

2009/2010 Activity Report

Phantoms Foundation

nanoscience & nanotechnology

knowledge

excellence

expertise

innovation

Academy

$H_2S + 2NH_3 + 2O_2$

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EU FUNDED PROJECTS

Pico-Inside

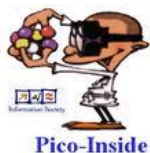
nanoICT

NANOMAGMA

NanoCode

Pico-Inside

Pico-Inside	Computing Inside a single molecule using atomic scale technologies
EC contribution	5,1 M Euros
Contract number	FP6-FET-014857
Nº. of partners	15
Coordinator	CEMES-CNRS (France) / Christian Joachim
Start date	September 01, 2005
Duration	42 months (36+6, amendment approved in 2009)
Website	www.phantomsnet.net/Picoinside



Creating an Atomic Scale Technology is a necessity for any uni-molecular device and machine in molecular electronics, molecular mechanics, molecular transducers and for laboratory scale experiments on one molecule. In the IST priority 2 of the FP6 (Emerging Nanoelectronics FET proactive initiative), the Pico-Inside consortium explored Atomic Scale Technology with the final goal of integrating a complex logic gate inside a single molecule.

In Pico-Inside, you could meet 15 of the most talented academic and industrial research institutes in Europe working together on:

- New intramolecular architectures for integrating a complex digital logic function inside a single molecule
- Understanding the electronic and mechanical behaviour of a single molecule on a surface with the best LT-UHV-STM and UHV-NC-AFM instruments in Europe
- The 4 stages of the interconnection problem from the atomic to the macroscopic scale: 50 pm to 5 nm (atomic wires), 5 nm to 50 nm (mesa island), 50 nm to 5 µm (nanostencil), 5 µm to 1 mm (micro-cantilever array)
- Organic chemistry for synthesising the supermolecule holding the intramolecular logic gate board and all the lateral chemical group equipping the final molecule to perform on a surface
- Theory of large molecule surface science including molecular structure extraction for the experimental STM and NC-AFM images.

To prepare the Framework Programme (7 and 8) of European Research, Pico-Inside provided a full range of roadmapping for interconnect and nano-communication, for chemistry of supermolecules and for intramolecular computing.

Pico-Inside Partners



WORK PERFORMED IN 2009

Within Pico-Inside project, the Phantoms Foundation coordinated the Workpackage 8, “Dissemination and training activities” with main tasks:

- Pico-Inside website
- General Dissemination activities
- External Collaborations
- Focused reports (Roadmapping)
- Plenary Meetings Organisation

Pico-Inside Roadmap

The principal aim of the Pico-Inside report was to provide an overview of the current research results in this field and to predict the main trends in the emerging R&D area of “Mono-Molecular Technologies” over the next 10/15 years. This report provided focus and accelerate progress in identified R&D directions for the FET program, guide public research institutions keeping Europe at the forefront in research and also provide a valid source of guidance for the semiconductor industry.

The structure of the roadmap relied on the Pico-Inside Work Packages and each WP coordinator was responsible for his roadmapping chapter.

Contents:

- 1.- Introduction
- 2.- Hardware nano-architecture
- 3.- Nano-hardware
- 4.- Planar multiple interconnect Atom Technology
- 5.- Conclusion



<http://www.phantomsnet.net/Picoinside/roadmap.php?project=2&intra=1>

Final results and their potential use

Pico-Inside objectives were to develop:

- The architecture
- The atomic scale technology
- The chemistry

to explore and quantify intramolecular resources for integrating much more than a single logic gate inside a single molecule.

Five very recent breakthroughs were fully exploited by Pico-Inside partners:

- The theoretical demonstration that intramolecular quantum evolution based on the nonstationary mixing of large molecule quantum states can perform digital operations
- The new intramolecular mesh and node circuit rules for large molecules whose internal chemical structure is similar to a standard electronic circuit architecture
- The experimental demonstration that the electronic contact between a single molecular wire and its contacting atomic pad requires 0.05 nm precision
- The atomic resolution now obtained by a non-contact UHV-AFM on insulating surfaces and by low temperature UHV-STM on insulator on metal systems
- The progresses of organic chemists to design and synthesise large multifunctional molecules adapted to surface performances at the atomic scale.

Pico-Inside integrated the necessary groups to explore new architecture concepts with Fujitsu Europe. LT-UHV-STM and NC-UHV AFM offered a complete and true access to the atomic scale for interconnects with Omicron. This included nano-stencil contact experiments, the necessary chemistry labs task force and the required theoretical group to support the architecture, the molecular design and the analysis of Pico-Inside nanoscale experiments. This integration was completed by dissemination activities that created and diffused original roadmaps to a large community around Pico-Inside towards mono-molecular computing and atomic scale technologies.

nanoICT

nanoICT	Nano-scale ICT Devices and Systems Instrument Coordination Action
EC contribution	1 M Euros
Contract number	FP7-FET-216165
Nº. of partners	12
Coordinator	Phantoms Foundation (Spain) / Antonio Correia
Start date	January 01, 2008
Duration	48 months (36+12, amendment approved in October 2010)
Website	www.nanoict.org



The nanoICT Coordination Action activities will reinforce and support the whole European Research Community in "ICT nanoscale devices" covering the following research areas expected to demonstrate unconventional solutions beyond the expected limits of CMOS technology:

- Demonstration of new concepts for switches or memory cells
- Demonstration of new concepts, technologies and architectures for local and chip level interconnects with substantial improvements over current solutions
- Demonstration of radically new functionalities by the integration of blocks from a few nanometres down to the atomic scale into high added-value systems

