



BUILDING a NANO-ELECTRONICS DESIGN and TECHNOLOGY COMMUNITY in EUROPE

Most experts agree that scaling CMOS technology is coming to an end in the next decades. The question asked are then what comes after? Which kind of technology can be used instead? Will Europe play an important role in technologies beyond CMOS? Will the European industry have a significant market share using emerging technologies? And if not, what will happen to European industries in, for example, the automotive and energy sectors, which are orders of magnitude bigger and are heavily dependent on electronic system competences? Will they shrink and fade away due to the lack of native innovation? Estimating the importance of future Nanoelectronics to calculate the risk for its dependable markets is like looking at the tip of an iceberg to calculate the risks of a ship wreckage.

To prepare for the future, Europe needs a strong R&D competence in Electronic System Design to integrate technology in emerging design processes. To this end, the European Commission is funding the Coordination Action project NANO-TEC (ICT-2010-257964) where leading stakeholders in Nanotechnologies R&D have come together to establish a joint design & technology community in Nanoelectronics in Europe. This community will have to face the new challenges of technology and the concomitant engineering questions towards novel industrial products emanating initially from academic research.

For the next generation of devices and systems, design and technology go hand in hand in industrial R&D. However, for future generations in nanoelectronics, design and technology are not sufficiently integrated to ensure a fast uptake should the proof-of-concept stage succeed. The capability of European industry to transfer and exploit research results in nanoelectronics depends on the availability of integrated solutions provided by, for example, the design and technology communities. There are fascinating ground-breaking results from research based on, for example, single atoms, molecules, semiconductor nanostructures, graphene and DNA strands, to name just a few. However, these

have to be integrated into either existing or future system platforms, and usually meet design constraints at this stage, as an afterthought. The objective of the Coordination Action "Ecosystems Technology and Design for Nanoelectronics" (NANO-TEC) is to address this mismatch by bringing design and technology together at an earlier stage in research. NANO-TEC aims to increase the probability of uptake by industry of the results of academic research and to foster a new way of collaboration within the European Research Area.

A special focus will be placed on raising awareness among public authorities on the importance of such effort. One of the activities of NANO-TEC will be a series of workshops, each with a different focus and objective designed to become familiar with the challenges faced by the science underpinning future nanoelectronics and the concurrent engineering design questions. The workshops will count with experts from the Americas, Asia and Europe. The topics of the workshop will range from molecular electronics, through silicon-based electronics and heterogeneous integration, all the way to spintronics and quantum information processing in the first instance.

The NANO-TEC consortium will work closely with the Scientific Community Council of industry-led ENIAC Technology Platform towards a position paper in Emerging Nanoelectronics. NANO-TEC will develop a state-of-the-art web platform for working groups, facilitating discussions, meetings, communications and access to an information repository. It will form an interface to disseminate the project results to the public and to experts in the field. All together, these initiatives will constitute a set of working tools for experts in nanoelectronics, who will gather in specialist groups, thus becoming a reference point to explore the needs of future nanoelectronics in Europe.





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About NANO-TEC:

NANO-TEC is led by the Catalan Institute of Nanotechnology and is funded by the ICT theme of the 7th Framework Programme of the European Commission. There are 11 partners in the NANO-TEC consortium. These other 10 partners are Valtion Teknillinen Tutkimuskeskus VTT from Finland, German Edacentrum GmbH and Forschungszentrum Juelich GmbH, Chalmers Technical University of Sweden, the Polish Institute of Electron Technology, Delft University of Technology from the Netherlands, the Greek National Centre for Scientific Research "Demokritos", Tyndall National Institute from Ireland, the Ecole Polytechnique Fédérale de Lausanne and the French Centre National de la Recherche Scientifique CNRS. All the partners are experienced in working in large consortia distributed over the European Union and contribute with their organisational and integrative expertise together with visionary research and ambitious goals in nanoelectronics. The scientific and social challenges of NANO-TEC can only be achieved with a constellation such as this, aided by global experts and strong links to industry to ensure a broad coverage of its topic at European level.

NANOTECH website: www.fp7-NANOTECH.eu

CONTACT: Prof. Dr. Clivia M. Sotomayor Torres
(project coordinator)

E-mail: clivia.sotomayor@icn.cat

