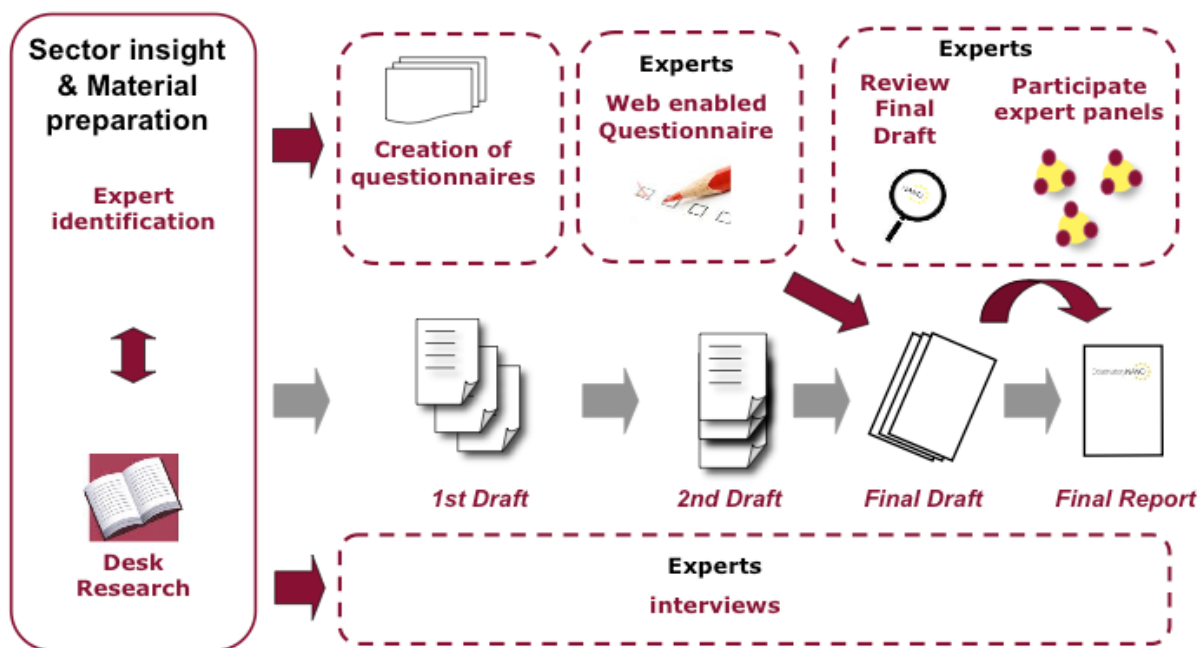


Welcome to the April 2010 Newsletter of the ObservatoryNANO Project

We have reached the end of the second year of the project and you can now find a rich resource of information on nanotechnology developments in ten key technology sectors. Over the last year the consortium has analysed a selection of 'hot topics' culminating in 16 focus reports, which are available for download at www.observatory-nano.eu. Additionally, the general summary reports of Year 1 have been updated according to the latest developments together with a Factsheet document presenting the most exciting developments in each sector in a concise and accessible form. Updates to patent & publication data and our benchmarking analysis have also been completed.

Our analysis depends crucially on engagement with the expert community through personal interviews, questionnaires, and workshops as detailed in the workflow graphic below. Therefore we would like to thank all those who have contributed over the last year.



Newsletter Contents

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A number of 'hot topics' were selected by consortium partners for more detailed analysis during Year 2 of the project; these topics were chosen for either their scientific novelty or likely high impact on European industry, economy or quality of life.

For each report, scientific and technological analysis (WP2) was completed in combination with economic and market analysis (WP3), using the methodology, described in the figure on p1, to provide a more complete picture of the impact of these nanotechnology developments on European economy and society.

All the reports are now available to download from our website www.observatory-nano.eu under 'Scientific and Technological Trends' and the relevant technology sector heading.