The nanoICT Coordination Action plans will go beyond the organisation of conferences, workshops, exchange of personnel, website, etc. developing the following activities:

- Consolidation and visibility of the research community in ICT nanoscale devices
- Mapping and benchmarking of research at European level, and its comparison with other continents
- Identification of drivers and measures to assess research in ICT nanoscale devices, and to assess the potential of results to be taken up in industrial research
- Coordination of research agendas and development of research roadmaps
- Coordination of national or regional research programmes or activities, with the aim to involve funding authorities in building the ERA around this topic
- Development of strategies for international cooperation on themes related to NanoICT

Expected impact will be the enhanced visibility, shaping and consolidation of the NanoICT research community in Europe.

nanoICT Partners



WORK PERFORMED IN 2009 - 2010

nanoICT website development and maintenance

A crucial activity of the nanoICT project consists in structuring, developing and maintaining a website being able to disseminate widely its results, spreading therefore Excellence not only in Europe but also in other countries.

<http://www.nanoict.org>

nanoICT flyer

Providing basic information on nanoICT CA a nanoICT specific flyer was distributed in order to publicise the project on a worldwide scale at international conferences and exhibitions.



nanoICT databases

Providing information on conferences/courses, jobs and news related with nanoICT research domains were developed and maintained during this period for visitors and consortium partners.

Short Facts

Published conferences/courses	
2009	32
2010	37
Published jobs	
2009	93
2010	75
Published news	
2009	126
2010	74

Creation and maintenance of a database of active groups on ICT research areas

This database (including core and associated members) will strengthen both collaboration and competition.

- 99 groups registered as of March 25, 2010
- 144 groups registered as of April 11, 2011

nanoICT Registration: <http://www.nanoict.org/register.php>

nanoICT Working Groups

Each of them dealing with research areas of interest for the FET/NanoICT proactive initiative: a “global vision” one and 10 more focused (11 in total – 2 new Working Groups set-up in 2009, Nanophononics and BioICT, and 1 new Working Group set-up in 2010, Graphene).

<http://www.phantomsnet.net/nanoICT/groups.php?project=4>

WG1 - Alternative Electronics from a global point of view: WG coordinated by Robert Baptist/Jean Philippe Bourgoin (CEA, France)

WG2 - NEMS: WG coordinated by Juergen Brugger (EPFL, Switzerland)

WG3 - Carbon Nanotubes (CNT): WG coordinated by Bill Milne (Cambridge University, UK)

WG4 – Semiconductor Nanowires (NW): WG coordinated by Lars Samuelson (Lund University, Sweden)

WG5 - Theory and Modelling: WG coordinated by Massimo Macucci (IU.NET, Italy)

WG6 - Mono-Molecular Electronics (M2e): WG coordinated by Christian Joachim (CNRS-CEMES, France)

WG7 - Spintronics: WG coordinated by Claude Chappert (CNRS-ORSAY, France)

WG8 - Nanophononics: WG coordinated by Jouni Ahopelto (VTT, Finland)

WG9 - Nanophotonics: WG coordinated by Clivia Sotomayor Torres (CIN2, Spain)

WG10 - Graphene (GN): WG coordinated by Stephan Roche (CIN2 (CSIC-ICN), Spain)

WG11 - BioICT: WG coordinated by Jean-Pierre Aimé (Université Bordeaux 1 & Cnano GSO, France)

Working Groups issued after each meeting of their core members a short **position paper** addressing discussed topics (work progress on mapping and benchmarking of European research, identification of drivers and measures to assess research in each particular domain, new strategies for international collaborations, etc.). Positions papers were published in the E-Nano Newsletter contribution and related Working Group website) and contributed to the preparation of the nanoICT Research agenda on “NanoICT” strategic research areas planned by the Management Board.

E-Nano Newsletter - 16 Issue



Research - nanoICT Position Papers:

- “Status of Modelling for Nanoscale Information Processing and Storage Devices” – version 2 by M. Macucci, S. Roche, A. Correia, J. Greer, X. Bouju, M. Brandbyge, J. J. Saenz, M. Bescond, D. Rideau, P. Blaise, D. Sanchez-Portal, J. Iñiguez, G. Cuniberti and H. Sevincli

Expert Consultation Report:

- “Atomic & Molecular Scale Devices and Systems and Bio-Chemistry Based Information Systems” Expert Consultation Workshop: 22 & 23 October 2009, Brussels (Belgium)

http://www.phantomsnet.net/files/E_NANO_Newsletter_Issue16.pdf

E-Nano Newsletter - 17/18 Special Issue



Research - nanoICT Position Papers:

- “Overview of nanowire electronics”
- “Overview of nanowire growth”
- “Overview transport / optical properties of nanowires”
- “Overview of nanowire for energy”
- “Overview of nanowire for biology / medicine”

Annex 1: Report from the NODE workshop on nanowire electronics, Report from the Nanowire growth workshop (NWG2009)

Annex 2: NODE project objectives and main achievements, NODE publications

Annex 3: European Nanowire-engaged groups by Lars Samuelson.

http://www.phantomsnet.net/files/E_NANO_Newsletter_Issue17_18.pdf

E-Nano Newsletter - 19 Issue



nanoICT Research:

- “Simulating the structural, electronic and transport properties of silicon nanowires” by Xavier Cartoixa and Riccardo Rurali
- “Field Emission Resonances at Tip/Mercapto-alkylferrocene/Au Interfaces” by Lars Müller-Meskamp, Silvia Karthäuser, Harold J. W. Zandvliet, Melanie Homberger, Ulrich Simon and Rainer Waser

