

ANNUAL REPORT 2022





WHY DO NANOSCIENCE AND NANOTECHNOLOGY MATTER?

At the ICN2, we are convinced that nanoscience and nanotechnology are ready to usher in a new era of profound societal transformation. Our mission is to **lead this change** through excellent research, groundbreaking solutions to global challenges, and engaging discussions about the benefits as well as potential risks of new technologies.



WHAT IS THE ICN2?

The Catalan Institute of Nanoscience and Nanotechnology (ICN2), situated on the campus of the Universitat Autònoma de Barcelona (UAB) and just a stone's throw from Barcelona city, is a non-profit, **globally recognised research institute**. Our role as a **CERCA** centre, founded on a robust collaboration between the **Generalitat de Catalunya**, the **CSIC**, and the **UAB**, enables us to pioneer cutting-edge scientific research and training. As members of **BIST**, we enhance the local ecosystem of innovation and excellence bridging the gap between nanoscale research and real-world applications.

Our goal is to collaborate with public and private institutions, facilitating the application of our pioneering discoveries in sectors such as industry, health, and energy. As an acknowledged leader in nanoresearch, **ICN2 merges fundamental and applied science, promoting technological innovations towards market readiness**. We take pride in establishing opportunities for dialogue and collaboration between researchers, industry, policymakers, and society, always upholding our commitment to high standards of equality, diversity, and the wellbeing of our community.



ORGANISATION

At the ICN2 we firmly believe that people are our main asset. Scientists from diverse backgrounds are joined by technicians and administration professionals in the pursuit of the institute's many goals. We are also fortunate enough to have a knowledgeable Board of Trustees and Scientific Advisory Board made up of international peers.

Director: Prof. Pablo Ordejón.

Vice-Director: ICREA Prof. Jose A. Garrido

General Manager: Mr Lluís Bellafont

Strategy Development: Dr Margarita Navia

Business and Innovation: Dr Pablo Pomposiello

20 Research Groups

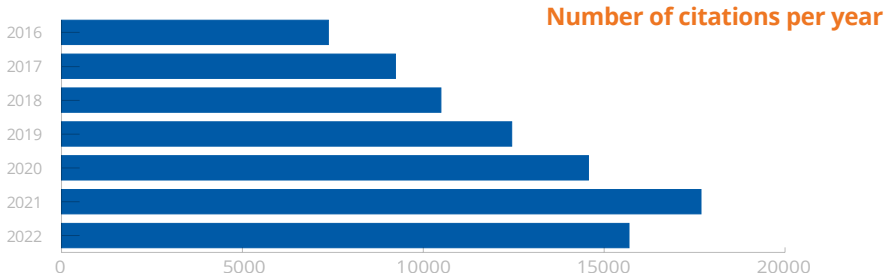
1 Support Division (3 Units; 6 Facilities)

8 Departments and Areas



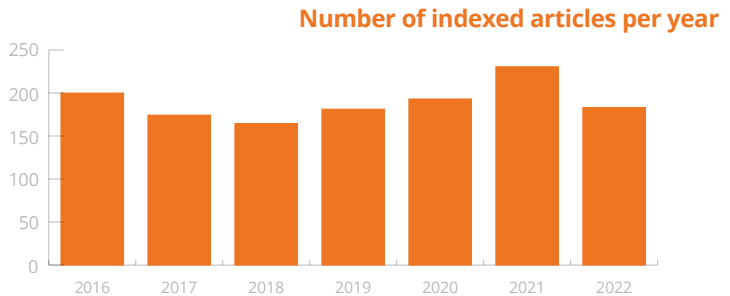
ICN2 IN NUMBERS

RESEARCH OUTPUTS



Papers authored by ICN2 researchers were cited **15,751 times**

186 original papers published



BUSINESS AND INNOVATION

For the Business and Innovation Office, 2022 was a year dedicated to extend and strengthen our network with communication actions with 112 companies and 14 NDA agreements signed.