Aerospace, Automotive & Transport



Coatings, adhesives & sealants for the transport industry

Environment



Nano Zero Valent Iron

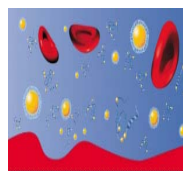
Agrifood



Biodegradable & Edible Food Packaging

Nutrient & Biocide Delivery in Agricultural Production

Health, Medicine & Nanobio



Therapeutic delivery

Regenerative Medicine

Chemistry & Materials



CNT & Nanodiamond

Aerogels

ICT



Printed electronics

Optical interconnects

Construction



Adhesives & Sealants

Security



Protective Materials for Emergency Responders

Energy



Photovoltaics

Batteries

Batteries for Electric Vehicles

Textiles



Sports/Outdoors & Medical-Textiles

ObservatoryNANO 2nd Annual Symposium

22nd & 23rd June 2010—Grenoble

The 2nd Annual Symposium of the ObservatoryNANO project is designed to provide policy makers with a concise, validated review of the latest developments in nanotechnology and their wider socio-economic impacts. This event will also act as a forum where policy makers can provide feedback to the project consortium to help us respond to their needs.

The programme (*see below*) features presentations from a number of high level invited experts in addition to the project partners providing an overview of the analysis and activities carried during Year 2 of the ObservatoryNANO project.

Symposium Day 1

Time	Topic	Presenter
09.00h	Welcome and overview of project	Mark Morrison (IoN)
09.10h	INVITED TALK: Materials	Andreas Leson (FhG-IZM)
09.40h	INVITED TALK: Security	Prof Ashok Vaseashta (Institute for Advanced Sciences Convergence, US)
10.10h	Economic and market trends	Fran Periales (B&W)
10.30h	<i>Coffee</i>	
11.00h	MATERIALS & SECURITY	
	Aerogels	Leif Brand (VDI-TZ)
	Adhesives and sealants for the construction industry	Michael Gleiche (VDI-TZ)
	Sport and outdoor textiles	Andrea Porcari (AIRI)
	Protective Materials for Emergency Responders	Eleanor O'Rourke (IoN)
12.00h	Developments in EHS research, and implications for new technologies	Bryony Ross (IOM)
12.15h	<i>Lunch</i>	
14.00h	INVITED TALK: Agrifood	Eugenia Nuñez (Nanobiomatters S.L.)
14.30h	INVITED TALK: Health, Medicine & Nanobio	Alex Domman (CSEM)
15.00h	INVITED TALK: Environment	Miroslav Cernik (Technical University of Liberec and AQUATEST)
15.30h	MEDICINE, FOOD & ENVIRONMENT	
	New developments in Drug Delivery and Regenerative Medicine	Mark Morrison (IoN)
	State-of-the-art in biodegradable and edible food packaging	Douglas K. R. Robinson (IoN)
	Nano-Iron - THE solution for Environmental Remediation?	Nicole Müller (EMPA)
16.15h	<i>Coffee</i>	
16.45h	New Developments in Regulations and Standards	Elvio Mantovani (AIRI)
17.00h	Ethics in Nanobiomedicine	Ineke Malsch (MTV)
17.15h	A Toolkit for Ethical Reflection and Communication in Nanotechnology	Marc Pavlopoulos (CEA)
17.45h	Close	



Symposium Day 2: Wednesday 23rd June

Time	Topic	Presenter
09.00h	INVITED TALK: ICT	Antonio Correia (PHANTOMS)
09.30h	INVITED TALK: Energy & Transport	Dominique Guyomard (OMNT/B&W)
10.00h	ICT, ENERGY & TRANSPORT	
	Nanophotonics and Graphene Based Electronics	Tom Crawley (Spinverse)
	Electric Vehicles	Fran Periales (B&W)
	Photovoltaics	Sébastien Berger (CEA)
10.45h	<i>Coffee</i>	
11.15h	Corporate Social Responsibility and the NanoMeter Tool	Brigitte Biermann & Stephan Schaller (triple innova)
11.35h	Plans for third year	
11.45h	Discussion, Q&A	
12.30h	Close	



Other Activities

ObservatoryNANO Governing Board Meeting: Wednesday 23rd June (afternoon)

The Governing Board will meet after the Symposium to discuss the activities of the last year of the project and plans for Year 3.

ObservatoryNANO Consortium Meeting: Thursday 24th June (morning)

The project consortium will meet informally to discuss plans for Year 3 activities.

WP7 Workshop: Monday 21st June (afternoon)

The ObservatoryNANO is developing a model for the establishment of a permanent European observatory on nanosciences and nanotechnologies. Part of this process is to evaluate existing models of science and technology observatories, and compare these with the direction taking within the project. Partners in the ObservatoryNANO from the Technical University of Darmstadt (TUD) will lead an internal workshop in Grenoble to discuss their analysis entitled 'Observing the Observers'. This analysis will be used to inform the approach taken by the ObservatoryNANO project, with the purpose of elaborating a structure for the permanent observatory.