Research - nanoICT Position Paper:

- “nanoICT BioInspired Nanomaterials” by Jean-Pierre Aimé

http://www.phantomsnet.net/files/E_NANO_Newsletter_Issue19.pdf

E-Nano Newsletter - 20/21 Special Issue



Research - nanoICT Position Paper:

- “Carbon Nanotubes”, by W. I. Milne et al.

nanoICT Research:

- “European Research Roadmap for Nanoelectronics”, by F. Balestra.
- nanoICT highlights
- “Report nanoICT Graphene and Nanotubes Session - TNT2010”, by S. Roche.
- “Phonons and Fluctuations Meeting”, by J. Ahopelto.
- “International Summer School Son et Lumière”, by C. M. Sotomayor Torres

http://www.phantomsnet.net/files/E_NANO_Newsletter_Issue20_21.pdf

nanoICT Cluster Reviews

High-level dissemination activities such as the **nanoICT Cluster Review meeting** helped to establish a critical mass of R&D at a European level and to stimulate development of an interdisciplinary community of researchers. During these review meetings, an open plenary session (1 day, composed of EU representative presentations, proactive action related talks and short contributions on ICT/FET FP7 scientific research highlights and restricted EU project reviews) took place.

- Cluster Review 2009 (Grenoble, France): March 24-27, 2009
<http://www.phantomsnet.net/nanoICT/CR/index.php?project=4>
- Cluster Review 2010 (Cambridge, UK): April 07-09, 2010
<http://www.phantomsnet.net/nanoICT/CR2/index.php?project=4>

nanolCT sessions at high-level European Conferences

Each **nanolCT session at high-level European conferences** was related to a topic of interest for the network and composed of a set of invited talks and a specific presentation of the NanoICT Coordination Action. These conference sessions described application and commercialisation opportunities, discussed and debated trends and issues in-depth and described cutting-edge research and development in “Emerging Nanoelectronics”:

- 2009 Sessions at: (a) Nanowire Growth Workshop – NWG2009 (Paris, France); (b) NanoSWEC2009 conference (Bordeaux, France)
- 2010 Sessions at: (a) Trends in Nanotechnology (TNT2010) – (Braga, Portugal); (b) Phonons and Fluctuations Meeting – (Paris, France); (c) International Summer School Son et Lumière – (Cargèse, France); (d) Franco-Iberian Nanosensor Workshop (FINW) – (Biarritz, France); (e) Seminar: “Which interactions between Synthetic Biology and Micro&Nanotechnologies?” – (Grenoble, France); (f) Nanoelectronic days 2010 – (Aachen, Germany); (g) ICREA workshop on Phonon Engineering – (Girona, Spain)

Training activities: nanolCT school

The main purpose of the school organized in San Sebastian (CIC nanoGUNE) was to educate graduate students on the scientific opportunities associated with the emerging fields of NanoICT. The event format was the following: two schools - one on “NanoOptics and Nanophotonics” covering both theoretical and experimental aspects and another one on “Theory and Modelling issues” – and one day symposium.



Short Facts

Participants	
School NanoPhotonics	35
School Modelling	26
Symposium	66
Invited Professors	
School NanoPhotonics	6
School Modelling	6
Symposium	14

<http://www.phantomsnet.net/nanolCT/School09/index.php>

nanolCT Research Agenda (version 1.0)

This first version of the nanolCT research agenda provides focus and accelerate progress in identified R&D directions and priorities for the “nanoscale ICT devices and systems” FET proactive program and guide public research institutions, keeping Europe at the forefront in research. In addition, it aims to be a valid source of guidance, not only for the nanolCT scientific community but also for the industry (roadmapping issues), providing the latest developments in the field of emerging nano devices that appear promising for future take up by the industry:

<http://www.phantomsnet.net/nanolCT/reports.php?project=4>



Main results achieved 2009-2010

- Development and maintenance of the nanolCT website
- Maintenance of nanolCT databases (Public: conferences/courses, jobs, news – Intranet: documents, publications, partners)
- Distribution of the nanolCT flyer
- Maintenance of a database of active groups on ICT research areas
- Development and maintenance of the nanolCT HUB
- Development of the nanolCT BLOG
- Five position papers published in the “E-Nano Newsletter” (1500/2000 printed copies of each issue) corresponding to Modelling, Nanowires, BioICT and Nanotubes Working Groups.
- Creation of new Working Groups: NanoPhononics and BioICT (2009) and Graphene (2010).

- nanoICT Management Board internal meeting organisation (Grenoble, France)
- Co-organisation of the TowardZeroPower meeting (Brussels, Belgium) in collaboration with EU/FET proactive initiative.
- nanoICT Cluster Review Meetings organisation (Grenoble, France 2009 & Cambridge, UK 2010)
- Organisation of the nanoICT Training School (San Sebastian, Spain) and one-day open NanoICT Symposium, 2009.
- Short training course: SPM course (Malaga, Spain), 2010
- Specific nanoICT sessions organised at (a) Nanowire Growth Workshop – NWG2009 (Paris, France); (b) NanoSWEC2009 conference (Bordeaux, France) (c) Trends in Nanotechnology (TNT2010) – (Braga, Portugal); (d) Phonons and Fluctuations Meeting – (Paris, France); (e) International Summer School Son et Lumière – (Cargèse, France); (f) Franco-Iberian Nanosensor Workshop (FINW) – (Biarritz, France); (g) Seminar: “Which interactions between Synthetic Biology and Micro&Nanotechnologies?” – (Grenoble, France); (h) Nanoelectronic days 2010 – (Aachen, Germany); (i) ICREA workshop on Phonon Engineering – (Girona, Spain)
- Publication of the nanoICT Research Agenda (Version 1.0)
- “nanoICT exchange visits” program launched

Expected final results and their potential use

Expected impact will be the enhanced visibility, shaping and consolidation of the NanoICT research community in Europe. The CA activities will therefore reinforce and support the whole European Research Community in “ICT nanoscale devices” covering the research areas expected to demonstrate unconventional solutions (disruptive technologies) to increase computing performance, functionality or communication speed, or to reduce cost, size and power consumption of ICT components beyond the expected limits of CMOS technology.

