

< WOMANIUM | QUANTUM >

Quantum Solutions Launchpad

# Empowering Executives to embrace QUANTUM COMPUTING

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Vardaan Sahgal

# About me



**Vardaan Sahgal**

- Software head at Womanium Quantum
- Lead - Quantum Solutions Launchpad
- IBM Qiskit Advocate
  
- Theoretical and software research background in quantum information theory and quantum computing.



[vardaan.sahgal@womanium.org](mailto:vardaan.sahgal@womanium.org)



[linkedin.com/in/vardaansahgal](https://www.linkedin.com/in/vardaansahgal)

# WOMANIUM

WOMANIUM works with leading US government agencies, national labs and companies to create the **scientific leaders of tomorrow** and **increase women in STEM+E**

2017

Founded in 2017 to build the next generation of scientific and entrepreneurial leaders

1100+

1177 scholarships awarded till date

80+

Womanium's training has impacted participants across 88 countries

2019

AFAR Icon of Ageing Award 2019

2023

Quantum Computing and Sensing Training Programs  
Quantum Solutions Launchpad



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\$36B

## Global public investments

The global quantum effort leading to research and innovation in quantum science and technology is continually rising with current worldwide investments exceeding \$36 billion. Overall, the global quantum technology market is projected to reach \$42.4 billion by 2027.

~Qureca

97%

## Believe in Quantum

Nearly all (97%) of the 501 executives surveyed expect quantum computing to disrupt their sectors to a high or moderate extent.

