

## **EUROPEAN INNOVATION COUNCIL & QUANTUM TECHNOLOGIES**

The European Innovation Council (EIC) is a flagship initiative of the European Commission with a budget of over EUR 10 bn under the Horizon Europe Programme (2021 – 2027). The EIC solicits the most ambitious ideas of thousands of startups and research teams from across Europe, and supports the best ideas at each stage of the innovation chain.



# MORE THAN €10 BILLION TO SUPPORT DEEP TECH INNOVATION IN EUROPE



## EIC PRIZES

- Women innovators
- Capital of innovation
- Innovation procurement
- Social innovation



## SEAL OF EXCELLENCE

- Fast track to other funding

## EIC ACCELERATOR

- For single companies
- Grants up to **€2.5 million**
- Equity up to **€15 million** or above
- To enter the market and scale-up (TRL 6-9)



## BUSINESS ACCELERATOR SERVICES

- Mentors, coaches
- Global partners
- Innovation ecosystems
- EIC Community Platform



## EIC TRANSITION

- For consortia and single companies
- Grants up to **€2.5 million**
- To develop business cases (TRL 4-6)

## EIC PATHFINDER

- For consortia
- Grants up to **€4 million**
- To research technology breakthroughs (TRL 1-4)

### European Innovation Council & Quantum Technologies

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*To date, the EIC has supported a portfolio of over 1 600 startups that have helped generate 12 deep tech Unicorns and 112 Centaurs here in Europe. EIC companies have attracted over EUR 10 bn of follow-on investment and the valuation of the EIC portfolio of companies stands at over EUR 40 bn. Further, the investment agreements signed to date by the EIC Fund have leveraged over 3 EUR of additional, generally private, investment for 1 EUR of equity invested by the EIC with an average EIC Fund ticket size of EUR 6 million, with a number of investments in the upper range (EUR 10-15 million).*

## EIC SUPPORT FOR QUANTUM TECHNOLOGIES



Quantum Technologies is a rapidly developing field with the potential to revolutionise numerous industries, including computing, communication, sensing, and cryptography.

They make use of the principles of quantum mechanics, allowing for the manipulation and measurement of individual quantum systems, such as atoms and photons, to perform tasks that are impossible using classical technologies. Quantum technologies have a wide range of potential application areas such as

drug discovery, financial modelling, materials science, medical imaging, secure information transmission, environmental monitoring, mineral exploration and energy research amongst many others. As research and development in this field continue to advance, we can expect to see even more applications emerge in the future.

France, Germany and the Netherlands are amongst the countries with the largest public investments in this field in the EU and the European Quantum Flagship, launched in 2018, is the most important EU initiative in support of quantum technologies, with EUR 1 billion allocated over a period of 10 years to consolidate and expand European scientific leadership and excellence in this area, and kick-start a competitive European industry in Quantum Technologies.

There is a long road ahead however. Although quantum computing is a rapidly advancing field, large-scale fault-tolerant quantum computers are still in the early stages of development. Likewise quantum communication technologies such as quantum key distribution (QKD) which have reached a

relatively high level of maturity and available commercially, lack widespread adoption and integration into existing communication infrastructure, and further developments are required. This is where the EIC and its funding instruments play a key role in helping transfer European innovation from lab to fab and specifically support European start-ups and SMEs to scale up and further develop quantum technologies to its full potential.