NANOMAGMA

nanoICT	NANOstructured active MAGneto-plasmonic Materials
EC contribution	2,96 M Euros
Contract number	FP7-214107-2
Nº. of partners	10
Coordinator	IMM / CSIC (Spain) / Antonio Garcia-Martin
Start date	November 01, 2008
Duration	36 months
Website	www.nanomagma.org



The purpose of this European funded project is the study, development and application of a novel concept of nanostructured materials formed by the combination of components with plasmonic and magneto-optic (MO) activity. This smart combination will produce “magneto-plasmonic” nanomaterials tailored on the nanoscale.

In short the S&T objectives can be regarded as four, in which it will consider both bottom-up and top-down approaches to obtain the desired magneto-plasmonic materials:

Development of nanomaterials that combine plasmons and magnetic properties (films, nanoparticles, core-shell structures).

Investigate the correlation between the optical, magnetic, magneto-optical and magneto-plasmonic properties.

Carry out theoretical calculations of the optical response considering the magneto-optical contribution.

Provide proof of concept for applications based in the magneto-plasmonic activity, and testing for specific applications in the field of chemical sensors and biosensors. Identification of applications for microelectronics and information technology.

NANOMAGMA Partners



WORK PERFORMED IN 2009 - 2010

Within NANOMAGMA project, the Phantoms Foundation participates in the Workpackage 1, "Management, dissemination and training".

NANOMAGMA website development and maintenance

Development and maintenance of NANOMAGMA website, including main public information about the project, partners, news, events and a restricted area (database: documents and internal events) for the Management Board (and individuals belonging to the project) to allow secured exchange of confidential information (documents, images, job opportunities, etc.) about the project and to display information on: progress about the project, calendar, plenary meetings, reports, etc.

www.nanomagma.org

NANOMAGMA flyer

Providing basic information on the NANOMAGMA project a specific flyer, including short facts, project objectives, highlights and publications was distributed in order to publicise the project on a worldwide scale at international conferences and exhibitions.

http://www.phantomsnet.net/files/Nanomagma_Flyer.pdf



Dissemination

Contribution to the E-Nano Newsletter edited by the Phantoms Foundation. In agreement with the project coordinator, a review article on the current status of "magneto-plasmonics and applications" and a list of the partners involved in the NANOMAGMA project (NANOstructured active MAGneto-plasmonic MATERIALs), detailing their activities and core competences was published in 2009 (1500 printed copies were distributed). This action promoted NANOMAGMA project worldwide but also enhanced collaboration between partners.

http://www.phantomsnet.net/files/E_NANO_Newsletter_Issue15.pdf

Internal Meetings Organization

- 1st Internal Plenary Meeting (Lecce, Italy) – May 21-22, 2009
Short facts: 2 days meeting – 17 participants – 18 contributions (WP's activities)
- 2nd Internal Plenary Meeting (Paris, France) – November 09-10, 2009
Short facts: 2 days meeting – 20 participants – 16 contributions (WP's activities)
- 1st Review Meeting (Alcala de Henares, Spain) – May 31-June 01, 2010
Short facts: 2 days meeting – 20 participants
- 3rd Internal Plenary Meeting (Grenoble, France) - December 16-17, 2010
Short facts: 2 days meeting – 13 participants – 9 contributions (WP's activities)

Short Training Course Organization

A Short Training Course was organized during the CEN2010 event (2nd Spanish NanoPhotonics Conference), Segovia (Spain) - June 15, 2010 (CEN2010), Segovia (Spain)

Short facts: 1 morning course – 19 participants – 4 contributions

<http://www.phantomsnet.net/cen2010/course.php>

NanoCode

NanoCode	A multistakeholder dialogue providing inputs to implement the European Code of Conduct for Nanosciences & Nanotechnologies (N&N) research
EC contribution	1,2 M Euros
Contract number	244521-FP7-SCIENCE-IN-SOCIETY-2009-1
Nº. of partners	10
Coordinator	Associazione Italiana per la Ricerca Industriale – AIRI (Italy) / Elvio Mantovani
Start date	January 01, 2010
Duration	23 months
Website	www.nanocode.eu



The objective of NanoCode is to define and develop a framework aimed at supporting the successful integration and implementation, at European level and beyond, of the Code of Conduct (CoC) for nanosciences and nanotechnologies (N&N) research as developed by the European Commission.