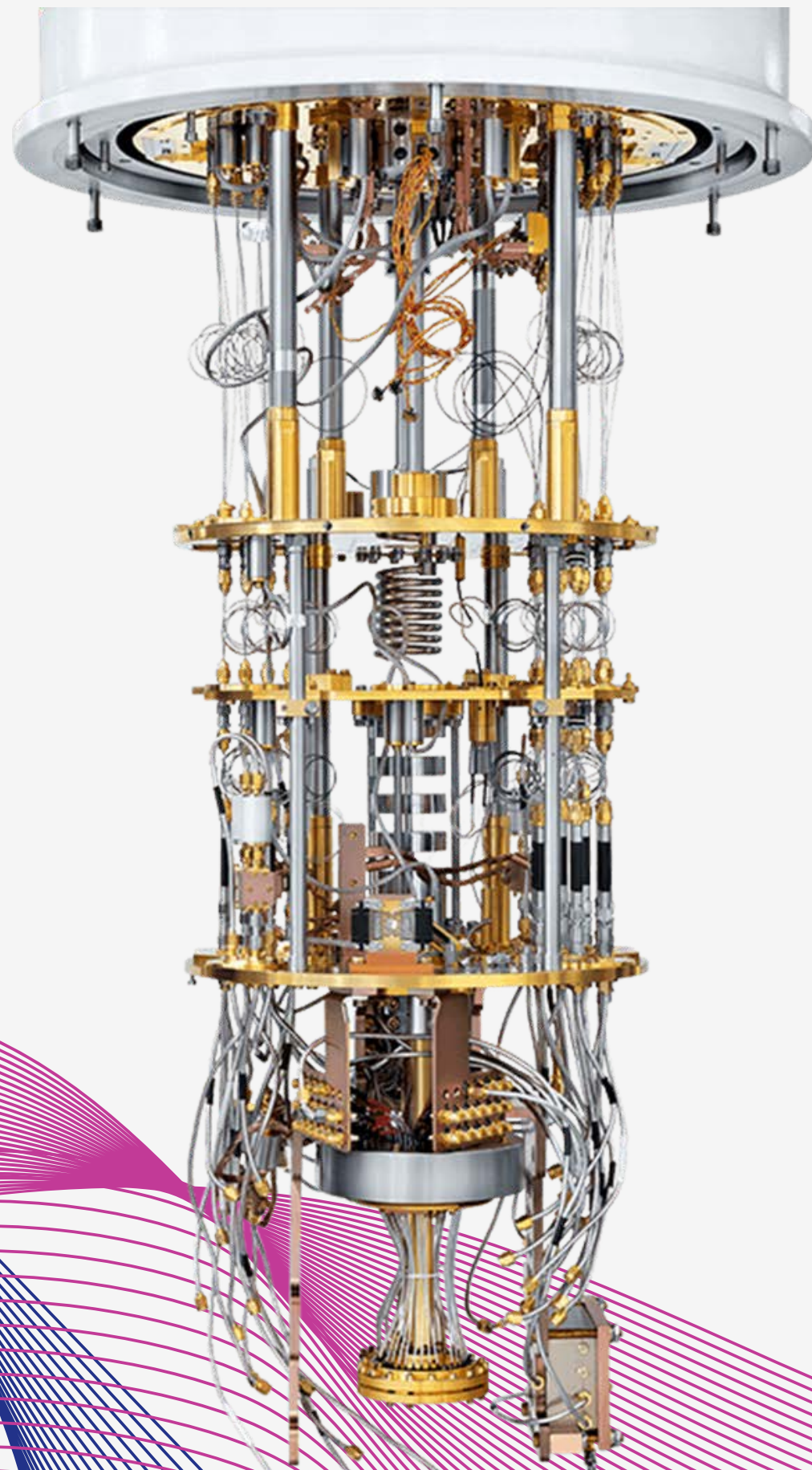
~EY



Quantum Computing Stack

Full Stack Providers

Focus Providers



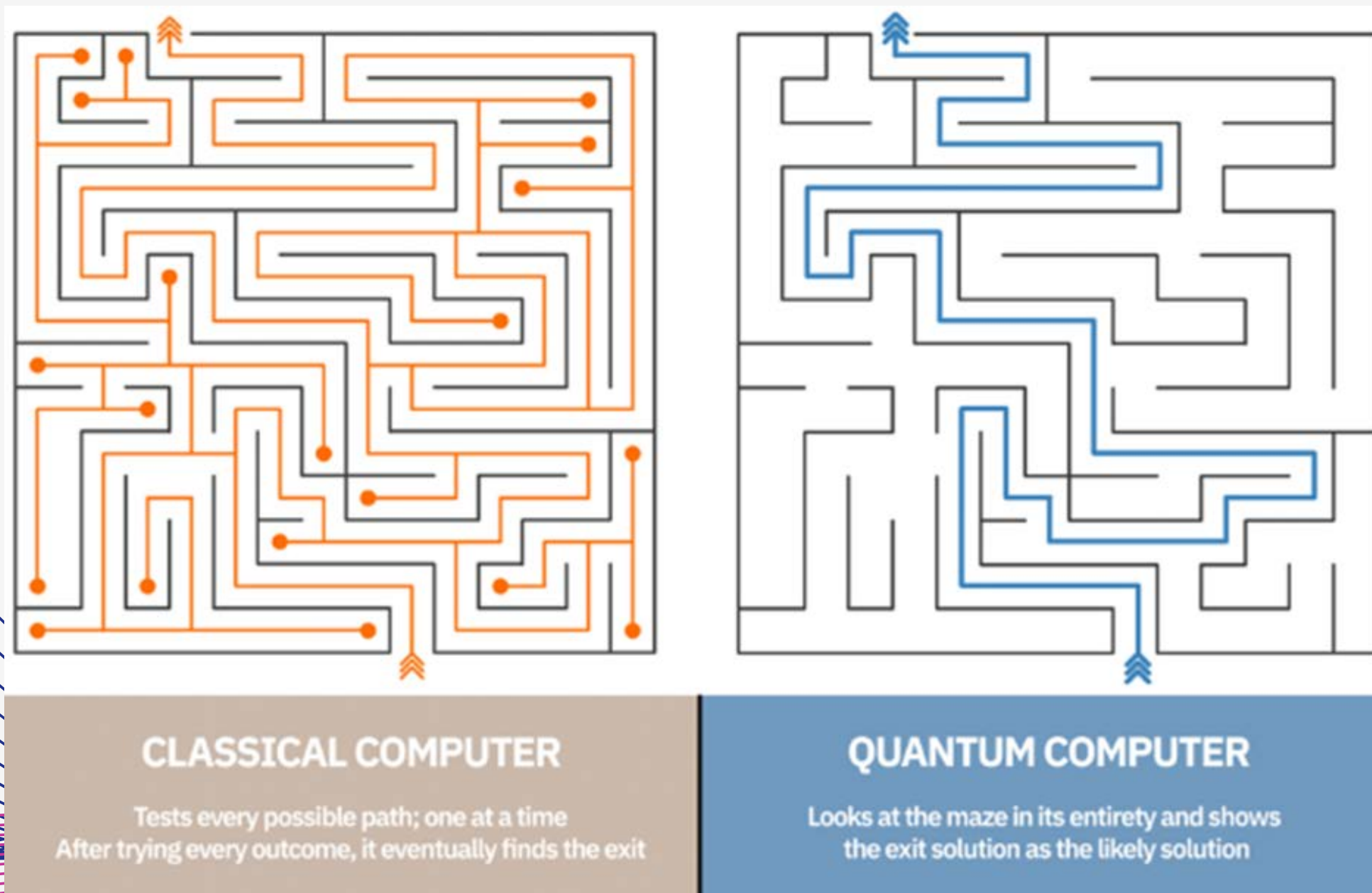
# What is QUANTUM COMPUTING?

Unlike classical computing, which relies on bits that can only exist in one of two states (0 or 1), quantum computing leverages the principles of quantum mechanics to create qubits that can exist in multiple states simultaneously. This allows quantum computers to perform calculations at a speed that is exponentially faster than classical computers.

