



# EQUINOX

AI&DATA LAB





# Quantum Strategy

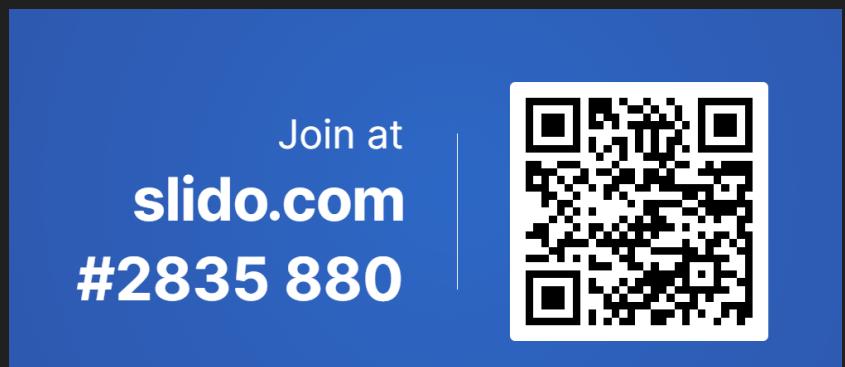
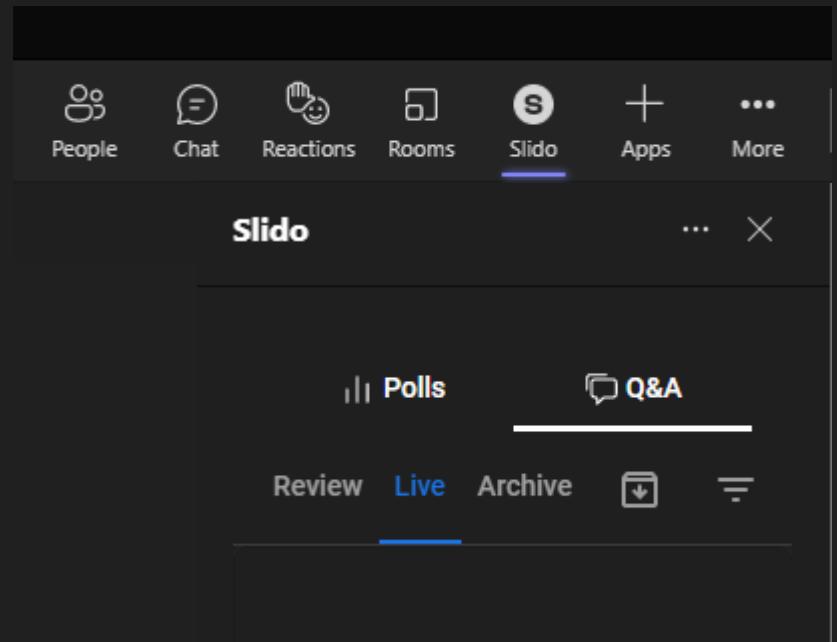
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Bringing QC into the business



# QnA

- We use Slido for Q&As and polls
- Teams app users can see Slido at the bottom of the meeting
- Web users can go to [slido.com](https://slido.com) and enter the number **#2835880**





**What does a company need to incorporate quantum computing into its business operations?**

- ① Start presenting to display the poll results on this slide.

# Quantum Strategy Contenido

- 1.The Quantum Mindset
- 2.Developing Capabilities
- 3.Project Development
- 4.Additional Considerations



# The Quantum Mindset

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# quantum mindset

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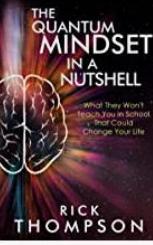
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The Quantum Mindset in a Nutshell: What They Won't Teach You in School That Could Change Your Life  
by Rick Thompson | 16 Nov 2019  
[★★★★★ 10 reviews](#)

[Kindle Edition](#)  
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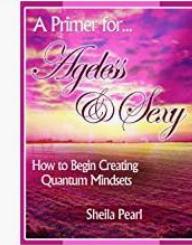
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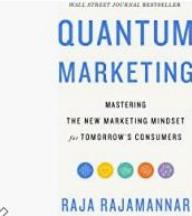


The Quantum Mindset  
by Cori Schuman  
[Podcast](#)  
£0<sup>00</sup>



A Primer for Goddess & Sexy: How to Begin Creating Quantum Mindsets  
by Sheila Pearl | 1 Feb 2012  
[★★★★★ 1 review](#)