ObservatoryNANO Workshop on Carbon Based Materials

International Congress Centre, Dresden

Wednesday 7th July, 11.00-15.00

The ObservatoryNANO project will hold a short workshop during the **Nanofair 2010** conference with a focus on the future of carbon based materials. The peer reviewed report on this topic, titled 'Focus Report 2010: CNT & Nanodiamond', is available from the ObservatoryNANO website (www.observatory-nano.eu). The purpose of the workshop is not only to discuss the report, but also to discuss possible future directions from a both scientific and commercial point of view. Several outstanding experts including Hans-Jörg Fecht (University of Ulm), Alison Crossley (University of Oxford), Hans-Joachim Scheibe (Fraunhofer IWS) and Leif Brand (VDI-TZ) will give a short introduction to this topic. After that a round table discussion is planned. Key questions to be addressed will focus on the most promising carbon based applications and future markets. The workshop is limited to 40 participants and therefore early registration is recommended by contacting Birgit Schaub at birgit.schaub@iws.fraunhofer.de

Further information on the Nanofair 2010 conference can be found at; www.nanofair.com



ICPC NANONET

ICPC Nanonet 2nd Annual Workshop

Monday 14th & Tuesday 15th June 2010

The ICPC NanoNet partnership is opening its doors for the Second Annual Workshop of the ICPC NanoNet Project at the Unisplendour International Center in Beijing, China, on Monday 14 & Tuesday 15 June, 2010, prior to the spectacular Dragon Boat Festival.

The ICPC NanoNet Workshop 2010 will facilitate the required insight into Nanoscientific and Nanotechnological activity in International Cooperation Partner Countries (ICPC) and offers networking platforms and opportunities to increase and intensify the number of collaborations between the EU and ICPC in the areas of Nanoscience and Nanotechnology. Distinguished speakers especially invited to this event will be highlighting specific nano-activities while stakeholders from all over the world will be able to follow the proceedings live via webcast.

The workshop will provide opportunities to:

- Discuss your views with a panel of distinguished guest speakers from the EU and ICPC and engage in discussion groups with expert panel members (see programme <http://www.icpc-nanonet.org/images/stories/ICPCNanoNetWorkshopflyer2010.pdf>).
- Discuss potential collaborations with organisations and researchers in similar fields.
- Disseminate posters, brochures, and other material on your organisation and its ongoing nano-activities.
- Table and board space for this purpose can be reserved in advance when registering.
- Follow proceedings online through a webcast, which will allow remote users to view presentations and be part of discussions in real-time.

Join delegates from the ICPC NanoNet partnership, including The Institute of Nanotechnology (UK) (ICPC Nanonet Project Coordinator); Sociedade Portuguesa de Inovação (PT); St. Petersburg Electrotechnical University (RUS); Jawaharlal Nehru Centre for Advanced Scientific Research (IND); Chinese Society of Micro-Nano Technology (PRC) (Workshop organiser); Malsch Techno-Valuation (NL); MERIT of Universiteit Maastricht (NL); Nanosciences African Network (NanoAfNet)

For further information, visit the project website <http://www.icpc-nanonet.org> or email the project coordinator: lesley.tobin@nano.org.uk



In God's kitchen all sciences were mixed

Interview with Dr Mira Marcus-Kalish, Tel Aviv University, Israel

Dr Mira Marcus-Kalish has participated in several EU projects on bionanotechnology. She is an interdisciplinary researcher combining engineering, mathematics and biology. Her aim is to stimulate truly multidisciplinary cooperation in nanobiotechnology including natural as well as social sciences and humanities. Relating to the whole human body as one system including the “mind” effects in healthcare and avoiding abuse of nanobiotechnology are her main concerns.

Under the header of Nanobioethics, the ObservatoryNano aims to highlight technological and economic trends in nanotechnology for health, medical, biotechnological and agrifood applications with potential ethical and social implications. Simultaneously, current debates on relevant issues in nanobioethics among ethicists and social scientists, policy making circles and stakeholders are analysed and confronted with the issues emerging from the technical and economic trends. This way, emerging issues not discussed sufficiently can be identified and brought to the attention of policy makers in the second annual report on nanobio ethics to be published online in the spring of 2010. The series of interviews with opinion leaders is intended to be a compilation of different views on the relevant issues currently in debate from the perspective of a social scientist, an entrepreneur, an ethicist and now finally a natural scientist.