~ Rigetti

# What is QUANTUM COMPUTING?

Quantum Computing exploits various quantum effects that allows quantum computers to perform many calculations at once, making them exponentially faster than traditional computers





# QUANTUM COMPUTING?

# QUANTUM COMPUTING?



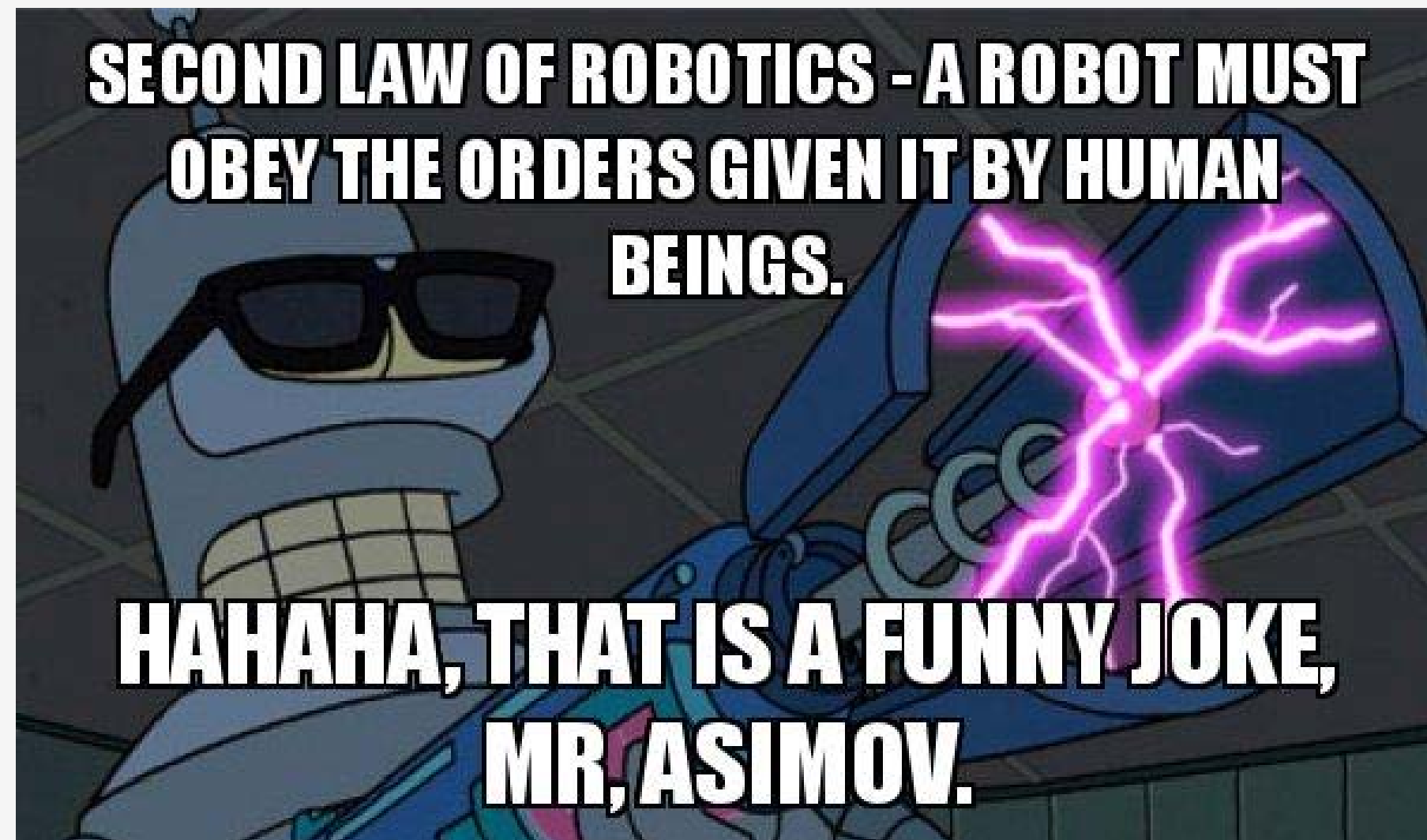
# QUANTUM COMPUTING?