The NanoCode project facilitates a multistakeholder dialogue on the CoC at European level and in selected Associated Countries that is aimed at improving and strengthening awareness of the CoC, promoting trustbuilding among stakeholders and, as an ultimate goal, developing a framework to support the wider application of the CoC. Based on the opinions of stakeholders and on experience with other codes, voluntary measures and practices set up by different organisations aimed at responsible development of N&N research, this framework will:

- Identify those practices that support compliance with the principles and actions of the EC's CoC and help to underpin its implementation
- Propose criteria and indicators to assess the level of application of the CoC
- Suggest and evaluate a portfolio of incentives and disincentives
- Propose possible future integration of and changes to the CoC

The development of practical tool (the CodeMeter) to help stakeholders assess their performance in complying with the CoC's principles will form a key element of the framework.

NanoCode Partners



WORK PERFORMED IN 2009 - 2010

Analysis of existing situation

In each of partners' country, an analysis of existing/proposed Codes of Conduct, voluntary measures and practices for a responsible R&D in N&N and identification of relevant stakeholders was performed. The analysis consisted in collecting and reviewing information available on the major code of conduct, voluntary measures and practices for a responsible technology development, regarding in first place N&N R&D, already adopted or under consideration in EU and at international level. The analysis included a brief review of regulatory and policy situation in relation with nanotechnologies and, in particular, ascertained the degree of awareness/diffusion of the EC Code of Conduct (CoC), and pointed out differences and similarities between CoC and other regulatory schemes.

Relevant stakeholders were identified in each partner Country, in order to prepare a qualified catalogue of stakeholders and to select those to involve in the consultation process.

A synthesis report on present situation about Code of Conducts, voluntary measures and practices toward a responsible development of N&N was published, including information from Country reports and the analyse of most important initiatives on the issues above in other Countries and at international level.

<http://www.nanocode.eu/files/reports/nanocode/nanocode-project-synthesis-report.pdf>



Stakeholders consultation

An engagement with relevant representatives of active stakeholders in N&N, and a survey of their opinions was performed, in each of partners' country, through a dedicated questionnaire and structured interviews. The consultation process took place through a questionnaire in electronic format sent to all identified stakeholders, and with few structured interviews with selected stakeholders whose opinions and possible contributions were considered of greatest interest. This activity promoted dissemination of information on project themes and helped to clarify and complement the information gathered in the first phase. In short, it was an essential step to assess stakeholders attitudes, expectations, needs and objections regarding the EC CoC.

A synthesis report on stakeholders consultation was published, including stakeholders opinion attitudes, expectations, needs, objections and proposals, and a collation of information from the Country reports on questionnaires and interviews.

<http://www.nanocode.eu/files/reports/nanocode/nanocode-consultation-synthesis-report.pdf>



Expected final results and their potential use

The project objective is the definition and development of a framework enabling the successful integration and implementation at European level and beyond, of the Code of Conduct (CoC) for responsible N&N research defined by the European Commission. This will be done by:

- Identifying and consulting the interested stakeholders, assessing, the most relevant codes of conducts, voluntary measures and practices for a responsible technology development
- Proposing criteria and indicators of "good practices" to implement the EU CoC as well as possible future changes, basing on identified criteria and indicators, defining and testing a practical tool (CodeMeter) for the assessment of performances in relation with the application of the CoC
- Selecting a set of incentives and disincentives to stimulate the adoption of the CoC, identifying future regulatory, policy and research needs in order to integrate foresight oriented aspects in further developments of the CoC
- Designing of a CoC MasterPlan enabling the implementation and integration of the CoC, including future changes, best practices, incentives/disincentives and performance criteria for the adoption of the CoC
- Communicating and disseminating information on project outcomes and on the CoC through national workshops and conferences, an international conference, the project website and a series of brief publications.
- The engagement of stakeholders in the debate will help to increase the awareness on the CoC and in shaping its content to the stakeholders' needs and expectations, making it a more accepted, concrete and practical instrument for decision-making in N&N R&D.

The project outcomes will support the EC, EU policy makers and stakeholders on the implementation and integration of the European CoC, and it will help the EC to prepare the second review of the CoC, planned for the beginning of 2012.

CONFERENCE ORGANIZATION



NanoSpain 2009

TNT 2009

NanoSpain 2010

CEN2010

TNT 2010

NanoSpain 2009



In 2008, Spain, Portugal and France (through their respective networks NanoSpain, PortugalNano and C'Nano GSO) decided to join efforts in order that NanoSpain events facilitate the dissemination of knowledge and promote interdisciplinary discussions not only in Spain but among the different groups from Southern Europe. NanoSpain2009 edition (March 9-12, 2009) organised in Zaragoza (Spain) also enhanced industrial participation.

Organizers

Exhibitors



Invited Speakers

- Marco Affronte (CNR-INFM National Research Center, Italy) - Nanomagnetism
- Alexandre Bouzidine (University Bordeaux 1, France) - Theory & Modelling
- Russell Cowburn (Imperial College London, UK) - NanoBiotechnology / Nanomagnetism
- Etienne Duguet (University of Sciences and Technology of Bordeaux, France) - Nanomaterials
- Jurriaan Huskens (University of Twente, The Netherlands) - Nanochemistry
- Xavier Marie (INSA-CNRS-LPCNO, France) - NanoOptics
- Wolfgang Parak (University Marburg, Germany) - Nanobiotechnology
- Maurizio Prato (University of Trieste, Italy) - Nanotube
- Albert van den Berg (University of Twente, The Netherlands) - Nanobiotechnology

Specific Sessions

- NanoBiotechnology
- NanoFabrication
- Industrial
- NanoChemistry
- NanoOptics and Nanophotonics

Short Facts

Participants	307
Keynotes	18
Orals	62
Posters	156
Poster Flash	10
Exhibitors	17
Student Grants	43

<http://www.nanospainconf.org/2009>

<http://www.nanospainconf.org>

TNT 2009



The TNT2009 edition (September 07-11, 2009) took place in Barcelona (Spain) in particular to emphasise the importance at the Spanish and European level of the Nanoscience and Nanotechnology activity of the Catalanian region. This high-level scientific meeting series aimed to present a broad range of current research in Nanoscience and Nanotechnology as well as related policies (European Commission, etc.) or other kind of initiatives (nanoGUNE, FinNano, GDR-I, etc.).

