The Catalonia Quantum Academy: building a solid educational base for the quantum future

New training platform brings together Catalonia's strong established quantum educational programs and new learning opportunities for students starting at the undergraduate level.
Researchers in the field of Quantum Science and Technology from theoretical and experimental research groups in Cataloni focus on training
The platform aims to promote internalization and mobility for students and researchers while attracting and retaining talent in Catalonia
ICFO will coordinate the CQA through the educational pillar of Catalonia's Quantica- Mediterranean Valley of Quantum Science and Technologies

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As the world races to explore the future applications of quantum technologies, it is becoming increasingly reliant on a quantum-ready workforce both, in academia and in the future quantum industry. The launch of the **Catalonia Quantum Academy (CQA)**, a collaborative platform that is the educational pillar of the **Quantica- Mediterranean Valley of Quantum Science and Technologies** initiative of the Generalitat of Catalunya**,** will leverage the region's internationally recognized expertise in **Quantum Science and Technology (QST)**, t strengthen education, training and potential to create impact on a global scale throug scientific and technological innovations.

Building on a strong history of education in quantum sciences

Catalonia is home to a network of universities and research centers that offer scientific an technical undergraduate and postgraduate education in the area QST across variou domains. The CQA, with its technical office at ICFO, will harness this broad experience a d expand it to meet the growing needs of quantum-oriented research and innovations. This **is a proactive strategy financed by the Generalitat de Catalunya, investing in the future of Catalonia by developing young scientific and technological minds, attracting international talent, enabling mobility for students and researchers, and ensuring the relevance and competitivity of the region's higher educational system.**

i¿½As an institute, we have always been convinced that it is important to make the training of the next generation of scientists and technologists a top priority,i¿½ comments **Prof. Robert Sewell, Head of Academic Affairs at ICFO** and coordinator of the CQA. i¿½Quantum technologies have the potential to create important technological advances based on th rules of quantum mechanics. With the base that has been built up over the past decades i Catalonia through research initiatives, collaborative educational programs, and ties w th industries that help to ensure the relevance and potential for impact of these combi ed actions, Catalonia is well positioned to capitalize on its ecosystem and to contribute on he international stage. The CQA will reinforce and strengthen this position.i¿½

The Master in Quantum Science and Technology, offered by the UB, UAB, UPC, ICFO, BSC, IFAE and ICN2, with the collaboration of local and international companies working on Quantum Technologies, is the strongest program of its kind in southern Europe and an illustration of the relevance of the region's educational portfolio of programs. i¿½Our Master is built on a solid academic and research community in Catalonia. It provides the student with a broad picture covering all aspects of QSTs, from the most fundamental questions t current technological advances, and equips students with the necessary tools to succeed i both academic and industrial environments. Students come away with both deep technica knowledge and transferrable skillsi¿½ explains **Bruno Julia**, **Professor at Universitat de**

Barcelona, the program's coordinator.

Underscoring the important synergies within the CQA, **John Calsamiglia, Professor at the Universtat Autonoma de Barcelona (UAB),** part of the coordinating team of the Quantum Science and Technology Master and member of the CQA Board explains that "University education drives social development, at the same time, it is deeply influenced by the local social, scientific and technological context. Students need a strong foundation of knowledge guided by experts, exposure to cutting-edge research, and opportunities to connect with career mentors and peers with similar interests. The CQA promotes actions that ar enriching in this context and undertakes joint projects that require a critical mass to flourish .i¿

The CQA's course offering complement and support the educational offering in Catalonia s universities.Undergraduate programs at the UAB provide in-depth knowledge to potential future key players in academia and industry in the field of QST," explains **UAB Prof Veronica Ahufinger** who is also a member of the CQA Coordination Board . "In this context, CQA supports the development and improvement of hands-on experiences in educational labs, which is crucial to be competitive at international level."

The Master in Photonics, a comprehensive Master's degree in the science and technology of light offered by the UPC (coordinator), UAB, UB and ICFO, has a strong quantum component and has been drawing an international cohort of talented students since 2007. Prof. **Crin Cojocaru** Director of the Master explains, i¿½Students with different scientific and technological backgrounds are drawn to Photonics because it is one of the key enabling technologies and present in all of the exciting technologies on the rise today. Students of this Master have found excellent opportunities in a wide range of companies or decided to pursue doctoral studies to expand their understanding of photonics and quantum enabled technologies, both in Catalonia and abroadi¿½. **Prof. Pietro Massignan**, the CQA coordinator at the UPC foresees that i¿½The UPC has a number of degree programs that are already preparing students to participate in the development of QST. We are working hard to keep these programs relevant to the needs of society. The synergies produced and strengthened through the CQA will help ensure that we continue to prepare students for high impact careers.i¿

Research Excellence

From the European Quantum Flagship to Quantum Spain and projects within the Complementarias framework, research centers and Universities in Catalonia are leading a surge of activities in QST and are positioned to participate as important partners to shar frontier knowledge with students for careers in academia and/or industry. The resear

h focus spans basic and applied topics, from theoretical and experimental perspectives acro s various domain

Actions supported by the CQA include:

Scholarships and internships for students at the masters and undergraduate level
Support for mobility of students and young researchers
Visiting Scholar program
Creation of a Career Development program
Organization of schools and training and career development events
Fostering of collaboration among the participating institutions

Partners contribute expertise from the diverse quantum ecosystem in Catalonia:

The Institute of Photonic Sciences (ICFO) **coordinator**
Universitat Autonoma de Barcelona (UAB)
Universitat de Barcelona (UB)
Universitat Politecnica de Catalunya (UPC)
Catalan Institute of Nanoscience and Nanotechnology (ICN2)
Institut de Fisica d'Altes Energies (IFAE)
I2CAT- The Internet Research Center
Centre Tecnologic de Telecomunicacions de Catalunya (CTTC)

Associate Members:

Barcelona Super Computing Center (BSC)
Centre Nacional de Microelectronica (CNM)
EureCAT
Institut de Ciencia de Materials de Barcelona (ICMAB)
Institute of Space Studies of Catalonia (IEEC)

Corporate Members:

Cellnex
LuxQuanta
Qilimanjaro
Quside

SateLiotT

Secpho

** New associate and corporate partners will be announced as their collaborations with th CQA are formalized.