# TOPSQUAD

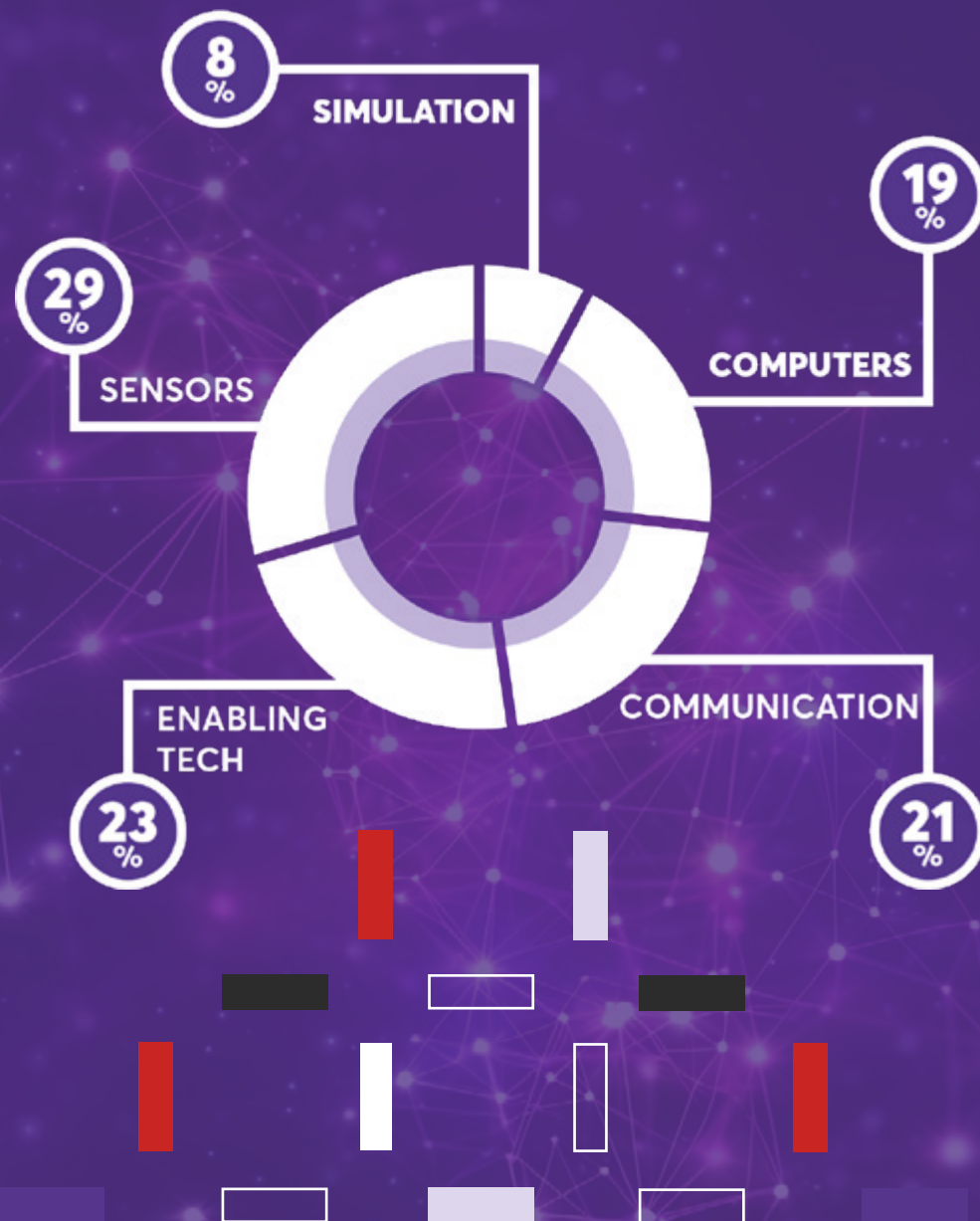
*Developing a universal quantum computer*

A universal quantum computer can be exponentially faster than classical computers for certain scientific and technological applications. No one has yet managed to create such a quantum computer because of two obstacles: qubit fragility and qubit scalability. The output of TOPSQUAD – which is supported by the EIC Pathfinder with over EUR 3 m from 2019 – 2023 – is expected to lay the foundation for universal quantum computing by addressing these two major obstacles. This long-awaited innovation under development by five partners - including three universities and two companies - could help solve global challenges related to health, energy and the climate. For example, quantum chemistry can help design new medicines; improved material property prediction can help make energy storage more efficient; big data handling can help tackle the complexity of climate physics.

To date, over EUR 125 million of support has been provided by the EIC in support of the quantum agenda spanning early-stage advances in groundbreaking research as well as the subsequent commercialisation and scaling up of those startups and SMEs that are bringing game-changing solutions to market.

The resulting portfolio features two 2022 Nobel laureates in Physics (Professor Alain Aspect and Professor Anton Zeilinger) and three of the 10 most highly valued companies in the EU - IQM, Alice & Bob and Pasqual - who have attracted increasing levels of private investment following EIC support.