[Kindle Edition](#)  
£2<sup>29</sup> £2.99  
Available instantly



Quantum Marketing: Mastering the New Marketing Mindset for Tomorrow's Consumers  
by Rajamannar and Raja | 1 Apr 2021  
[★★★★★ 197 reviews](#)

[Hardcover](#)  
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About 6,830,000 results (0.45 seconds)

<https://www.amazon.co.uk/Quantum-Mindset-Nutshell...> [The Quantum Mindset in a Nutshell: What They Won't ...](#)

The **Quantum Mindset** in a Nutshell teaches us that anything we can imagine is considered possible. This isn't cliché New Age fantasy, but in fact, ...  
[★★★★★ Rating: 4.6 · 10 reviews](#)

<https://www.amazon.co.uk/Quantum-Mindset-Nutshell...> [The Quantum Mindset in a Nutshell: What They Won't ...](#)

The **Quantum Mindset** in a Nutshell teaches us that anything we can imagine is considered possible. This isn't cliché New Age fantasy, but in fact, these ...  
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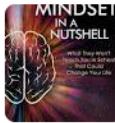
## People also ask

What is a quantum thinker?

What is Quantum mind theory?

What do you mean by quantum?

Do humans have quantum?



Feedback

[https://en.wikipedia.org/wiki/Quantum\\_mind](https://en.wikipedia.org/wiki/Quantum_mind) [Quantum mind - Wikipedia](#)

The **quantum** mind or **quantum** consciousness is a group of hypotheses proposing that classical mechanics cannot explain consciousness.  
[Approaches](#) · [Penrose and Hameroff](#) · [Criticism](#) · [Conceptual problems](#)

<https://blackwells.co.uk/bookshop/product/The-Q...> [The Quantum Mindset in a Nutshell: What They Won't Teach ...](#)

The **Quantum Mindset** in a Nutshell teaches us that anything we can imagine is considered possible. By using quantum insights to align your attitudes, ...

<https://projectqsydney.com/time-crystals-and-the-qua...> [Time Crystals and the Quantum Mindset - Project Q](#)

17 Aug 2021 — Instead of a Classical worldview, what I'm advocating is a '**quantum mindset**'. A mindset where the banal past-present-future trope has been ...

# What is the Quantum mindset?

## Quantum Mindset - A Definition

*The quantum mindset is the collective mentality of an organization that allows it to harness the power of quantum technologies as a crucial enabler of its 'why'.*

A set of guiding principles for any organisation that wants to use quantum advantage to achieve their goals

Collective: applies at every level of the company



[Becoming a Quantum Company – Quantum Strategy Institute](#)