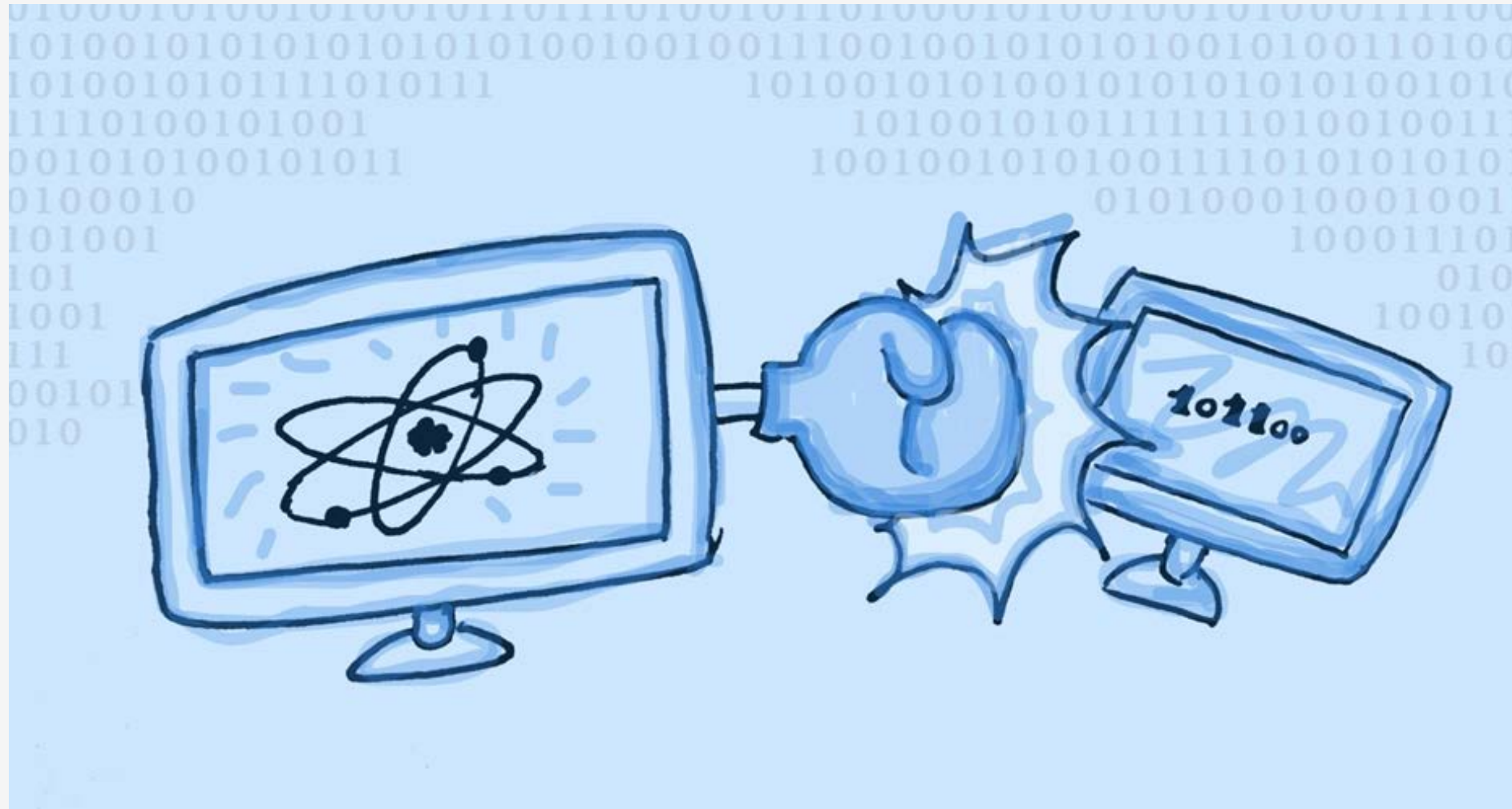
# QUANTUM COMPUTING?