# BREAKDOWN OF THE EIC QUANTUM PORTFOLIO





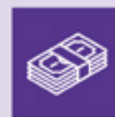


*EIC Fund selected & supported Pasqal at an early stage, helping it to scale up and attract investments.*



## SUCCESS

- Alain Aspect is one of the winners of the Nobel Prize for Physics in 2022
- 100+ employees



## SUBSEQUENT SUPPORT & CO-INVESTMENT

- Secured €100 million of Series B venture funding in a deal with EIC Fund led by Temasek Holdings on Jan 2023



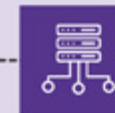
## CREATION

- Founded in 2019, in France
- Founded by Georges-Olivier Reymond, Christophe Jurczak and Alain Aspect



## EIC SELECTION & FUNDING

- EIC identified company and provided €2.5 million of grant funding in Dec 2020



## FIRST STEP

- Developer of a full-stack quantum computing technology
- 2 Patents (2020, 2021)

## KEY TRENDS

1



### Quantum Sensors

Quantum sensors measure physical properties including temperature, magnetic field, gravity, and rotation, with extreme sensitivity. They have many advantages compared to classical sensors for instance, better, safer autonomous navigation of vehicles on the ground; detailed and accurate medical diagnostics imaging with lower cost and fewer potential side effects for patients; and more accurate and less vulnerable guidance systems in Space. Moreover, quantum sensors are expected to have a great impact in the development of other quantum technologies such as quantum computers.

The EIC Pathfinder quantum portfolio features numerous projects working on the development of quantum sensors at an early stage, with one third of our quantum projects in the EIC Transition programme focusing on increasing the TRL level of quantum sensors.

2



### Quantum Software

Quantum computing is not only a technological advancement but also a new general-purpose paradigm for software development, which can radically influence how a software system is conceived and developed.

The EIC quantum portfolio includes some software and simulation projects at Pathfinder and Accelerator level, including some start-ups. However, there is a need for further investment and support of start-ups in this field.

3

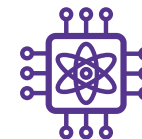


### Novel qubits

Like bits in classical computing, qubits are the smallest data storage units in quantum systems. However, qubits exist in a superposition state of 0 and 1 simultaneously. This ability to store multiple states at once makes quantum computers highly powerful. Novelty in qubit design, high-fidelity quantum gates, and room-temperature controllers could open up new ways of scaling up multi-qubit devices.

The EIC Pathfinder portfolio includes several projects focusing on the development of novel qubits including five projects selected from a targeted Pathfinder Challenge competition in 2022.

4



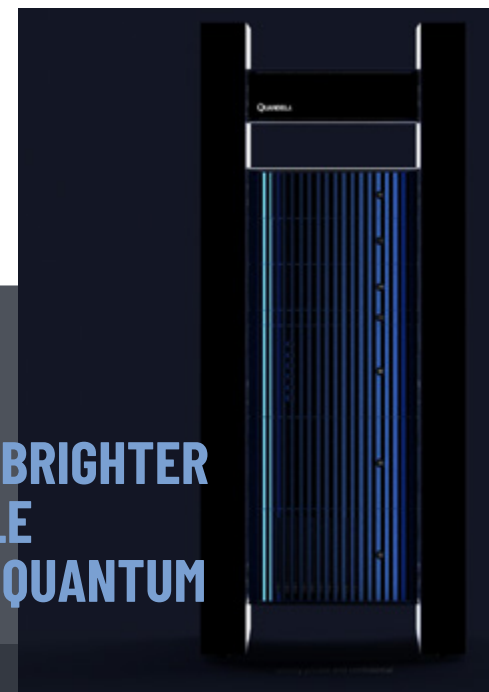
### Hybrid computing

As long as pure quantum applications are not mature enough for the market, hybrid quantum computing is one of the most promising approaches for industrial applications. The combination of quantum elements and classic computers optimises both to solve highly complex problems. The impact of hybrid quantum applications on different technology areas and applications is expected to be very high and Europe is already very active in this area. This important field has been supported by the European High-Performance Computer Quantum Simulator hybrid (HPCQS) initiative. This initiative seeks to integrate and couple two quantum simulators, each capable of controlling more than 100 qubits, with two existing European Tier-0 supercomputers, and deploy an open European federated hybrid HPC-QS infrastructure that will provide non-commercial cloud access to public and private European users.

QUANDELA

QUANDELA.COM

WE MAKE  
FUTURE COMPUTING BRIGHTER  
& MORE SUSTAINABLE  
THROUGH PHOTONIC QUANTUM  
COMPUTERS



## Who Are We?

Quandela is a European start up that provides photonic quantum computers that are modular, scalable, energy-efficient and accessible both on the cloud and on premise. Our team specialises in the development of both software and hardware solutions for a variety of quantum applications.

## Why Us?

We are a dynamic team of international experts who share a common goal: to push the boundaries of computing using photons and quantum computers. To do so, we have developed MosaiQ, the first generation of quantum computers based on the manipulation of photons in the world. In parallel, we have developed a unique software and opened our cloud to public access. Using these unique tools, our teams have demonstrated a quantum advantage based on entanglement for cybersecurity applications. We are now dedicating our efforts on solving the next challenges of our industries—from logistics to chemistry and pharmaceutical or even finance.