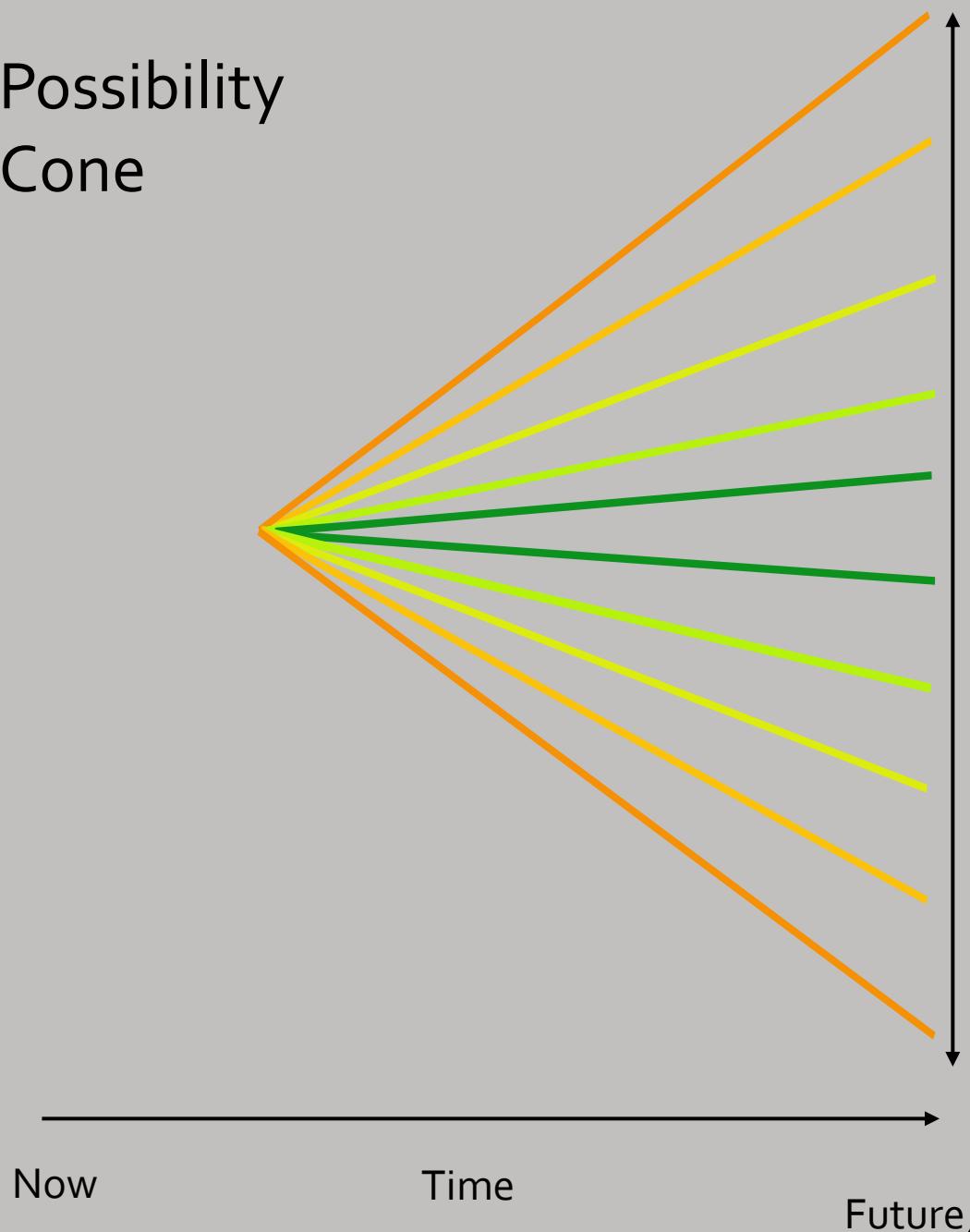
# Risks & uncertainty

- QC is an emerging technology
- Difficult to predict when powerful QC might become available, or how it will perform in the real world
- Risk from overpromising and underdelivering – exaggerated expectations
- **Quantum Winter:** QC fails to provide a meaningful advantage causing a period of low public interest, funding
- **Quantum mindset:** needs have risk awareness & good communication

[What if quantum computing faces a winter? \(slate.com\)](https://slate.com/technology/2018/01/what-if-quantum-computing-faces-a-winter.html)



## Possibility Cone



- Project succeeds first time, industry outperforms expectations
- Project requires a few attempts, industry progresses at stable rate
- Project doesn't succeed, but other projects are successful
- Industry fails to make any progress  
  > **Quantum Winter**



# THE EMOTIONAL JOURNEY OF CREATING ANYTHING GREAT

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This is the best idea ever!!

This will be fun

This is harder than I thought

This is going to be a lot of work

This sucks I have no idea what Im doing

Belief/Persistence

Family+Humour

Dark swamp of despair

#%@}!!!!!!....

This is one of the things I am most proud of

Family+Humour

1

Wow

Hey!

Hmm...

Quick, let's call it a day and say we learned something

Ok but it still sucks

THE EMOTIONAL JOURNEY IS INEVITABLE AND PERHAPS NECESSARY

# Itaú Quantum Initiative

24

IEEE ENGINEERING MANAGEMENT REVIEW, VOL. 50, NO. 1, FIRST QUARTER, MARCH 2022

## Managing a Quantum Computing Team—Insights and Challenges at Itaú Unibanco

- Started with a small budget in 2020
- Assembled a team of experts from outside the company
- Current project is a risk analysis proof of concept
- Collaborating with QCWare- a software provider with access to QC

"challenges of her role and aims of the quantum initiative required convincing of sceptical managers."

"They shifted from an awareness raising process to build capacity through education and training."