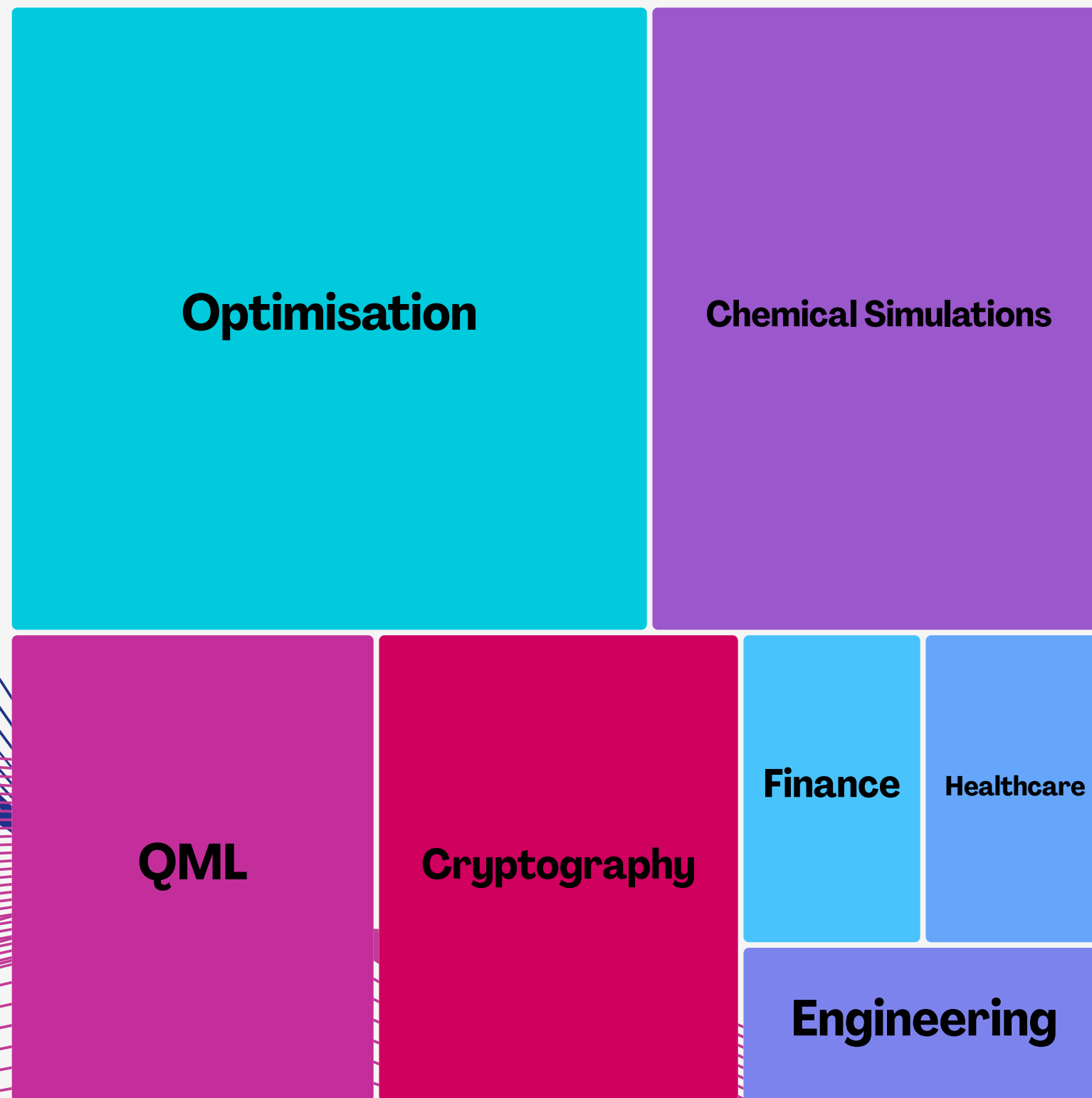


# QUANTUM COMPUTING?



# Quantum and Classical are bound to co-exist





# Market APPLICATIONS

While the potential applications of quantum computing are vast, the technology is still in its early stages and faces significant technical challenges. However, as the technology continues to evolve, it has the potential to transform industries ranging from finance to healthcare by enabling new levels of optimization and innovation.

Qualitative estimate of expected value unlocked by the application of quantum computing by 2030



		Industries						
		Life sciences	Financial services	Travel, transport, and logistics	Global energy and minerals	Telecommunications, media, and technology	Advanced industries	Insurance
Algorithm archetypes	Simulation	High-value	Medium-High	Medium	Medium-Low	Low-Medium	Medium	High-value
	Linear algebra for AI/machine learning	High-value	High-value	Medium	Medium-High	Low-Medium	Low	Medium-High
	Optimization and search	High-value	High-value	High-value	High-value	High-value	High-value	Medium
	Factorization	Low-Medium	High-value	Low-Medium	Low-Medium	High-value	Low-Medium	Medium