Organizers

Exhibitors



Invited Speakers

- Masakazu Aono (NIMS / MANA, Japan)
- Federico Capasso (Harvard University, USA)
- Pedro Echenique (DIPC / UPV-EHU, Spain)
- Sumio Iijima (Meijo University, Japan)
- Uzi Landman (Georgia Institute of Technology, USA)
- Stuart Parkin (IBM, USA)

Specific Sessions

- Nanobiotechnology (organised in collaboration with IBEC-UB)
- Nanomagnetism (organised in collaboration with nanoGUNE)
- Nanotubes & Graphene (organised in collaboration with GDRI)
- NanoIndustry Parallel Session (organised in collaboration with 22@Barcelona)

Short Facts

Participants	447
Keynotes	40
Orals	40
Posters	292
Poster Awards	18
Exhibitors	22
Student Grants	83

<http://tntconf.org/2009>

<http://www.tntconf.org>

NanoSpain 2010



The NanoSpain2010 edition (March 23-26, 2010) was organised in Malaga (Spain) to emphasise the importance at the Spanish and European level of the launch of the Centre for Research in Nanomedicine and Biotechnology, Bionand. This event was organised in collaboration with 3 networks: NanoSpain (Spain), Portugalnano (Portugal) and C'Nano Grand Sud Ouest (France)

Organizers

Exhibitors



Invited Speakers

- Philippe Barthélémy (Université Victor Segalen Bordeaux 2, France) - NanoBiotechnology/ Nanomedicine
- Lajos P. Balogh (University of Buffalo, USA) - NanoBiotechnology/Nanomedicine
- Leonhard Grill (Freie Universität Berlin, Germany) - Molecular Electronics
- Philippe Leclerc (Université de Mons/Materia Nova, Belgium) - SPM and Modelling
- Pierre-Emmanuel Milhiet (CBS / CNRS-INSERM, France) - Nanobiotechnology
- Hans Peter Oepen (University Hamburg, Germany) - Nanomagnetism
- Danny Porath (Hebrew University, Israel) - SPM
- Stephan Roche (CEA-INAC, France) - Graphene/Carbon Nanotubes
- Mihail Roco (NNI and NSF, USA) - Scientific Policy
- Christof Woell (Karlsruher Institut für Technologie (KIT), Germany) - Nanochemistry

Specific Sessions

- NanoBiotechnology
- NanoElectronics/NEMS and Nanofabrication
- Industrial
- NanoChemistry
- NanoOptics and Nanophotonics

Short Facts

Participants	290
Keynotes	12
Orals	59
Posters	115
Poster Flash	10
Exhibitors	20
Student Grants	36

<http://www.nanospainconf.org/2010>

<http://www.nanospainconf.org>

CEN2010



The 2nd edition of the Conferencia Española de Nanofotonica took place in Segovia (Spain) during 15-18 June 2010. The Conference aimed to gather all the groups carrying out research in Nanophotonics in Spain (as well as somewhere else with interest in the research in Nanophotonics performed in Spain). It intended to spread the research results achieved by all the different Spanish groups and to promote the establishment or reinforcement of contacts between them, as a mean to help the community to become more visible and dynamic.

Organizers



Exhibitors



Invited Speakers

- Kurt Busch (Karlsruhe University, Germany) "Advanced material models for nano-plasmonic systems"
- Stefan Linden (Universität Bonn, Germany) "Recent Progress on Photonic Metamaterials"
- Christian Seassal (Université de Lyon, INL - Institut des Nanotechnologies de Lyon, France) "Slow light in photonic crystals for photovoltaics"
- Claude Weisbuch (Ecole Polytechnique, France) "The Physics of Photonic Crystals LEDs"
- Anatoly V. Zayats (The Queen's University of Belfast, United Kingdom) "New trends in plasmonic nanophotonics"

Specific Sessions

- Nanomagma Short Training Course
- Nanophotonic Applications
- Nanophotonic Applications
- Plasmonics
- Metamaterials
- Nanophotonic Applications
- Photonic Materials and Photonic Bandgap Structures

Short Facts

Participants	107
Keynotes	5
Orals	40
Posters	45
Poster Awards	1
Exhibitors	3
Student Grants	20

<http://www.phantomsnet.net/cen2010>

TNT 2010



The 11th edition of the Trends in Nanotechnology International Conference (TNT2010) was launched following the overwhelming success of earlier Nanotechnology Conferences. The TNT2010 edition (September 06-10, 2010) took place in Braga (Portugal) to emphasise the importance at the Portuguese and European level of the Nanoscience and Nanotechnology activity of the Northern Portugal region and in particular the launch in 2010 of the International Iberian Nanotechnology Center.

