New Tenured Group Leader Driving Sustainable CO?-Based Technologies at ICFO

Prof. Dr. Pelayo Garcia de Arquer, leader of the CO? Mitigation Accelerated by Photons group at ICFO, has been awarded tenure by the institute.

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Prof. Dr. Pelayo Garcia de Arquer, leader of ICFO's CO2 Mitigation Accelerated by Photons research group, has been awarded tenure by the Institute's Board of Trustees following a successful evaluation by an international committee.

Garcia de Arquer studied telecommunications engineering, mathematics, and photonics. He earned his PhD at ICFO, where he investigated how interactions between nanostructured semiconductors and metals can be tuned to control key optoelectronic properties, including absorption, charge transport, and doping. He also explored new device concepts in which highly energetic (i¿½hoti¿½) electrons in metals are harnessed for sensing and en
rgy harvesting, applying these findings to develop more efficient photodetectors and solar cells.

He then joined the University of Toronto as a Connaught Postdoctoral Fellow working on Bioinspired Ideas for Sustainable Energy. During his postdoctoral work, he broadened his research across materials science and clean energy, including the use of emerging solution-processed materials-such as perovskites, low-dimensional perovskites, and quantum dots-and their combinations. This work involved creating and tailoring new materials to control energy transfer at the nanoscale. As a later role of director of research in optoelectronics in the group, he sought to push these advances towards commercial impact, closely working with industry.

In parallel, he turned his attention to clean energy storage and conversion through electrocatalysis, with the goal of enabling the sustainable production of widely used energy carriers and chemical feedstocks (e.g., green hydrogen and carbon-based fuels) using renewable electricity and carbon dioxide rather than fossil resources. In this area, he contributed to major advances in understanding these reactions, providing insights and design strategies to improve performance by leveraging the highly dynamic nature of electrochemical interfaces.

Returning to ICFO in 2021 as a group leader, Garcia de Arquer established his research group and has since focused on developing scalable and sustainable approaches to decarbonization. The group has advanced methods to observe electrochemical interfaces in operation under industrially relevant conditions using photonic and electronic probes. These new insights have enabled innovative approaches to designing electrochemical interfaces and to producing valuable chemicals with a lower carbon footprint-advances that could help reduce emissions from existing manufacturing and transport processes, among other sectors.

Garcia de Arquer has received major scientific distinctions, including the Spanish National Research Award for Young Researchers (Felisa Martin Bravo, 2023) and the 2021 Best Young Experimental Physicist award from the Spanish Royal Society of Physics and the BBVA Foundation. Since 2020, he has been recognized as a Highly Cited Researcher by Clarivate. His research output includes more than 160 peer-reviewed publications and over 42,000 citations, reflecting a strong impact in materials science and energy research. His contributions also extend beyond research through transversal initiatives such as the Spanish Young Academy of Sciences.

At ICFO, Garcia de Arquer mentors early-career researchers and fosters collaborations across disciplines and with industry partners to accelerate technology transfer. Under his leadership, the group aims to translate fundamental advances into technologies that support global sustainability goals.

Arquerlab & friends