

Two ICFO early-career researchers awarded prestigious ERC Starting Grants to tackle big questions in science

ICFO researchers Prof. Nicoletta Liguori and Prof. Carmen Rubio-Verdu have each been awarded an individual ERC Starting Grant by the European Research Council for their cutting-edge research in photosynthesis processes and the physics of 2D materials, respectively.

The ERC Starting Grant is one of the most prestigious European grants for early-career researchers, granting each awardee a total of 1.5M?, plus up to 1M? in top-up funding for the purchase of equipment for 5 years. This allows each awardee to conduct an independent high-risk, high-gain project, driving scientific excellence and giving support to retain top researchers in Europe in order to foster innovation and knowledge advancement.

With the addition of these two new ERC grants, ICFO now holds a

total of 53 ERC grants since its foundation in 2002, which include all categories: Starting (14), Consolidator (7), Advanced (14), Synergy (1) and PoCs (17).

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Today, the European Research Council announced the Starting Grant awardees. Out of nearly 4,000 submitted proposals, just over 12% were selected, including the projects of two ICFO researchers who will each receive this prestigious grant. This is an outstanding feat for the brilliant researchers and group leaders at ICFO, Prof. Nicoletta Liguori and Prof. Carmen Rubio-Verdu, who have proven to show an extremely promising scientific track record, and for ICFO, a reaffirmation of the research excellence carried out at the institute, propelled by frontier research and innovation.

Being one of Europe's most competitive and respected funding opportunities for exceptional early-career researchers, the European Research Council (ERC) Starting Grant means a major turning point in the careers of early-stage researchers. With a substantial budget over 5 years, it gives the awardees the freedom to secure scientific stability for a long period of time and pursue high-risk, high-reward research of their choice.

Photosynthesis and 2D materials

Nicoletta Liguori and Carmen Rubio-Verdu were accepted to the talent attraction program for tenure-track group leaders offered by ICFO. They arrived at the end of 2022 and in 2023, respectively, as two promising early-career researchers in their fields to start their own research groups, the former in molecular mechanisms of photosynthesis and photobiology, and the latter in fundamental physics of 2D materials. Since then, they and their groups have been steadily pushing the frontiers of science to better understand their respective fields, find novel techniques to enter new pathways to go beyond what is known and discover new fascinating aspects of how the physical world works and behaves.

Now, the ERC awarded **MARIONETTE** project led by Liguori and funded with almost 2.2M? between the project core funding and top-up funding to purchase equipment, she and her team will aim to understand **how plants regulate light harvesting at the nanoscale**, to perform photosynthesis safely under the sun, and protect themselves from photodamage by tuning the molecular environment and structure of single photosynthetic proteins. The team will implement and integrate novel spectroscopy methods and advanced molecular dynamics simulation approaches to change the proteins' structure and environment at a molecular scale, and follow in real time the effect of these changes to reconstruct how plants activate photoprotection - step by step.

As part of the Clean Planet Program at ICFO, the project's direct impact will be mainly in fundamental science, and potentially, in a very long run, the knowledge generated may be

used to increase the efficiency in the plants' utilization of solar energy. Liguori is thrilled wit this ERC grant because i¿½I strongly believe this is an amazing opportunity that Europe gi es to early-career teams and researchers like us to tackle the most ambitious questions at he fundamental level,i¿½ she comments. This grant will enable her and her group to keep advancing their main research line, hoping to turn the mysteries surrounding photosynt etic protein's structure and environmental interaction into scientific f cts. As for Rubio-Verdu's **STMoire** project, also funded with ~2.5M? between the project's core funding and top-up funding to purchase equipment, she and her team will try to uncover the mechanisms behind the unusual **behavior of twisted 2D materials** such as twisted bilayer graphene, which exhibit exotic properties like unconventional superconductivity. Being one of today's hot topics in frontier science, Rubio-Verdu and her team will use a complementary experimental approach, using Scanning Tunneling Microscopy at extremely low temperatures, to study and understand the quantum phases of these materials at the atomic scale. Their ultimate goal is to discover, if possible, a new, **never-before-seen form of superconductivity**. The findings are expected to provide useful insights for further exploration in the field of material science, quantum technologies, photonics and optoelectronics, among others. i¿½This ERC is of extreme importance for th s project. I don't think I would be able to carry it out without such prestigious grant,i¿½ she admits. i¿½This grant is a great opportunity for my group to really carry out cuttin -edge research and work to discover new phases that emerge in 2D materials, either in indi idual layers or twisted laye

ERCs significance to ICFO

The two Starting Grants awarded to Prof. Liguori and Prof. Rubio-Verdu add to the recently Advanced Grant awarded to ICREA Prof. at ICFO Adrian Bachtold, for pioneering research in studying the limits of quantum mechanics through the quantum delocalization of carbon nanotubes.

Adding these 3 grants to the track record in 2025, which signifies for ICFO securing a total of 53 ERC grants - Starting (14), Consolidator (7), Advanced (14), Synergy (1) and PoCs (17) -, emphasizes and confirms the institute's continuous commitment to research excellence since its inception in 2002.

Underscoring the success of this achievement, Prof. Oriol Romero-Isart, Director of ICFO, proudly concludes that i¿½these ERC grants reflect the ambition and creativity of o r researchers and the culture of excellence and collaboration that defines ICFO. We a e grateful to the European Research Council for its continued trust and support, which enabl s us to push the frontiers of knowledge, train exceptional talent, and develop solutions with a positive impact on society and the planet.i¿½



Nicoletta Liguori (left) and Carmen Rubio-Verdu (right) at ICFO



Nicoletta Liguori in her lab at ICFO



Carmen Rubio-Verdu in her lab at ICFO