Organizers

Exhibitors



Invited Speakers

- Masakazu Aono (NIMS / MANA, Japan) "Atomic and molecular electrochemical structure control"
- Andre Geim (University of Manchester, UK) "Graphene: Status and Prospects"
- Klaus Kern (Max-Planck-Institut für Festkörperforschung, Germany) "Nanoscale electronic contacts"
- Uzi Landman (Georgia Institute of Technology, USA) "Small is different: physics and chemistry in the non-scalable nano regime"

Specific Sessions

- Nanomaterials (organised in collaboration with FRIMAT)
- Nanobiotechnology (organised in collaboration with IBEC-UB)
- Self-Assembly (organised in collaboration with nanoGUNE)
- Nanotubes (organised in collaboration with nanoICT)
- Graphene (organised in collaboration with GDRI)

Short Facts

Participants	290
Keynotes	31
Orals	26
Posters	174
Poster Awards	19
Exhibitors	15
Student Grants	100

<http://tntconf.org/2010>

<http://www.tntconf.org>

INTERNATIONALIZATION OF THE SPANISH N&N

Internationalization of the Spanish Nanoscience and Nanotechnology

The Phantoms Foundation is coordinator of the Spanish Nanotechnology Plan funded by ICEX (Spanish Institute for Foreign Trade), as an initiative under the program España, Technology for Life, to enhance the promotion in foreign markets of Spain's more Innovative and leading industrial technologies and products in order to:

- Represent the Scientific, Technological and Innovative agents of the country as a whole
- Foster relationships with other markets/countries
- Promote country culture of innovation
- Better integrate the Spanish "Science-Technology-Company-Society" system in other countries
- Generate and develop scientific and technological knowledge
- Improve competitiveness and contribute to the economic and social development of Spain

The Phantoms Foundation and the Spanish Institute for Foreign Trade (ICEX), bring since 2008 to international exhibitions and conferences "Nanoscience and Nanotechnology Spain Pavilions/Areas". At these events, nanoscience and nanotechnology companies, science and technology research centers and industry associations present innovative technologies uses, advances in nanotechnology and projects from Spain under "Spanish Nanoscience and Technological Offer" in order to better integrate the Spanish Science-Technology-Company-Society in the Global Market.

Funding Agencies



Participating companies/institutions within the Spain Area/Pavilion

Nano tech 2009



Tokyo (Japan) 18-20 February 2009
<http://www.nanotechexpo.jp/en/index.html>
<http://www.phantomsnet.net/nanotech2009/>



Taiwan Nano Exhibition

Taipei (Taiwan) 7-9 October 2010

<http://nano.tca.org.tw/index.php>

<http://www.phantomsnet.net/Taiwan2010>

**Nano tech 2010**

Tokyo (Japan) 17-19 February 2010

<http://www.nanotechexpo.jp/en/index.html>

<http://www.phantomsnet.net/nanotech2010/>

**Nanotech 2009**

Houston (USA) 03-07 May, 2009

<http://www.nsti.org/Nanotech2009/>

<http://www.phantomsnet.net/NSTI2009>

**Other activities**

Coordination of the specific session about Nanotechnology Applications at MIDEST Paris (France) 06 November, 2008

<http://www.midest.com/index.php>

- Antonio Correia – Phantoms Foundation (NanoSpain Network)
- César Merino Sánchez – GRUPO ANTOLIN (Carbon Nanofibers)
- Silvia Llopis- THREELOP (Inorganic Chromosome based in Silicon)

NETWORK COORDINATION

NanoSpain Network

M4nano Initiative

NanoSpain Network



NanoSpain, Spanish Nanotechnology Network, coordinated by the Phantoms Foundation and the Spanish National Research Council (CSIC), promotes the exchange of knowledge between Spanish groups working in different fields related to Nanotechnology and Nanoscience increasing collaboration among universities, research institutions and industry:

Main purposes:

- To provide a frame to researches where show the outcome of research trough a web site and multidisciplinary meetings
- To publicise new initiatives
- To enable technology transfer
- To promote industrial involvement in NanoSpain activities
- To recognize priority scientific areas, impelling technological application to define the Spanish objectives for international market
- To establish successful relationships with European initiatives, as Excellence Networks, and other international institutions
- To build a Spanish source of information related to Nanotechnology, with database with research groups and industries belonging to network and to disseminate results of researching, reports and effects of European Union Projects, patents, etc.
- To provide a periodical newsletter information about conferences, news, workshops, employment, grants, etc.

Short Facts

298 Registered Groups, more than 2000 researchers	
Published conferences/courses	
2009	65
2010	62
Published jobs	
2009	82
2010	87
Published news	
2009	144
2010	144

<http://www.nanospain.org>

M4nano Initiative



"Modelling for Nanotechnology" (M4nano) is a WEB-based initiative led by four Spanish Institutions: Phantoms Foundation, Parque Científico de Madrid (PCM), Universidad Autónoma de Madrid (UAM) and Universidad Complutense to maintain a systematic flow of information among research groups and therefore avoid that research efforts in Nanomodelling remain fragmented.

M4nano provides a comprehensive guide -"who's who"- of groups working in Modelling at the nanoscale listing their accomplishments, background, infrastructures, projects and publications. In this way, M4Nano completes the aim of both raising awareness of scientists in Nanotechnology modelling issues and aiding them in developing beneficial collaborations and employment opportunities.

M4nano in close collaboration with other European Research Institutions deeply involved in "modelling at the nanoscale" develops tools such as a user's database, a forum to stimulate discussions about the future of Nanocomputing, a source of documents (courses, seminars, etc.) on modelling issues, etc.

Short Facts

139 Registered Groups

<http://www.m4nano.com>

DISSEMINATION



Website

Reports / Articles

Newsletter

Dissemination

The Phantoms Foundation plays an important role as a dissemination platform to spread excellence among a wider audience.