 **112**
companies

 **14** NDA
agreements signed

 **1**
Spin-Off

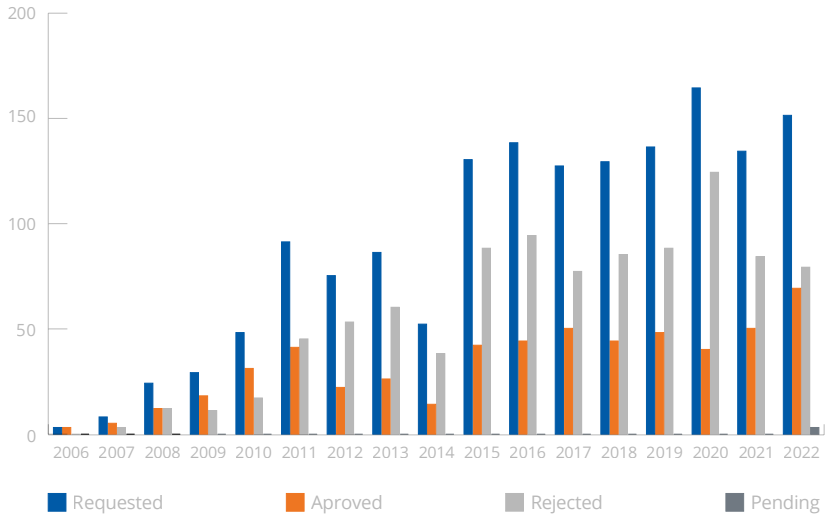
 **15**
new R&D
projects

 **3** competitive
valorisation
projects

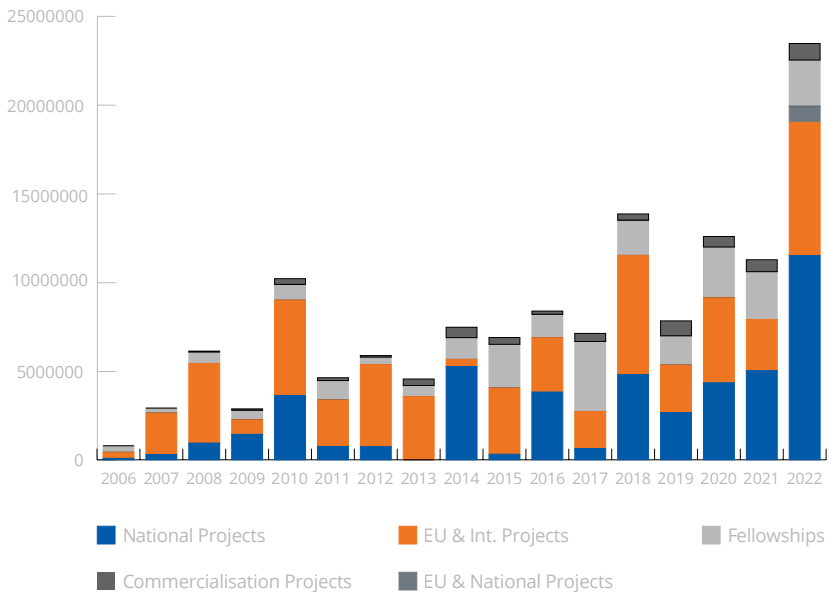
 **4** families
of active
patents

PROJECTS

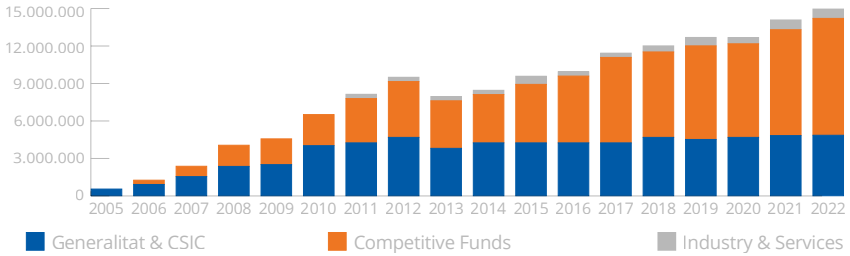
Outcome of proposals submitted on each year (as of 30/04/2022)



Evolution of income from approved competitive proposals by source



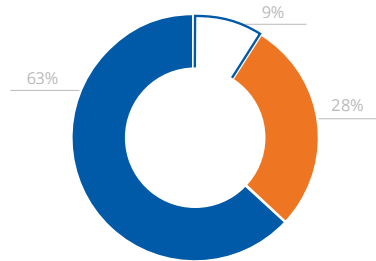
Evolution of ICN2 Operational Funds



In 2022, the **total operational funds for ICN2 were recorded at €14,813,266**. Of this sum, **32%** was procured from the **Generalitat de Catalunya and the Spanish National Research Council (CSIC)**, **63%** was drawn from **competitive funding** opportunities, and the remaining **5%** was sourced from **industry and services**.

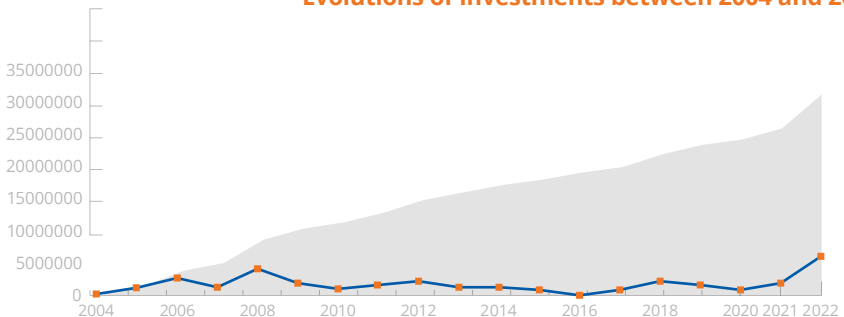
Expenditure in 2022

- Personnel
- Current Expenses
- Depreciation



Total expenditure in 2022 reached €14,213,866 including current expenses, personnel costs and depreciation.