"more than 100 people learning and participating in internal events"

"in innovation, their superiors do understand that successful results are not always achieved in research"



A photograph of a wooden roof truss structure against a clear blue sky. The trusses are made of light-colored wood beams forming a complex geometric pattern. A small yellow rectangular graphic is located in the top left corner.

# Developing capabilities

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# Developing Capabilities

- Industry is new and dynamically evolving
- Staying up-to-date requires constant upskilling
- Quantum skills are very rare in industry- **biggest challenge** for industry
- By considering quantum as a part of a pipeline, we can upskill existing engineers & data scientists
- **Collective mindset:** Business awareness & technical skills will be required for a successful project



# Different approaches

- There is no universal quantum strategy for all businesses
- The approach used depends on a few factors:
  - Relevance of quantum to your industry
  - Size of R&D budget
  - Level of risk tolerance
  - Timescales



# Big pharmaceutical company

- Quantum very relevant
- Large R&D budget
- Significant value from marginal improvement
- Can take risks on emerging industry
- Established companies have long timeframes (10+ years)

## Approach:

- Hire PhDs in quantum
- Establish relationships with big players
- Invest in proof of concept project very early
- First to publish results

# Medium software development company

- Quantum may be relevant
- More limited R&D budget
- Some risk can be taken
- Short-term profitability needs

## Approach:

- Monitor the industry
- Upskill existing software developers
- Dedicate smaller budget, but carry out over longer period
- Build on work others have already done



## 10 WAYS TO ADDRESS TALENT SHORTAGES IN THE QUANTUM FIELD

BRIAN LENAHAN, QSI FOUNDER & CHAIR

1. Attend quantum courses and **create connections** with your cohort of students



2. Engage in quantum **internships**



3. Sponsor PhD's prior to graduation



4. **Reskill** conventional software programmers



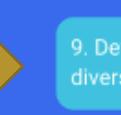
5. Find talent from **other jurisdictions** and countries