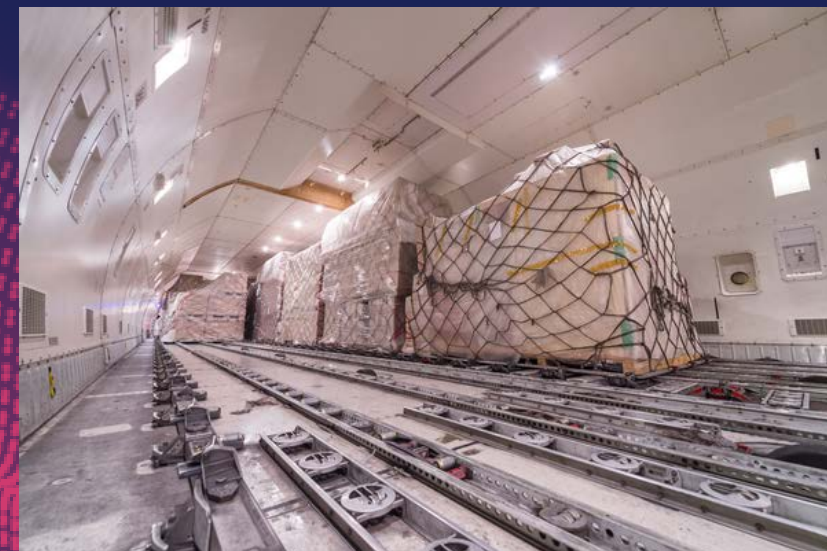
~ Mckinsey



# Case Study

## QUANTUM OPTIMISATION

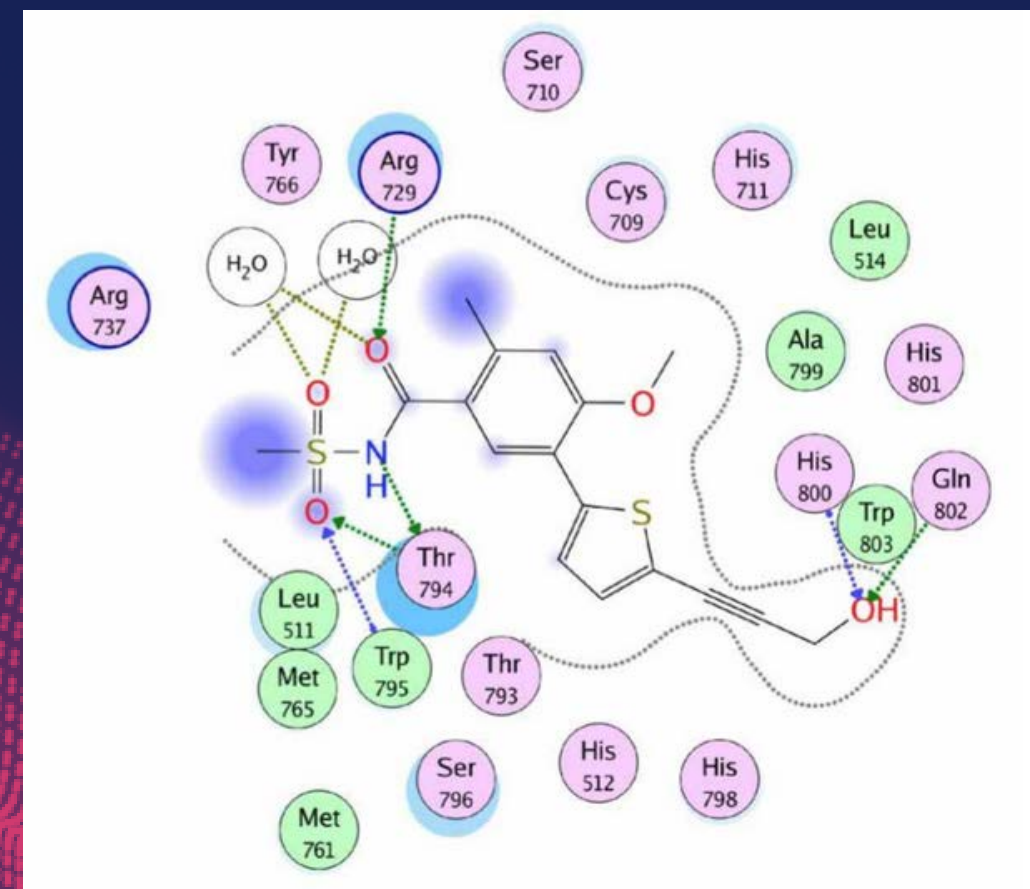
- Traffic optimization is one of the potential applications being explored by Volkswagen. Smart traffic management based on the performance capabilities of a quantum computer can provide effective support for cities and commuters.
- Quantum-South has found a solution to improve cargo loading plans by using a hybrid approach with quantum annealers to optimize cargo in the bellyhold of passenger aircraft.



# Case Study

# DRUG DISCOVERY

Quantum computers are able to simulate molecular interactions much more accurately than traditional computers, allowing for the rapid identification of potential new drugs. In fact, Fujitsu is already using quantum computing along with its Digital Drug Platform. This kind of breakthrough has the potential to revolutionize the pharmaceutical industry and improve patient outcomes.



~ Fujitsu

~ Yokokawa et al. 2016

# Case Study

## FINANCE

Earlier this year, JPMorgan Chase, QC Ware and the University of Paris successfully developed and used deep reinforcement learning algorithms and quantum computing to improve on their deep hedging model. Today's prototype quantum computers aren't powerful enough to run large and useful financial applications like this. However, despite technical limitations, today's quantum machines don't restrict the development and testing of quantum algorithms.



≡ Forbes

FORBES > INNOVATION > CLOUD

## JPMorgan Chase And QC Ware Collaborate On Quantum Finance Breakthrough In Deep Hedging

Paul Smith-Goodson Contributor  
Moor Insights and Strategy  
Contributor Group @

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0

May 22, 2023, 02:23pm EDT

# Case Study

## PQC & SECURITY

- Id Quantique has been an early adopter of quantum cryptography, showcasing an experimental project in as early as 2007.
- Softbank in a collaboration with SandboxAQ recently announced the successful completion of combining classical encryption algorithms with Post Quantum Cryptography (PQC). The hybrid approach allows for security against quantum computer attacks without degrading the security that has been guaranteed by classical cryptography until now.