Evolutions of Investments between 2004 and 2022





THE YEAR AT A GLANCE

INSTITUTIONAL HIGHLIGHTS



In 2022, the ICN2 demonstrated its leadership in the nanoscience sector through various initiatives and partnerships. The institute stood out for its dedication to excellence in research, renewing its Human Resources Strategy for Researchers (HRS4R) badge. This commitment was echoed in its collaboration with the International Network for Sustainable Nanotechnology, contributing to global sustainability efforts. Additionally, ICN2 championed women in science, exemplified by the successful Women Talent Programme and the celebration of multiple accolades awarded to Prof. Laura Lechuga, among others, including her investiture as Doctor Honoris Causa.

Partnerships played a crucial role in the institute's achievements, notably through collaboration with CATRIN, setting the stage for future scientific endeavours. Further reinforcing its commitment to research excellence, the ICN2 participated in the European Distributed Research Infrastructure for Advanced Electron Microscopy. Meanwhile, ICN2 welcomed the addition of Prof. María Escudero Escribano, an ICREA Research Professor and ERC Grant holder, further strengthening its research prowess.

In recognition of its contributions to the field, the ICN2 was awarded the Severo Ochoa Centre of Excellence for the third time. Additionally, Dr José Hugo García, a senior researcher at the ICN2, received the prestigious ERC Starting Grant. These accolades underscore the ICN2's pivotal role in advancing nanoscience, contributing to sustainable development, and promoting equality and diversity in research.

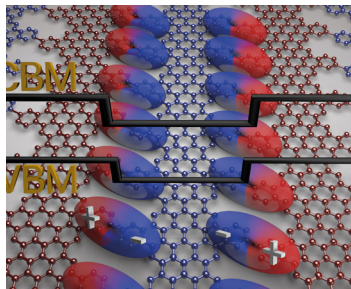


RESEARCH HIGHLIGHTS

In 2022, the scientific community was rife with numerous significant discoveries and advancements. One of the most notable achievements was in the field of nanotechnology, with the development of a graphene-based neural probe. This tool provides unprecedented insights into neurological conditions such as epilepsy, offering a path towards more effective treatments.

Another key breakthrough was the inception of "Clip-Off Chemistry," a new synthetic strategy that has the potential to revolutionize materials science. Meanwhile, a groundbreaking software, elpholt, was introduced. This simulation tool offers a deep understanding of electron and phonon interactions, helping to accelerate the discovery and development of sustainable technologies.

In the area of biosensing, a novel nano-biosensor was introduced for the rapid detection of SARS-CoV-2 antibodies. Other significant achievements included new insights into the heat dissipation properties of layered semiconductors, as well as advancements in our understanding of the memristive and conductive properties of various materials. In the arena of molecular electronics, the successful integration of single-molecule circuits with silicon technology marked a significant leap forward.



B&I HIGHLIGHTS

Throughout 2022, ICN2 exhibited significant advancements in the fields of science and innovation. At the 4YFN - Mobile World Congress, ICN2 had a significant presence, showcasing the results and vision of their spin-off companies. Notably, INBRAIN Neuroelectronics, a company developing graphene-based applications for neurological diseases, was in the spotlight. They signed a landmark agreement to develop patented neurotechnology, and received a substantial investment from the European Commission via the EIC Accelerator and EIC Pathfinder Challenges to advance the development of a pioneering graphene brain network platform. Other initiatives showcased spin-off companies such as FutureChromes, Cooling Photonics, Graphenica Lab and Napptilus Battery Labs.

ICN2's contribution extended beyond the industry events, with series of talks for the ICN2 community with the goals of encouraging scientists to dip their toes in innovation, increase scientists' business culture, and facilitate networking with the industrial world. Furthermore, in a collaborative effort, ICN2 teamed up with CSIC and Art-lens to revolutionize ocular prosthetics. A new spin-off company, Distinkt, was launched to commercialize smart, nanotechnology-based ink for anti-counterfeiting applications. The institute's involvement in the exciting PUZZLE X event, showcasing frontier technologies, further underscored its commitment to pushing the boundaries of innovation.

It's clear that 2022 was a year of remarkable strides in scientific research, innovation and institutional efforts. For a more detailed exploration of these discoveries, we encourage you to delve into the full ICN2 Annual Scientific Report.



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Center of:



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With the support of:



Distinctions:



www.icn2.cat

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