6. Interview and train **internal resources** who are **quantum-curious / passionate**



7. Establish relationships with **quantum educational organizations / universities**



8. Play **the long game** creating a quantum talent pipeline



9. Develop **LinkedIn networks** adding diverse role connections



10. Establish relationships with **quantum recruiting organizations**

Big pharmaceutical company

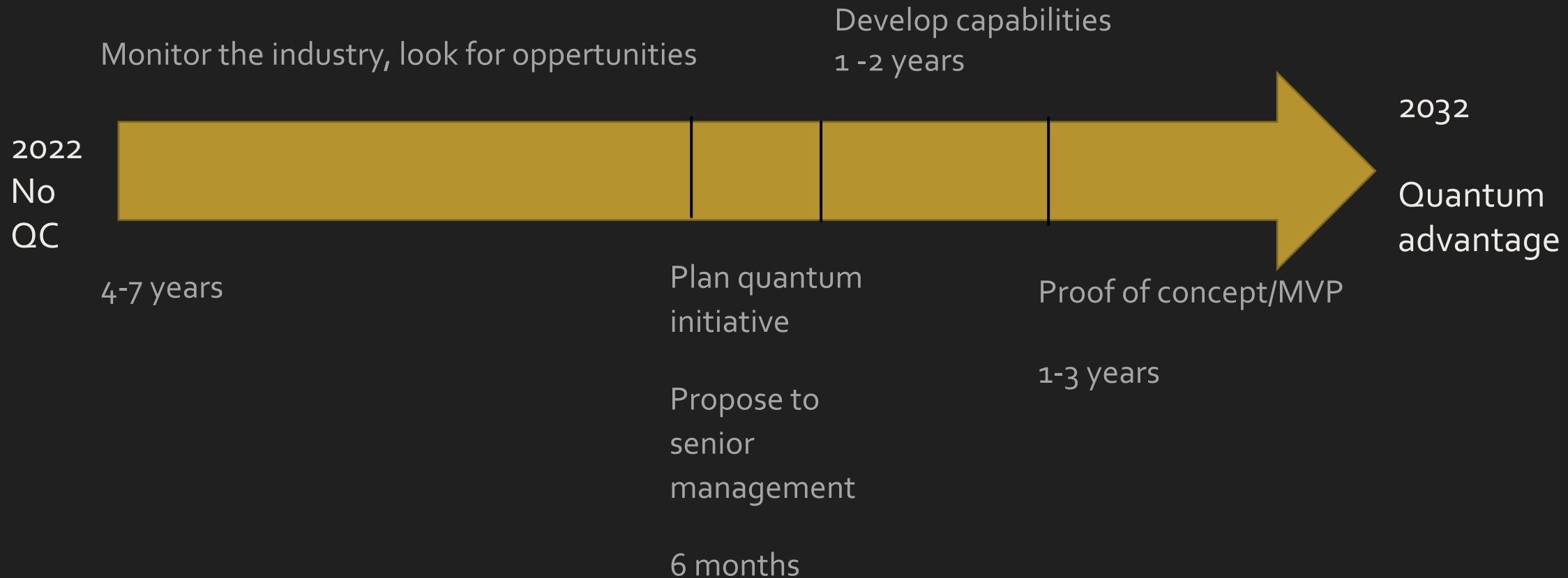
Medium software development company

Source: Quantum Strategy Institute



# Example timeline

Let's assume QC will mature for your area in 10 years, what should you do & when?



# Business Awareness



- ✓ These business courses offer a good overview of the industry
- ✓ Webinars on industrial applications
- ✓ Networking events
- ✓ Following news updates



# Technical development

- Unreasonable to expect everyone to need a PhD in physics to work with quantum computing
- 5 Colombian universities offer at least 1 course in QC
- Possible to develop the technical skills without a physics/computer science background
- Learning can work well as a group & with a playful hands-on approach
- We don't need QC to learn quantum computing- simulators can work for small QCs (up to 30 qubits)