### Geneva Vote Will Use Quantum Cryptography > First real-world use of physics-based encryption

BY MORGEN E. PECK | 01 OCT 2007 | 2 MIN READ |

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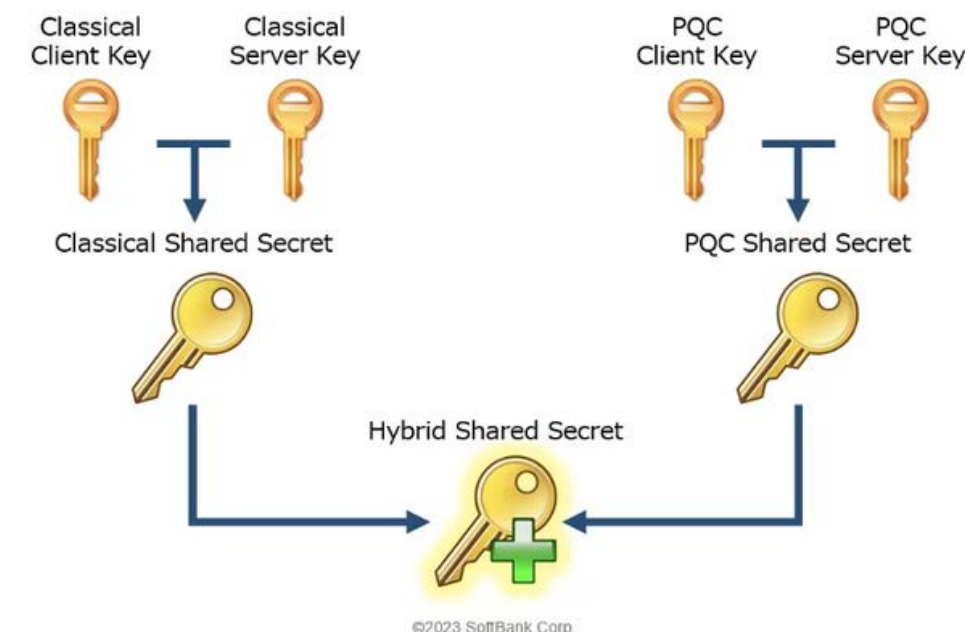
TAGS

NETWORKS ENCRYPTION

QUANTUM NETWORKS

16 October 2007—A system that produces unbreakable encryption based on the quantum properties of light will be used to secure the electronic transmission of votes in a Swiss election next week. Grégoire Ribordy, CEO of Geneva-based id Quantique, the company that built the system, considers it to be the first real-world use of quantum cryptography and a major