Ineke Malsch: What are the main issues in nanobioethics currently in debate?

Mira Marcus-Kalish: I see two big issues. The first is the “Mind” Effect, as broad as we define it. Until today, even in systems biology we usually relate to the whole body without always taking into account the brain and especially excluding parts of its activity- the “mind”. We currently don’t do it in drug delivery nor in other medical treatments. If you administer medication to the liver, to knockout an enzyme, for example, there might be a big influence on the rest of the body including the mind, followed by various reaction, but nobody understands it. We understand something about endorphins and about auto-immune systems, but we don’t analyse effects on the whole body, such as bypass, mind effects like mode of beliefs, etc. What is the mind beyond chemicals and electronics? If we know more about the whole body reaction, we can develop better fitted medication, focused with higher efficacy.

Ineke Malsch: Do you mean neurological effects on the mind or cultural or psychological aspects?

Mira Marcus-Kalish: Both. We don’t combine the insights and know how from different disciplines enough. The neurological and physiological knowledge, and the medical and brain research experience are still separated in many cases and not integrated enough in others. If pharmaceutical companies develop a new medication, they don’t, or can’t afford to evaluate in clinical trials environmental or cultural issues, depressions, or other issues that may affect immune reactions. We invest so much in all the preclinical and clinical tests and trials to get FDA approval and then when it’s out there in the market, it is still only effective in 30% of patients. Why is that? We talk so much about personalised medicine, but it is not out there yet.

Ineke Malsch: Should we go for personalised medicine?

Mira Marcus-Kalish: It is part of it. We should go even further out to cultural factors, like people who believe more or less in medication, guided affective imagery or tribes who believe in a specific person who could heal them with or without medication. There are also many environmental influences. It is not only genetics. All these factors have an integrative effect in my opinion. We are investing a lot of efforts and have understood and learned so much, but we are still not very far in understanding regenerative medicine for restoring body tissues and organs.

Ineke Malsch: Diagnostics and sensors could be abused?

Mira Marcus-Kalish: There are several issues in nanobioethics that could be abused. One main issue, for example, is related to diagnostics and sensors. We use a lot of MRI and similar imaging and other equipment for identifying local health problems like plaques. But these things could be abused for other purposes than diagnostics. If I enable such imaging on my head, others can see that a specific area of the brain is lightening up when I am reacting to something or imagining it. This could be used so that others can know what I am thinking even if I am trying to hide it.



In God's kitchen all sciences were mixed

Interview with Dr Mira Marcus-Kalish, Tel Aviv University, Israel

Ineke Malsch: Is the current legislation adequate to deal with that?

Mira Marcus-Kalish: No. We have some real big problems in control and prevention of abuse on the one hand and better healthcare services on the other hand. All these big tools like MRI and fMRI to help people and provide better diagnosis could so easily be abused. In the psychology and medicine research departments we are investigating the localisation in the brain which reacts to doing rather than not doing something. Even if you are developing it for very good reasons it could be abused. It could be utilized to know what I am thinking. The current legislation is not dealing with that at all. All what was done to affect ones motivation or behaviour without advanced equipment could be done today even further down and more effective.

Ineke Malsch: Which issues are caused by a lack of scientific insight into ethical, legal or social aspects? What can ethicists, philosophers and social scientists contribute to the discussion on these issues?

Mira Marcus-Kalish: The lack of shared scientific insight among disciplines works both ways. First, because ethicists are not involved in basic science we lack their possible contribution. We underestimate the cultural effects, the role of beliefs and alike as well as the possible control. If we fully understand the hearing system for example, why don't we create people who can hear even better than we used to? That is called going beyond nature. This shouldn't be done according to my personal opinion. But unless we involve ethicists, we will go there. Or why shouldn't I be able to see at night? I think this development should be stopped for common human usage. I don't mean military night vision lenses. That is fine as far as it is not integrated into the human body. There are also some economic issues. What are the priorities in research funding? I am not speaking about basic sciences. Are we providing equal opportunities to all diseases and people? Finally, a major issue is genetic therapy. This could be abused. It could help us cure people with a particular genetic background. Genetic modification could get further than we want, e.g. build nice blonde people rather than cure disease. If I know that all people with a particular genetic background are sensitive to a particular substance I could hurt them by targeting their weakness. So in these kinds of applications of nanobiotechnology I want to make sure it is not abused or used in an unethical way. I want to dedicate more money to curing people with specific genetic profiles. So in my opinion ethicists should be part of basic science: first in order to be part of and contribute to the research and second to learn and be able to distinguish between safe and harmful, good or dangerous.