# What is needed for QC?

Breaking the journey into manageable chunks, teach over a longer period

1. Basic principles & maths
2. Fundamentals of quantum circuits
3. Quantum algorithms
4. Projects/ hackathons (applied)

Awareness of trends in literature

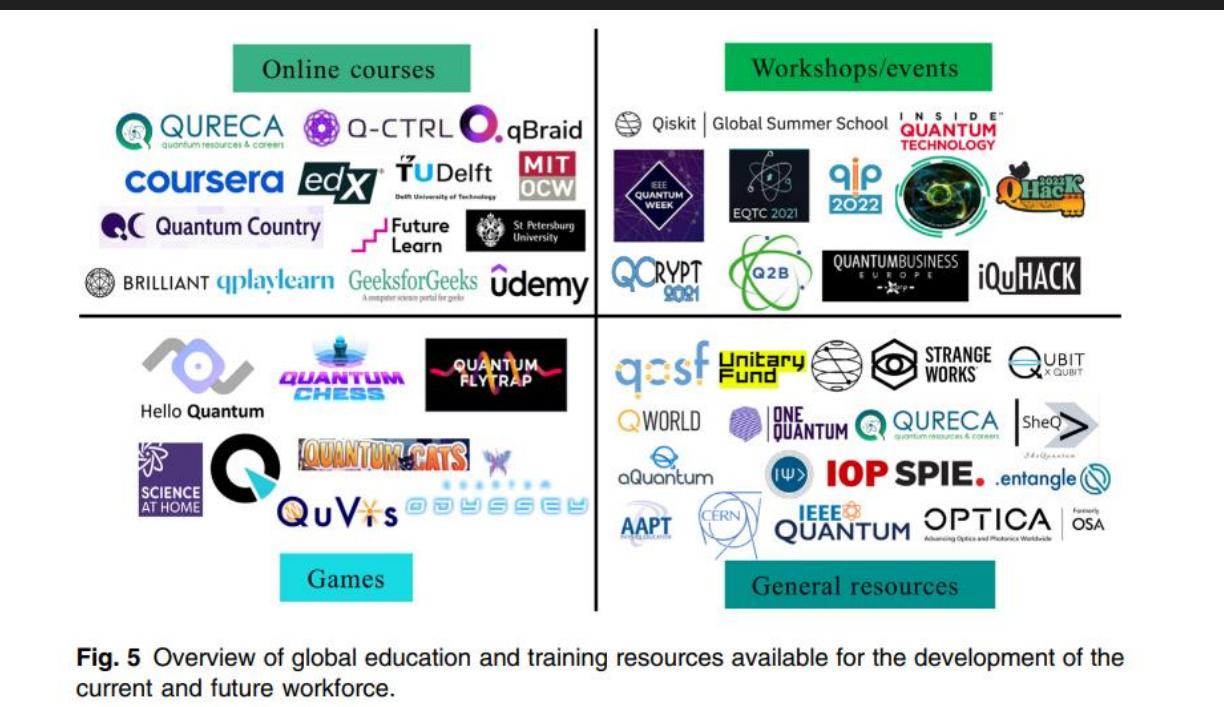


## REVIEW

# Defining the quantum workforce landscape: a review of global quantum education initiatives

Maninder Kaur<sup>id\*</sup> and Araceli Venegas-Gomez<sup>id</sup>

QURECA (Quantum Resources and Careers), Glasgow, Scotland, United Kingdom



[Defining the quantum workforce landscape  
review of global quantum education initiatives  
\(spiedigitallibrary.org\)](https://spiedigitallibrary.org)



# Project Development



# Identifying Opportunities

- Don't know where QC will make the biggest impact
- Look at projects in industry & take inspiration
- People familiar with quantum can have new insights
- Companies who innovate/experiment are well-suited



# Projects

- QC needs to work with existing skills to integrate into projects
- Need for data engineers, data scientists & designers
- QC specialists will also need to understand details of the problem and work with those who work in that area
- Communication between stakeholders is vital



