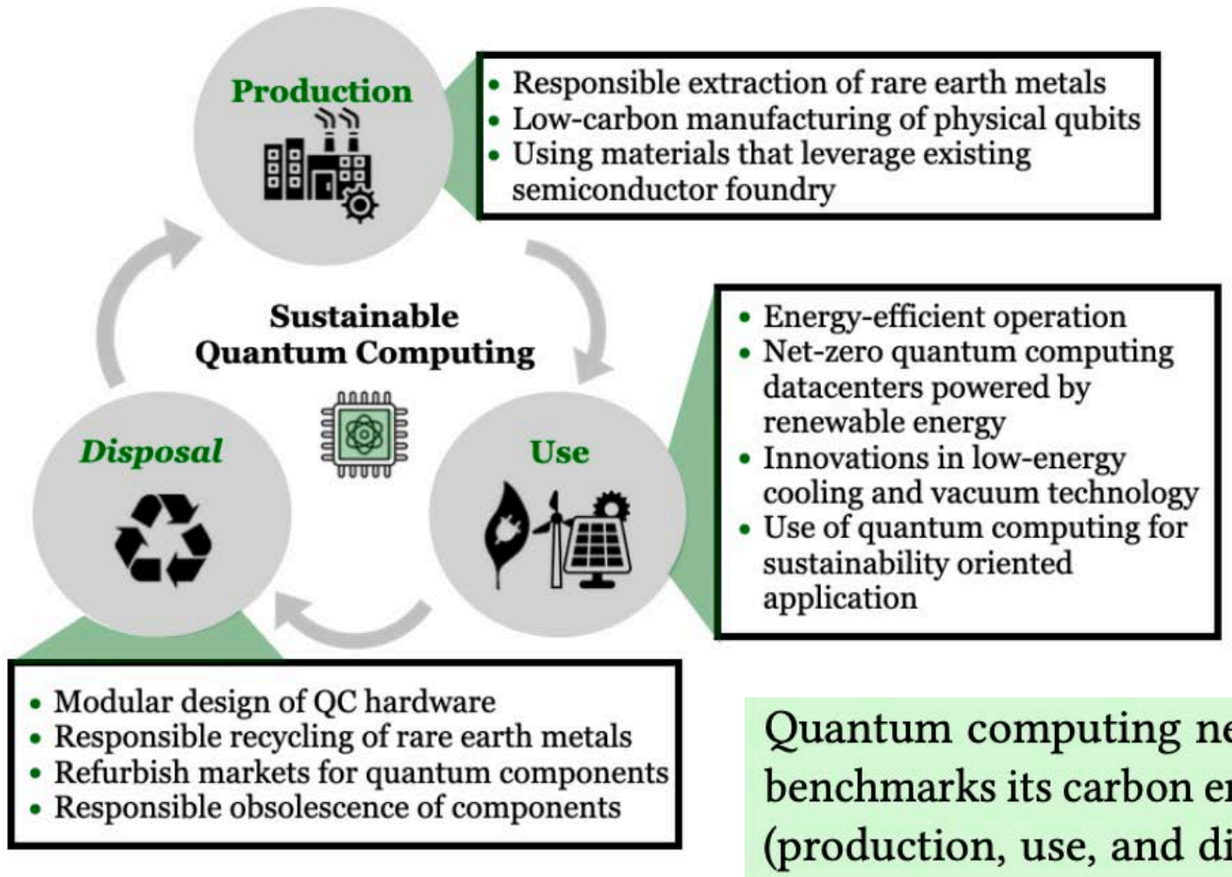


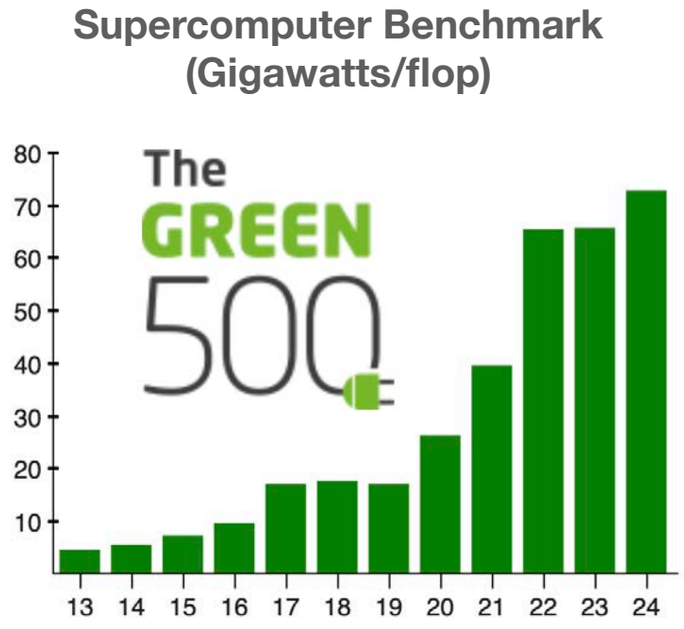
Jakhar, A.M. et al 2022. “Nano-fertilizers: A sustainable technology for improving crop nutrition and food security” *NanoImpact,* July.

5. Support Sustainable Quantum Computing By Design

The necessary next step for quantum and high-performance computing is sustainability, Northeastern experts say

In the qubit revolution, sustainability needs to be a forethought, not an afterthought.



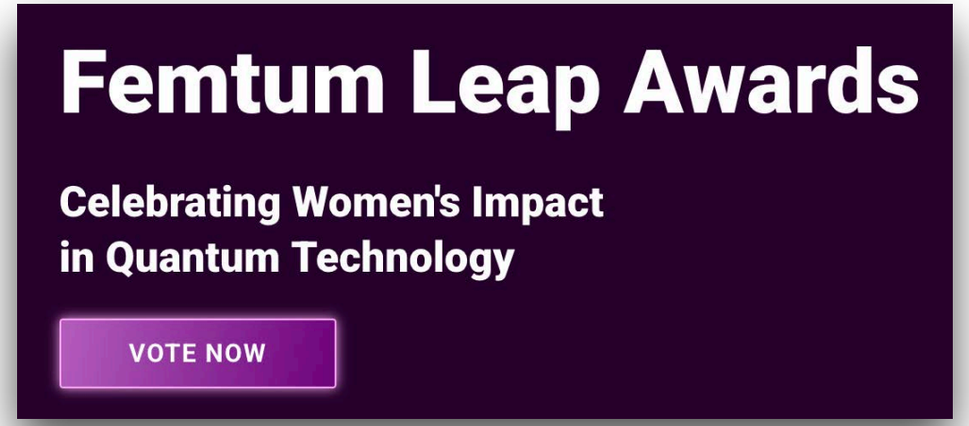


Quantum computing needs a **sustainability initiative** that benchmarks its carbon emissions throughout its entire life cycle (production, use, and disposal) and informs computing stack design decisions.

Arora, N. & Kumar, P. 2024. “Sustainable Quantum Computing: Opportunities and Challenges of Benchmarking Carbon in the Quantum Computing Lifecycle,” August 13. https://arxiv.org/pdf/2408.05679

6. Support Equitable Participation and Access

Assure equitable access to the environmental and other benefits of quantum computing and ensure diverse participation in research, development, commercialization, and use. Address Global South access.



