



Quantum Computing: from fundamentals to applications



The program will cover topics ranging from theoretical foundations to available architectures and technologies, software development, quantum algorithms, and key applications.

10.Sep - 12.Sep 2025

Cod. Z23-25

Mod.:

Streaming Face-to-face

Edition

2025

Activity type

Summer course

Date

10.Sep - 12.Sep 2025

Location

Miramar Palace

Languages

English

Academic Validity

30 hours

Organising Committee



Description

Framed within the International Year of Quantum Technologies, this Summer Course offers a comprehensive overview of advancements in Quantum Computing, blending theory with practical applications. The program will cover topics ranging from theoretical foundations to available architectures and technologies, software development, quantum algorithms, and key applications. Additionally, it will explore crucial aspects such as quantum-classical hybridization and the expected industrial impact of these technologies.

Aimed at researchers, advanced students (in fields such as Physics, Mathematics, Engineering, and Computer Science), as well as industry professionals and academics, this course seeks to provide essential tools and knowledge to understand and leverage the potential of quantum computing across various scientific and industrial domains.

Objectives

Provide a comprehensive overview of the fundamentals and technological advancements in Quantum Computing, from its theoretical foundations to practical applications.

Organised by



Program

10-09-2025

09:00 - 09:15	“Apertura del Curso por representante del Departamento de Ciencia, Universidades e Innovación” Presentation by the Director of the activity Javier Aizpurua BasQ - Director Igor Campillo --- Euskampus Fundazioa - Director
09:15 - 11:30	“Fundamentos de la Computación Cuántica: conceptos y principios” Juan José García Ripoll CSIC - Investigador
11:30 - 12:00	Break
12:00 - 12:50	“Transmones Superconductores: arquitectura y aplicaciones” Sebastian Bergeret --- CFM - Research Scientist
13:00 - 13:50	“Puntos cuánticos en Computación Cuántica: enfoque y avances” Fernando González Zalba Quantum Motion - Ikerbasque Professor - Principal Quantum Engineer

11-09-2025

09:00 - 09:50	“Átomos Fríos: control y aplicaciones en Computación Cuántica” Claudia Polit ETH
10:00 - 10:50	“Fotones en Computación Cuántica: tecnología y perspectivas” Ponente Pendiente De confirmar
11:00 - 11:30	Break
11:30 - 12:20	“Plataformas de desarrollo cuántico: Qiskit, Cirq, Braket, PennyLane, etc.” Aitor Moreno Fdz. de Leceta LKS Next
12:30 - 13:30	“Taller práctico: ejercicios básicos en la simulación y ejecución de algoritmos cuánticos en hardware real.” Ponente Pendiente De confirmar

12-09-2025

09:00 - 09:15	“Introducción a la Jornada de Aplicaciones en la Industria” Maialen Agirre Departamento de Ciencia, Universidades e Innovación - Gobierno Vasco - Directora
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09:15 - 10:30	“Casos de uso en Computación Cuántica: Biomedicina”
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Sara Capponi IBM - Research Staff Member

10:30 - 11:45	“Casos de uso en Computación Cuántica: Energía”
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Roberto Marijuan Iberdrola

11:45 - 12:15	Break
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12:15 - 13:30	“Optimización Cuántica e Hibridación Cuántico-Clásica”
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Mitsuhisa Sato RIKEN

13:30 - 14:00	Cierre
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Directed by



Javier Aizpurua

Ikerbasque, Profesor

Ikerbasque Research Professor at Donostia International Physics Center, DIPC, and distinguished researcher at the University of the Basque Country, where he leads the Nanophotonics Theory Group. Javier Aizpurua gained his doctorate in Physics at the University of the Basque Country (UPV/EHU) in 1998 for work on the interaction of rapid electrons and nanostructures. After his pre-doctoral stage, he spent two periods as a post-doctoral researcher, one at Chalmers Technology University in Gothenburg, Sweden, and the other at the US National Institute of Standards and Technology (NIST). In 2004, Aizpurua joined DIPC, the Donostia International Physics Center, as a research fellow, starting to train a nanophotonics group. In 2008 he was awarded a permanent scientific place at the CSIC, taking responsibility for the photonics line of research at CFM, the Materials Physics Centre in San Sebastián, where he worked until 2023. From this year on, he joined Ikerbasque. He obtained the Euskadi Research award 2022, and is currently the director of the strategy Basque Quantum.