## Our Solutions



### Quantum Hardware

**MOSAIQ:** Single-photon based quantum computer

**PROMETHEUS:** High performance stand-alone deterministic quantum-light source



### Quantum Software

**PERCEVAL:** Open-source software platform for photonic quantum computing



### Quantum Cloud

**QUANDELA CLOUD:** The gateway to our photonic Quantum Processing Units (QPUs).

WE DESIGN AND DEVELOP INDUSTRIAL SOLUTIONS FOR WIDE-RANGING APPLICATIONS



ENERGY



AEROSPACE



AUTOMOTIVE



CHEMISTRY



PHARMACEUTICALS



FINANCE



CYBERSECURITY



LOGISTICS



## Enabling the Second Quantum Revolution with easy-to-use and sustainable cryogenics

### THE PROBLEM

Quantum tech is set to become a multi-billion Euro market, but its widespread adoption is blocked by the need for extreme cooling that is expensive, complex, slow and hard to scale as it relies on the use of rare and expensive helium-3.

### OUR SOLUTION

kiutra uses an alternative cooling technology – magnetic refrigeration. Leveraging our unique technology and IP we offer:

- future-proof, sovereign, and sustainable cooling independent of strategic helium-3,
- simple, compact, and highly integrated devices for application-specific and cost-efficient cooling,
- super-fast cryogenic test equipment and services that facilitate working with cryogenic temperatures and shorten quantum hardware innovation cycles.

kiutra has successfully positioned itself as a provider of innovative cryogenic solutions serving customers in Germany, Europe and the USA. We build devices for the development, characterization, and testing, as well as the operation of quantum systems at low temperatures. Our focus going forward is on offering tools, integrated solutions, and services along the whole quantum technology chain.



### OUR TEAM

We are a team of 40-plus people from diverse countries and backgrounds, with different specialties and talents, joined by our shared passion for our work.



### INVESTMENT OPPORTUNITY

Our company is backed by trusted deep tech investors who have to date invested 10 mio. € – Hightech Gründerfonds, APEX Ventures, UnternehmerTUM Initiative for Industrial Innovators, TRUMPF Venture, Verve Ventures – complemented by 6.5 mio. € public funding and significant commercial traction.

After successful seed and A-rounds, we are now preparing our next financing round. Get in contact if you are interested to learn more about kiutra and this upcoming investment opportunity!

Address: kiutra GmbH, Floessergasse 2, 81368 Munich, Germany. Web: [kiutra.com](https://kiutra.com)  
Contact: Dr. Alexander Regnat (CEO) – [alexander.regnat@kiutra.com](mailto:alexander.regnat@kiutra.com)  
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## WHO ARE WE?

### BRIEF INTRODUCTION TO MULTIVERSE COMPUTING



## BRIEF INTRODUCTION TO MULTIVERSE COMPUTING

Multiverse Computing S.L. (Multiverse, hereinafter) is a start-up company incorporated on March 15, 2019 in Donostia, Basque Country. Multiverse's growth has been anomalous. It is currently the most relevant company in quantum software programming in Europe. With more than 70 employees of 25 nationalities, Multiverse is based in Canada, France, Germany, and the Basque Country, where it is headquartered. It is supported by the European Commission, through the European Innovation Council. It is a strategic partner in multiple verticals, in a transversal way.



**Image 1.** Graphical representation of the nationalities of the people employed at Multiverse

The company was created as a spin-off of the Donostia International Physics Center (DIPC), associated with the University of the Basque Country, with the main business objective of developing quantum computing technology and applying it to all sectors of industry through hyper-efficient software and algorithms, thus optimizing financial, executive and operational resources.

## BRIEF INTRODUCTION TO MULTIVERSE COMPUTING

### TECHNOLOGICAL CAPABILITIES

The technological base of Multiverse Computing is indisputably one of the pillars of the current technological revolution: quantum computing, applied to real industry cases. To understand the significance of quantum computing, a brief overview of its implications is necessary.

Quantum computing technology, and specifically the one offered by Multiverse Computing, will make it possible to perform calculations that are currently impossible with the current model of computation and computers (commonly known as "classical" computing).

Quantum computing makes it possible to tackle "open" problems (for which there is not, and will not be, a solution with classical computers). With these solutions, we will be able to move forward in the near future, for example, to address challenges as ambitious and far-reaching as poverty, sustainability, accelerated drug discovery, or more efficient logistics, making markets more efficient and sustainable.