QUANTUM ETHICS PROJECT

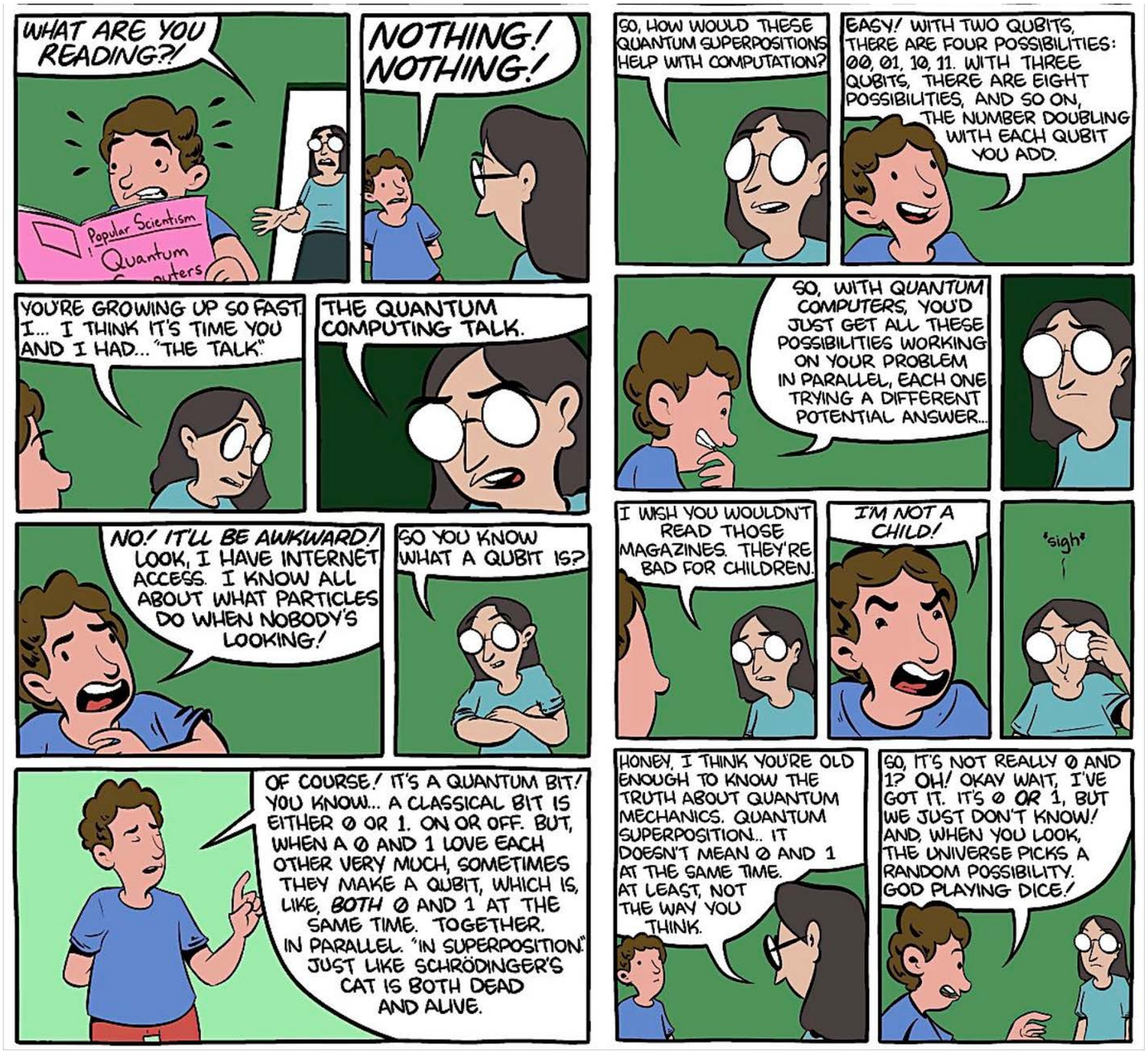
The hub for quantum enthusiasts from all walks of life to imagine an equitable quantum future