Igor Campillo ---

Euskampus Fundazioa, Director

He is director of Euskampus Fundazioa, founded in 2011 by the University of the Basque Country (UPV-EHU), Tecnalia Corporation and the Donostia International Physics Center (DIPC). He worked as assistant professor in the Faculty of Sciences of the UPV/EHU, international projects manager in Gamesa Energy, researcher and project manager at LABEIN- Tecnalia, project and outreach manager in the Nanoscience Cooperative Research Center- nanoGUNE, manager of the nanoBasque Strategy in the Basque Business Development Agency- SPRI, and director of DeustoTech. He holds a PhD in Physics from UPV/EHU, and a master degree in journalism and science communication from the Spanish Open University. He is the author of more than 70 international scientific publications indexed in the Web of knowledge, and author of 3 international patents. He has been awarded as one of the word-leading “Boundary Spanners” for University Business Cooperation by the University Industry Innovation Network.

Teachers



Maialen Agirre



Javier Aizpurua

Ikerbasque, Profesor

Ikerbasque Research Professor at Donostia International Physics Center, DIPC, and distinguished researcher at the University of the Basque Country, where he leads the Nanophotonics Theory Group. Javier Aizpurua gained his doctorate in Physics at the University of the Basque Country (UPV/EHU) in 1998 for work on the interaction of rapid electrons and nanostructures. After his pre-doctoral stage, he spent two periods as a post-doctoral researcher, one at Chalmers Technology University in Gothenburg, Sweden, and the other at the US National Institute of Standards and Technology (NIST). In 2004, Aizpurua joined DIPC, the Donostia International Physics Center, as a research fellow, starting to train a nanophotonics group. In 2008 he was awarded a permanent scientific place at the CSIC, taking responsibility for the photonics line of research at CFM, the Materials Physics Centre in San Sebastián, where he worked until 2023. From this year on, he joined Ikerbasque. He obtained the Euskadi Research award 2022, and is currently the director of the strategy Basque Quantum.



Sebastian Bergeret ---

CFM-CSIC



Igor Campillo ---

Euskampus Fundazioa, Director

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Sara Capponi



Juan José García Ripoll



Fernando González Zalba



Roberto Marijuan



Aitor Moreno Fdz. de Leceta



Ponente Pendiente De confirmar

Licenciada en Biología por la Universidad Autónoma de Madrid (2005) y doctora en Genética y Biología Molecular por la Universidad del País Vasco (2009). En 2012, obtuvo el Máster en métodos de investigación y evaluación de servicios sanitarios y economía de la salud de la Universidad Nacional de Educación a Distancia (UNED). En 2015, obtuvo el LEAD - El certificado de Especialización en Liderazgo y Transformación en Organizaciones y Sistemas de Salud de Deusto Business School. En 2017, obtuvo el título sobre Eficiencia en la producción de servicios sanitarios "Marco conceptual y uso de software" en la Escuela de Salud Pública de Andalucía (España). En 2018, alcanzó el título sobre Aplicación de la metodología LEAN para la mejora de las vías asistenciales en la Escuela de Salud Pública de Andalucía (España). En 2019, realizó el Curso de Liderazgo y Organización para el Cambio del Institute for Healthcare Improvement (IHI). En 2021, logró el título de Epidemiología Avanzada de la Escuela de Salud Pública de Andalucía (España). Se incorporó al Instituto Kronikgune como investigadora a finales de 2012 y actualmente es la coordinadora científica.



Claudia Polit



Mitsuhisa Sato

Registration fees

FACE-TO-FACE	UNTIL 30-06-2025	UNTIL 10-09-2025
jounq fee	25,00 EUR	84,00 EUR
General	-	120,00 EUR
Reduced fee regular	-	102,00 EUR
Registration exemptions	-	84,00 EUR

LIVE ONLINE	UNTIL 30-06-2025	UNTIL 10-09-2025
jounq fee	25,00 EUR	84,00 EUR
General	-	120,00 EUR
Reduced fee regular	-	102,00 EUR
Registration exemptions	-	84,00 EUR

Place

Miramar Palace

Pº de Miraconcha nº 48. Donostia / San Sebastián

Gipuzkoa