### Quantum-safe Hybrid Key



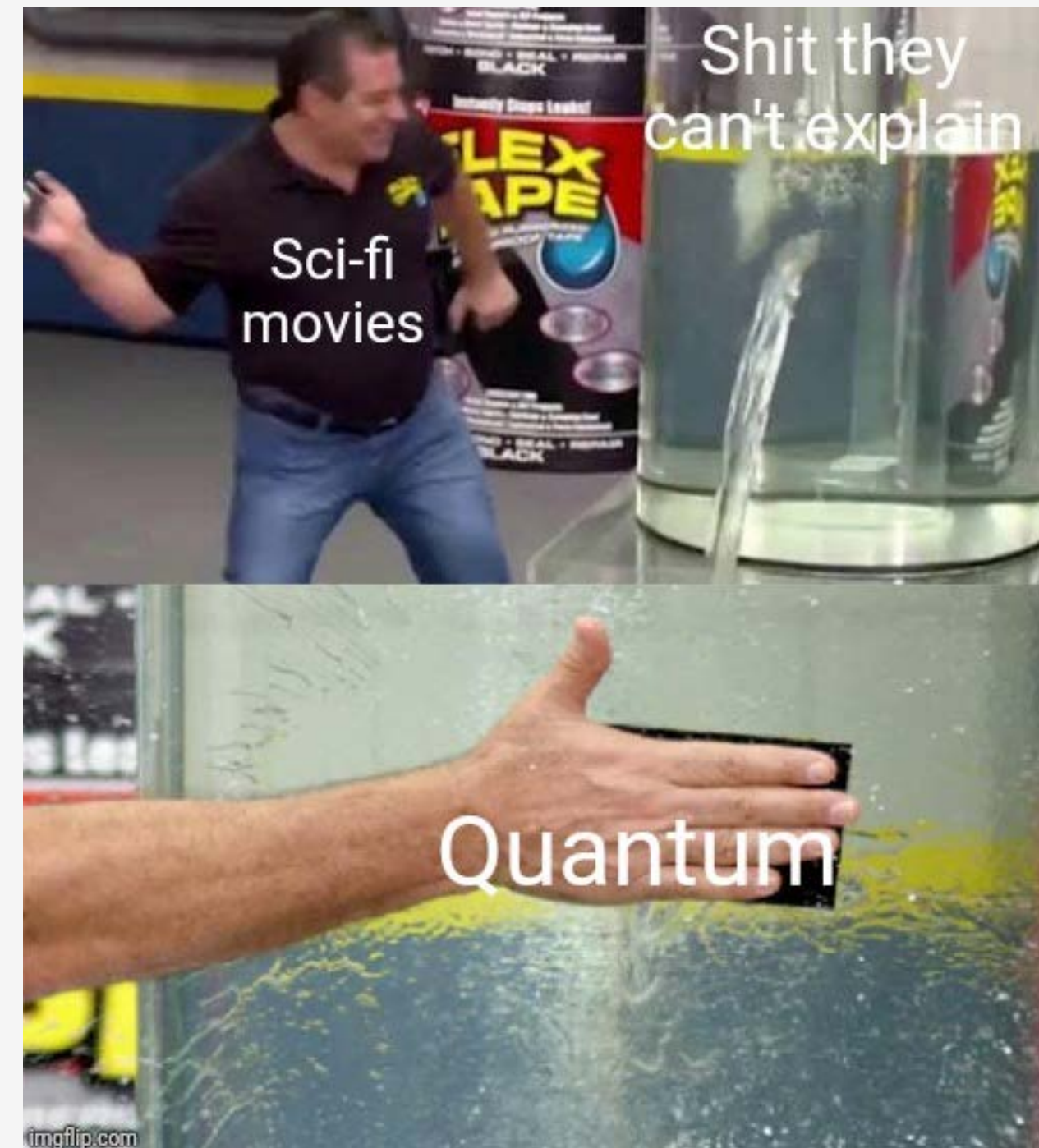
~ IEEE

~ thequantuminsider

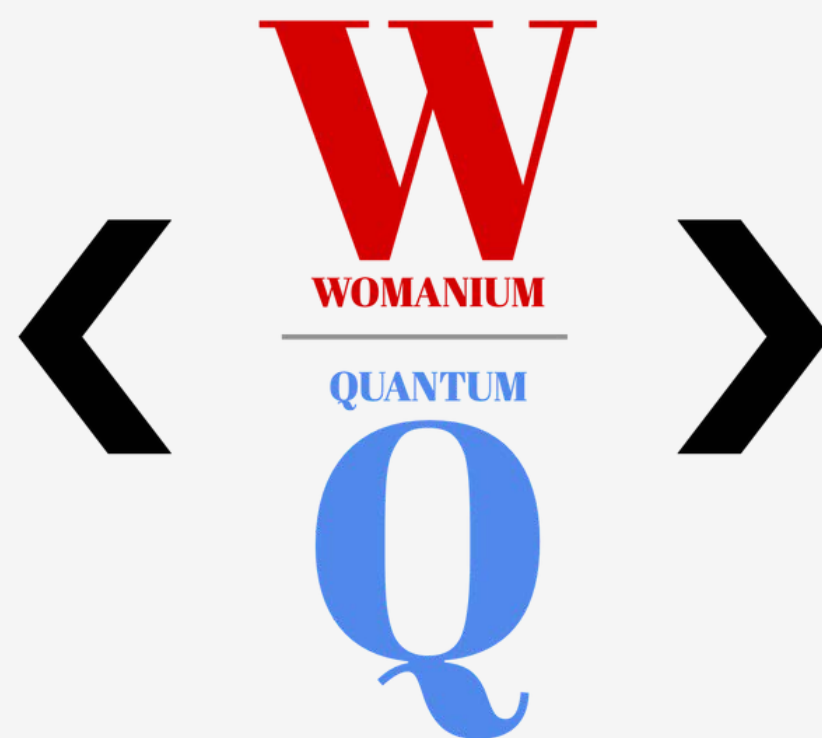
# Next steps for EXECUTIVES

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**Get  
READY !**



**Get  
READY !**



## Workforce Training Program

Our flagship global quantum training program, annually providing an advanced quantum training to over 2000+ participants, ranging across 80+ countries.

- Month long program, intensive quantum training
- Best suited for students and technical professionals aspiring of a career in quantum
- [Register Now!](#)

## Executive Education

On-demand quantum education modules, customised to the needs and requirements of executives.

- Short, fast-paced, bootcamp style quantum training
- Best suited for Executives, Government Leaders, Investors, Policymakers
- Let's discuss more - get in touch with us now!

## Quantum Solutions Launchpad

Full stack quantum computing solutions - tailor made for your business.

- Take the first step and get started with quantum.
- Let's discuss more - get in touch with us now!

# Why partner with QUANTUM SOLUTIONS LAUNCHPAD

01

## Global Workforce

You get access to a truly global remote workforce. We handpick the best team possible, specific to the project requirements. The shortlisted team works exclusively on your project - for you!

03

## Budget Friendly

We are a non-profit, and hence 100% of the funds we receive are directed towards student scholarships and training the next generation of quantum workforce.

02

## Unbiased Opinion

We proudly position ourselves in an open quantum eco-system, such that we can provide an honest and un-biased of the various market players - and help you make the right decision on getting started with quantum.

04

## Complete Ownership

You own the complete IP rights to the quantum solution developed as a part of the Quantum Solutions Launchpad.



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**Quantum Solutions Launchpad**

# CONTACT

**Vardaan Sahgal**



**[vardaan.sahgal@womanium.org](mailto:vardaan.sahgal@womanium.org)**



**[linkedin.com/in/vardaansahgal](https://www.linkedin.com/in/vardaansahgal)**