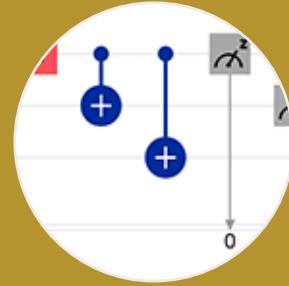
# Collaborative Development



QC provider

Access to hardware

System specific knowledge



Quantum solution  
developer

Quantum algorithms

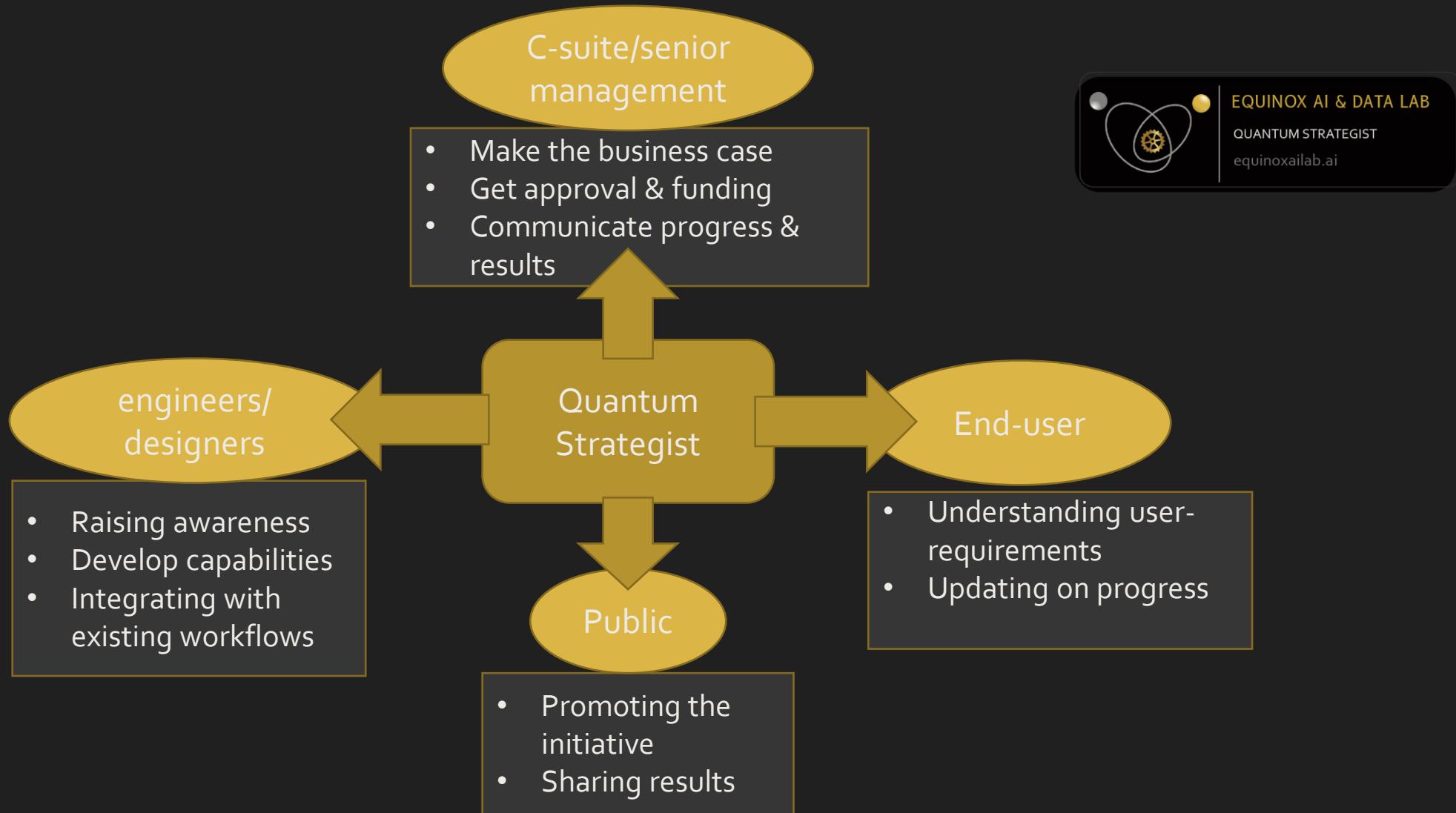


Client

Domain specific  
knowledge & expertise



# Quantum Strategist



# Additional considerations



# Additional considerations

- Those of us working in the industry really want it to succeed – **can lead to bias**
- Early success it to be celebrated so long as there is transparency in communication
- A wonderful community to engage with
- QC is very fun to learn (and teach)