Ineke Malsch: How can you prevent military from using something that has been developed for medical applications?

Mira Marcus-Kalish: I wouldn't put it like that. As Altmann said in his book, we need homeland security. We need to protect ourselves. It should be well observed, well controlled and not abused. I am more concerned about societal abuse than military.

Ineke Malsch: How could it be abused in society? People improving themselves like in cosmetic surgery?

Mira Marcus-Kalish: That is a low-level abuse. The high level abuse is if people want only a blonde child or a genius or to control something else, e.g. to improve human performance or selection beyond nature. On a basic level, to use resources that are intended to benefit everybody to benefit a particular group in society.

Ineke Malsch: Which other issues are caused by conflicts of interests between groups in society? What is the role of politicians and civil society in addressing these issues?

Mira Marcus-Kalish: Naturalists or people in favour of alternative medicine or holistic therapy have their own agenda and interests. The collaboration between them and medical research and pharmaceutical companies is very important. If I make you think that you can be cured by using this plant or by not eating meat, or by following a specific guru, there is a gap of knowledge and a conflict of interest that we have to bridge. Neither of these groups have God's secret in its hands. Collaboration, integration, knowledge transfer and cross borders could benefit all.



In God's kitchen all sciences were mixed

Interview with Dr Mira Marcus-Kalish, Tel Aviv University, Israel

Interview: Dr Mira Marcus-Kalish

Ineke Malsch: Is that an actual problem related to nanomedicine?

Mira Marcus-Kalish: Yes. If some naturalists say that imaging technology used to check your stomach for cancer is abusing your body, it is nanomedicine. They are against it and make you believe that if you go to a guru or eat something you will be cured. Both sides should talk to each other. Traditional medicine must become more open to the holistic approach and the naturalists must open the window to basic research or traditional medicine.

Another conflict of interest is related to controlling and prevention of basic research and exposing research results to society as a whole. There are many interests involved including big Pharma, government and the people. In Israel, representatives of the government participate in research consortia. We have a lot of discussions about how to avoid benefiting one societal group at the expense of another. Governmental groups help to disseminate information and provide best practices to everybody. For example, all medical insurance and companies that provide most of the medical care in Israel include in their board naturalist representatives. They integrate holistic therapy and alternative therapy in their hospitals. That should be done in basic research as well. Such people from all disciplines will have to be involved from the basic research phase. Once we reach the nano-era sociologists, ethicists and naturalists should be involved and understand all procedures or they will be against any nanoparticle without really knowing what is toxic or not and what could be absorbed by the body with no harm, and what not, just like what happened in the GMO debate.

The stakeholder dialogue organised by the European Commission is very important, but not enough. Stakeholders sometimes don't reach the deep understanding. We are now building basic courses bridging biology and philosophy, or biology and psychology. That is to provide students with some basic tools for understanding and to encourage them to be involved in multidisciplinary research. To understand what is dangerous or what could modify natural behaviour. To let philosophers and social scientists be involved in basic science as listeners or contributors. I am trying to make it happen in Tel Aviv University a meeting place converging humanities, science and technology. Our philosophers are getting very active. It is a new era and it is very interesting to them as well as to all other parties from life sciences, engineering, medicine, etc.

Ineke Malsch: you mentioned a role for insurance companies and providers. Is there also a role for politicians?

Mira Marcus-Kalish: Politicians have a huge power in setting a prioritized agenda and accordingly providing resources, funds, publicity, etc. Thus they should be involved in responsible knowledge dissemination. Be sure that everything that is developed will be disseminated and translated to everyone who is interested. Politicians should encourage involvement of social scientists and philosophers in basic research projects in their funding policies. The politicians are also those responsible for the control and regulations to prevent abuse.

Ineke Malsch: Are politicians aware enough about nanotechnology?

