NETWORK4SUSTAINABLE NANOTECHNOLOGY

HIGHLIGHTS FROM THE 2025

N4SNANO GLOBAL SUMMIT

GLOBAL CONFERENCE ON HOW NANOTECHNOLOGY CAN CONTRIBUTE TO THE DEVELOPMENT OF THE SUSTAINABLE CITIES OF THE FUTURE

As the third international gathering of the N4SNano network and hosted by **Institut Català de Nanociència i Nanotecnologia (ICN2)**, Spain, the **2025 N4SNano Global Summit** not only deepened global scientific interaction, but also consolidated the N4SNano network's role as a cornerstone in shaping responsible and sustainable research while connecting key stakeholders.

Over three days (June 16–18, 2025), experts from academia, industry, and policy makers came together in **CosmoCaixa, Barcelona**, to share cutting-edge research, align strategies and exchange perspectives on how nanoscience and nanotechnology can contribute to one of the most pressing challenges of our time: creating sustainable cities and communities (UN SDG #11).

A CONSOLIDATED GLOBAL NETWORK

Leveraging the framework developed by the previous summits, this year's event in Barcelona demonstrated the maturing of N4SNano into a vibrant, coordinated, and solution-oriented network. **With participation from over 29 institutions across 14 countries**, the Summit provided a unique platform for interdisciplinary dialogue, advancing the network's mission to enable nanoscience and nanotechnology-based solutions for more sustainable urban systems.

"It is wonderful to see how our global community has grown over the years and creating positive impact for our communities and beyond" **Sushanta Mitra, President of N4SNano**.

KEY TAKE-HOME MESSAGES BY SESSION

1. Clean and energy-efficient transport

Nanotechnology-based innovative solutions is no longer a niche concern but a global imperative-requiring coordinated science, policy, and education.

Speakers highlighted the complex global context affecting materials supply for the development of sustainable batteries, key for a greener transportation in cities, as well as how specific country regulations directly affect sustainable development of urban areas.

2. Sustainable and efficient buildings

Smart, nanostructured materials can dramatically increase buildings' energy efficiency and safety.

Presentations ranged from adaptative photochromic films for increased energy efficiency to Aurivillius perovskites for clean and electrocaloric cooling, highlighting the importance of long-term investment in materials research, that can lead to the creation of added-value companies playing a key role in the mitigation of global warming.

3. Healthy cities

The development of enhanced real-time sensors is key for making smart buildings and healthy cities a reality. Nanotechnology can push the boundaries of current state-of-the-art solutions.

Speakers pointed out the need of multidisciplinary research around nanoscience and nanotechnology to achieve higher sensors sensitivity and specificity for real-time environmental monitoring, pollution control, and efficient resource management in urban ecosystems.

4. Connected cities

Nanotechnology plays a pivotal role in shaping the next generation of sustainable cities where motion, light, and ambient energy are transformed into electricity and data.

From self-powered sensors to brain-inspired computing and intelligent energy networks, these breakthroughs enable urban systems to become cleaner, more efficient, and adaptive by design.

5. AI track

AI-driven tools, when thoughtfully designed and responsively applied, have the power to accelerate research processes, reduce resource consumption, and drive more sustainable and impactful research, contributing to more sustainable societies.

Speakers stressed that nanomaterials science and related research can not only contribute but also benefit from AI and that both researchers and society must be aware of how to use it responsively to favour sustainability.

6. Policies

A greener future for our societies in urban environments needs transformative interactions between scientists and policy makers to bring innovative ideas to reality.

Dialogue with policy implementation experts emphasized co-creation of knowledge for and with society, public engagement, alignment of funding agendas, and addressing the local priorities of the government. The scientific communication will play an important role on how we address diverse challenges ranging from nanotoxicology to green chemistry towards the development of sustainable housing for our future cities.

POSTER SESSION

A poster session was organized as a unique space of interaction and networking. 29 posters related to the different sessions of the Summit were presented, showing forefront research on nanoscience and nanotechnology contributing to greener energy, transportation, health, connectivity and urban infrastructure, as well as practical implementations for more sustainable research. At the end of the Summit, **6 poster awards were given to: Alvaro Gallo-Cordova (*ICMM, Spain*), Ricardo M. L. Silva (*INL, Portugal*), Arnau Fons-Cervera (*CNM-IMB, Spain*), Marta Duran (*ICN2, Spain*), Jessica C. Ramirez (*ICN2, Spain*) and Aleix Carrascull (*ICN2/Futurechromes, Spain*).** Congratulations!

LOOKING AHEAD

The **2025 N4SNano Global Summit** reinforced the strategic importance of a multidisciplinary, science-based and sustainable implementation of nanotechnology-based solutions for the development of future cities worldwide. Through shared tools, data, and vision, the N4SNano network is guiding the safe and sustainable integration of nanotechnologies into transformative societies.

ICN2 is proud to have hosted this landmark event at the unique space of CosmoCaixa Science Museum in Barcelona and joins congratulating MESA+ institute (Twente, The Netherlands), the organising institution of the 2027 N4SNano Global Summit.

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