There are two cores within Multiverse's technology base: pure quantum computing and quantum-inspired computing. While the former needs a quantum computer to be executed, quantum-inspired computing does not. The latter can be performed on an ordinary computer.



**Image 2.** Quantum computer. A work of engineering at the frontier of innovation.

Quantum-inspired computing is something that Multiverse adds, in addition to its knowledge of quantum computing, and that is the use of classical algorithms and computing technologies from

## BRIEF INTRODUCTION TO MULTIVERSE COMPUTING

areas of advanced physics, and also based on quantum mechanics (referred to in the industry as "Quantum-Inspired" or QI systems).

In terms of access to computational resources, Multiverse has partnerships with all relevant providers worldwide. A number of years of experience have been accumulated in this relationship between hardware vendors (such as D-Wave, IonQ, IBM, etc.) and software vendors such as Multiverse. Multiverse's capability is to mediate between hardware vendors and end users (the industry). But Multiverse's technological capability goes beyond hardware and quantum computing partners: the value and capability is provided by the professional staff.

Multiverse's technological capability is fundamentally constituted in terms of the academic capacity of its staff, and its vision and knowledge in terms of engineering and systems integration.

Multiverse's mission is to bring quantum computing to society, to use cases with great impact on society and on the technological wealth of the national and international territory. Because of this international nature, the talent to be attracted is multinational. This requires competing in the global market, offering an impeccable quality standard.

The workforce is made up of more than fifty people with the forecast to double in size by Q1 2023. There are 30% women and 38% PhDs in quantum physics and mathematics. It has professionals in computer, industrial, mechanical, electrical engineering oriented to generate patents, implementation and integration. It has a balanced balance between science and technology, with an ambitious industrialization strategy.

Integrations are currently being studied in production environments of leading energy companies, industrial manufacturing and financial institutions. This explains that quantum computing is at the engineering stage. The science behind quantum computing is over 100 years old.

Multiverse possesses the technological and industrial capability to modify the operations of client and friendly companies. Although the hidden mechanisms that govern the inner workings of quantum computing are unknown, it is clear that industry demands such applications. And the reason is simple: optimization, efficiency.

## Alcyon Photonics-

Making easy photonics to support mass producible ultra broadband and high yield devices



**Name:**  
*Alcyon Photonics*

**HQ:**  
*Spain*

**Founded in:**  
2018

**Size:**  
10 FTEs

### Business proposition

- Alcyon value proposition combines powerful photonics design to boost performance competitiveness and a platform to scale customer product development.
- Alcyon will monetize the commercialization of the IP through customer license, mimic the successful electronics IP model.

### Market size

- The Global Photonics Market was valued at USD 589.82 billion in 2020. The Alcyon portfolio of industrial property (IP), makes possible addressing different applications through the combination of its blocks based on the IP platform.
- Addressing in 2 years transceiver market 1% of top 15 vendors at 5% royalty share €1.7M/year. Unlocking applications markets (including Data Center, PON networks, IoT-FBG and BioSensing) at 1% value share, resulting in \$19.7Bil opportunity

### Competitive advantages /

- 9

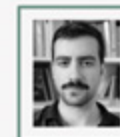
### Team



**Jimena Garcia-Romeu**  
CEO and partner



**Dr. Antonio Dias**  
CTO and partner



**Dr. Aitor Villafranca**  
Scientific advisor and Founder

## FUNDING ROUND

### Investment journey

#### Raising €1m pre commercial series

- Complementing €1.8m grant from EIC
- Seeking €1M from private investors, follow on by current VC
- Round closing date Q3 2023

#### Raising €5m scale series

- Confirmed €2m available EIB contribution
- Round closing date Q1 2025

### Use of funds

- Embark our designs in commercial development via customer pilots
- Build the channel for future growth via foundry collaboration
- Grow the team\*

### Previous Funding

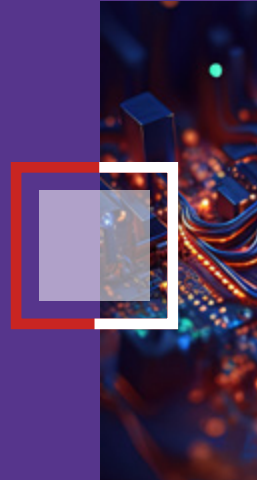
- Venture builder VC : € 1.2m
- Public funding: € 2.8m

### Website:

Alcyonphotonics.com



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