Website

Development of a multidisciplinary website providing information on Nanotechnology and Nanoelectronics in particular (Emerging Nanoelectronics). Such initiative allows to strengthen excellence, allow research for the advancement of knowledge and its industrial application; and increase the impact of Nanotechnology worldwide.

Short Facts 2009 - 2010

309 Registered Groups, more than 2000 researchers	
Published conferences/courses	
2009	96
2010	82
http://www.phantomsnet.net/Foundation/conferences.php	
Published jobs	
2009	157
2010	105
http://www.phantomsnet.net/Foundation/jobs.php	
Published news	
2009	296
2010	213
http://www.phantomsnet.net/Foundation/news.php	

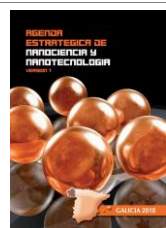
Reports / Articles

Publication of focused reports on specific areas of interest for the Nanoscience/Nanotechnology Community. These reports provide focus and accelerate progress in identified R&D directions for the EC programs, guide public research institutions keeping Europe at the forefront in research and also provide a valid source of guidance for governmental Institutions.



Article in Revista del Colegio Oficial de Físicos (Spain), No. 20 December 2009 pages 36-39. "2010-2020: ¿LA DÉCADA DEL DESPEGUE DE LA NANOTECNOLOGÍA ESPAÑOLA?", overview on the most important Nanoscience and Nanotechnology initiatives in Spain and perspectives for the decade 2010-2020. Information on research and technology infrastructures supporting nanotechnology research, main Centers in Spain, and Spanish initiatives (networks, platforms, regional programmes, conferences, etc.) related with nanotechnology promotion.

http://www.cofis.es/pdf/fys/fys20/fys20_completo.pdf
http://www.cofis.es/pdf/fys/fys20/fys20_36-39.pdf



Focused report "Agenda estratégica de nanociencia y nanotecnología, Galicia 2010", specific nanoscience and nanotechnology Galician Strategic Agenda, including main nanotopics in Galicia, N&N groups and statistics.

<http://www.phantomsnet.net/Resources/files/NANOGALICIA.pdf>

Newsletter on Nanotechnology (E-Nano)

Publication of a printed Newsletter on Nanotechnology (E-Nano) aiming at promoting European Nanotechnology results and enhancing collaborations between groups. The E-Nano Newsletter (edited and published by the PHANTOMS Foundation) provides three-monthly scientific articles, reports and general information in the field of Nanotechnology and more specifically "Emerging Nanoelectronics". This newsletter also publishes relevant information about Projects funded by the European Commission.

<http://www.phantomsnet.net/Foundation/newsletters.php>

E-Nano Newsletter - 15 Issue



- **"NANOMAGMA: NANOstructured active MAGneto-plasmonic MATerials"** by A. Garcia-Martin (IMM-CNM-CSIC)
- **"The implementation of the Action Plan for Nanosciences and Nanotechnologies in Spain (2005-2007)"** by P. A. Serena (ICMM-CSIC)

http://www.phantomsnet.net/files/E_NANO_Newsletter_Issue15.pdf

E-Nano Newsletter - 16 Issue



- **"Status of Modelling for Nanoscale Information Processing and Storage Devices" – version 2** by M. Macucci, S. Roche, A. Correia, J. Greer, X. Bouju, M. Brandbyge, J. J. Saenz, M. Bescond, D. Rideau, P. Blaise, D. Sanchez-Portal, J. Iñiguez, G. Cuniberti and H. Sevincli
- **"Atomic & Molecular Scale Devices and Systems and Bio-Chemistry Based Information Systems"** Expert Consultation Workshop: 22 & 23 October 2009, Brussels (Belgium)

http://www.phantomsnet.net/files/E_NANO_Newsletter_Issue16.pdf

E-Nano Newsletter - 17/18 Special Issue



- **"Overview of nanowire electronics"**
- **"Overview of nanowire growth"**
- **"Overview transport / optical properties of nanowires"**
- **"Overview of nanowire for energy"**
- **"Overview of nanowire for biology / medicine"**

Annex 1: Report from the NODE workshop on nanowire electronics, Report from the Nanowire growth workshop (NWG2009)

Annex 2: NODE project objectives and main achievements, NODE publications

Annex 3: European Nanowire-engaged groups by Lars Samuelson.

http://www.phantomsnet.net/files/E_NANO_Newsletter_Issue17_18.pdf

E-Nano Newsletter - 19 Issue



- **"Simulating the structural, electronic and transport properties of silicon nanowires"** by Xavier Cartoixa and Riccardo Rurali
- **"Field Emission Resonances at Tip/Mercapto-alkylferrocene/Au Interfaces"** by Lars Müller-Meskamp, Silvia Karthäuser, Harold J. W. Zandvliet, Melanie Homberger, Ulrich Simon and Rainer Waser
- **"nanoICT BioInspired Nanomaterials"** by Jean-Pierre Aimé

http://www.phantomsnet.net/files/E_NANO_Newsletter_Issue19.pdf

E-Nano Newsletter - 20/21 Special



- **"Carbon Nanotubes"**, by W. I. Milne et al.
- **"European Research Roadmap for Nanoelectronics"**, by F. Balestra.
- **nanoICT highlights**
- **"Report nanoICT Graphene and Nanotubes Session - TNT2010"**, by S. Roche.
- **"Phonons and Fluctuations Meeting"**, by J. Ahopelto.
- **"International Summer School Son et Lumière"**, by C. M. Sotomayor Torres

http://www.phantomsnet.net/files/E_NANO_Newsletter_Issue20_21.pdf



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