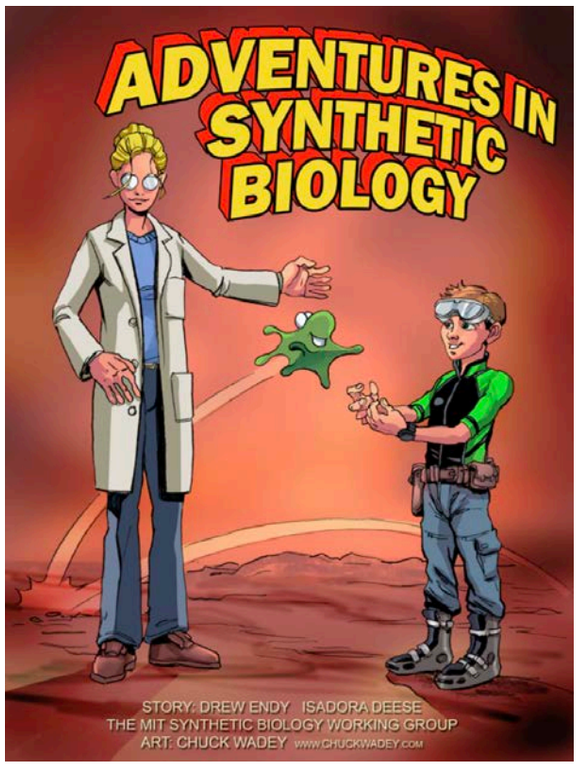
https://www.quantumethicsproject.org/

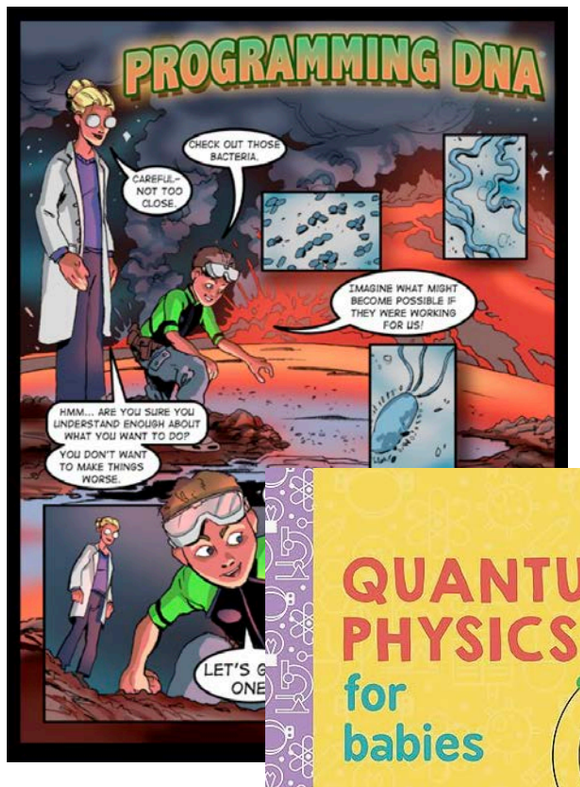
Qlimate is a quantum computing net zero initiative that aims to support large-scale decarbonization. Qlimate is backed by PsiQuantum. PsiQuantum will dedicate a substantial share of initial quantum computing capacity to high-impact sustainability applications, and we are building partnerships with corporates, governments, and non-profits to develop and scale end-to-end the most promising decarbonization solutions that could take years off the path to net zero.
https://www.qlimate.world/

Qlimate

7. Develop Alternative Engagement/Education Strategies







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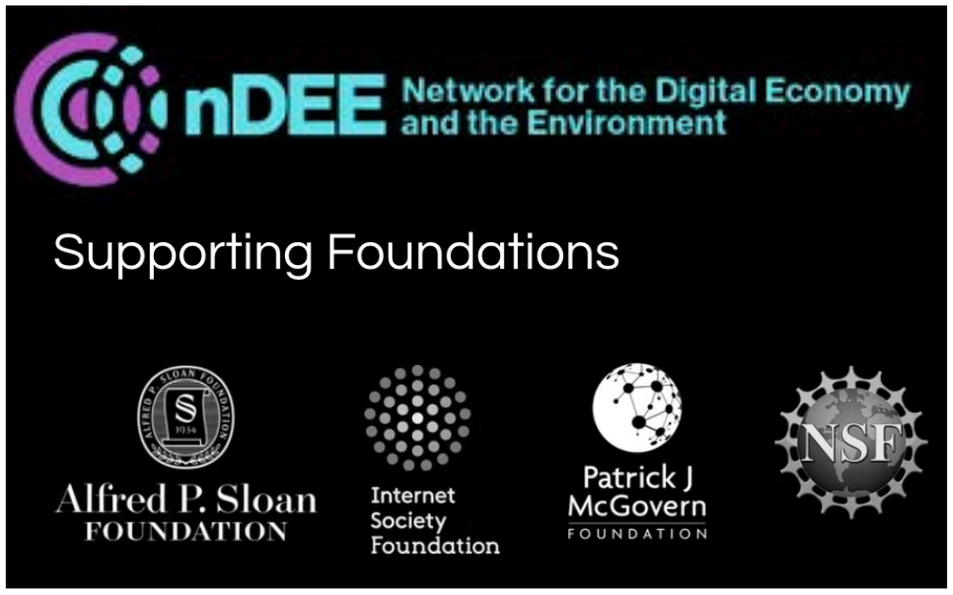

https://www.networkdee.org
https://ndeercn.org/directory/

Contact: dave.rejeski@gmail.com
rejeski@eli.org