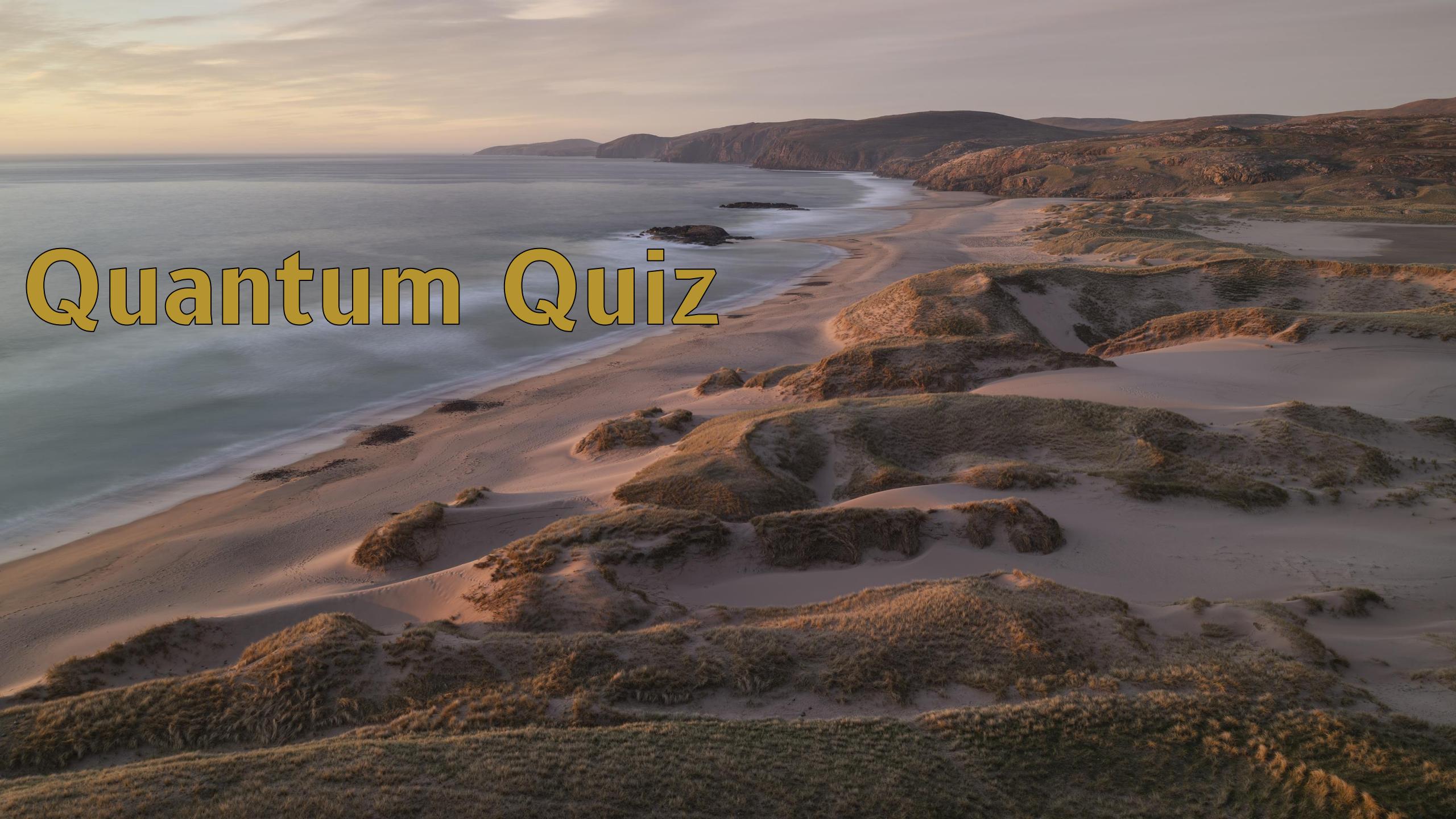


# Summary of the course

- B1: Introduction
  - What is QC
  - What you should know about QC
- B2: Applications & Key players
  - How does QC add value
  - Which companies
- B3: Quantum strategy



# Quantum Quiz





**1. Which of these is the ideal QC form?**

ⓘ Start presenting to display the poll results on this slide.



**2. Which is not a barrier to scaling quantum computers?**

ⓘ Start presenting to display the poll results on this slide.



3. Which of these does a QC proof of concept require?

- ① Start presenting to display the poll results on this slide.



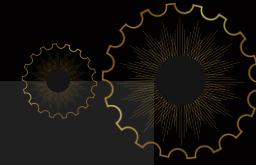
4. Which is not a threat to any quantum computing project?

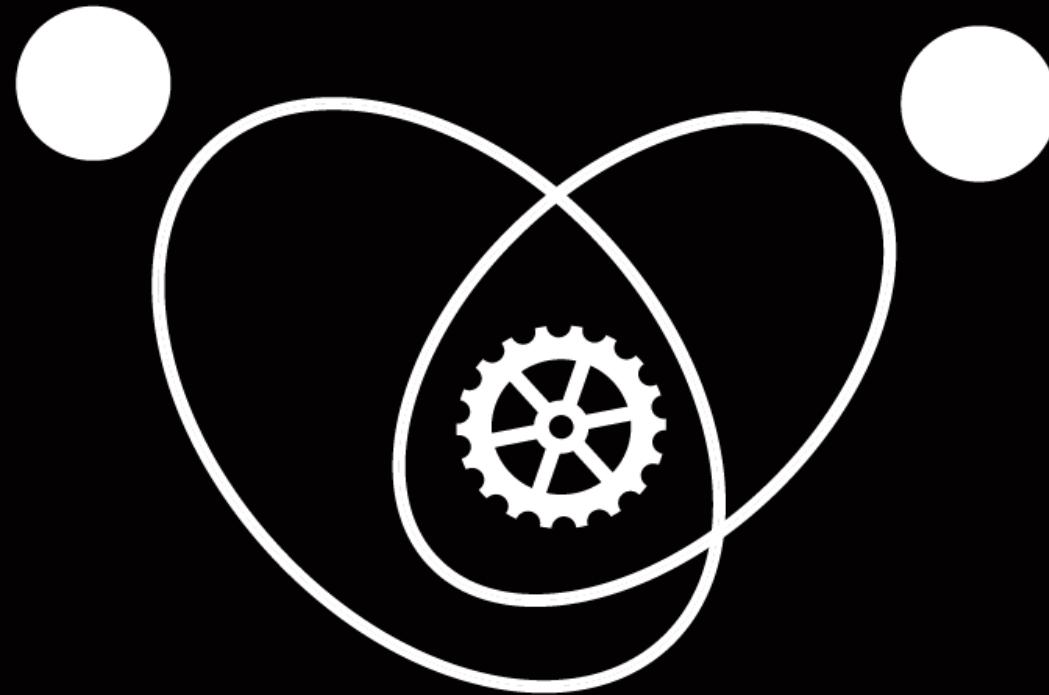
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# GRACIAS

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G R A C I A S





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