Mira Marcus-Kalish: No. That is why I am on top of it. I think it is the responsibility of scientists to inform politicians. We have to disseminate and translate what we know and explain to the politicians and public that our future depends on progress in science. There is not enough interest in the media. There are not enough scientists who could be translators or popularizers. The scientific culture is a barrier. There is a gap between the science willing to disseminate to the public and the media ability and interest to spread the scientific facts and achievements. More than that, there are still language barriers in between scientific areas, and it is much harder to make it clear and coherent to the public and politicians. Some may get their information on nano-medicine from the internet, but there is a lot of misleading information. As such, in Medicine, the doctor is still seen as an authority by many patients. But in most cases the doctor has a lack of knowledge about nanotechnology; we should develop tools to translate this information. It should be much stronger than the recommendations from the recent report of the NanoMed Roundtable.



In God's kitchen all sciences were mixed

Interview with Dr Mira Marcus-Kalish, Tel Aviv University, Israel

Ineke Malsch: What role can the European Commission code of conduct for responsible nanotechnology research play in governing nanobiotechnology?

Mira Marcus-Kalish: The EC code should cover all nanotechnologies area including nanobiotechnology. The EC should encourage interdisciplinary and multidisciplinary cooperation including natural sciences as well as social sciences and philosophy. The EU evaluation and regulation is a very important issue. One important measure could be to stipulate that certain disciplines should be involved in research projects to qualify for funding. There was an article in Nature called "The molecular naked people". Once we reach this level that all is known about our molecular body, we have to be sure that everything is aimed at our well-being, to improve our quality of life and not go beyond that. Not to make better people. The guardians are the ethicist, social sciences as well as economists. How can we avoid risks and target benefits for society?

Ineke Malsch: At which level should new regulatory measures be taken (national, EU, global)?

Mira Marcus-Kalish: It should start at national level and then contracts should be made between countries, continents and especially the EU. It should start with groups, who are organised nationally in a bottom up process, and at the same time a top down process lead by the EU governance.

Ineke Malsch: Do you think there are applications of nanobiotechnologies which should be stimulated more than they are now for ethical reasons?

Mira Marcus-Kalish: Treating the public health, societal and environmental issues. Environmental and societal issues which could benefit equally the society as a whole and not just private people should be stimulated. Dissemination on a broad and multi level should really be encouraged.

Ineke Malsch: How do you see your own role in the developments and discussions?

Mira Marcus-Kalish: I am a middle-man based on my broad background. I have studied computer science, engineering, mathematics and biology. There are still language barriers even between these areas. I can be a kind of concept and language translator between the groups. Looking into the future, the universities will have to change their structure towards flexible education and research programs, especially in higher degrees. Universities should encourage multidisciplinary modes of research while transferring of tools and know how between various area, as we see it happening locally today. It may foster scientific research, innovation and reduce redundancy in tools developments. In God's kitchen, the almighty didn't start with chemistry and than moved to physics and so on. He put it all together. God is in the optimal refinement and synergy of all parties. We have to reach this point. The special role for ethicists and social scientists is to be part of this perspective. I am willing to participate.

Dr Mira Marcus-Kalish

Senior Research Fellow

Tel Aviv University, Interdisciplinary Center for Technology Analysis and Forecasting ICTAF
Israel

<http://ictaf.tau.ac.il/>

Mira Marcus-Kalish is mainly investigating mathematical modelling and data analysis applied to biology and medicine, biotechnology new enterprise and strategic planning. She has participated in several EU projects on bionanotechnology.

Relevant recent publication and projects

Marcus-Kalish, Mira, "Converging Technologies for the European Knowledge Society," in Rip, Arie, Wils, Jean-Pierre, Nordmann, Alfred, Malsch, Ineke and Quesada, Maria Angeles (eds.) "Ethics of Nanotechnology and Converging Technologies", Ethicschool e-learning DVD, 2009

Nano2Life, <http://www.nano2life.org/>;

EuroNanoBio, <http://www.euronanobio.eu/>;

ReNaChip, <http://www.renachip.org/>

The ObservatoryNANO Project

The ObservatoryNANO project aims to present reliable, complete and responsible science-based and economic expert analysis, across technology sectors, establishes dialogue with decision makers and others regarding the benefits and opportunities, balanced against barriers and risks, and allows them to take action to ensure that scientific and technological developments are realised as socio-economic benefits.

The ObservatoryNANO collates and analyses data regarding scientific and technological (ST) trends (including peer-reviewed publications, patents, roadmaps, and published company data) and economic realities and expectations (including market analysis and economic performance, public and private funding strategies). The ST and economic analysis is further supported by assessment of ethical and societal aspects, impacts on environment, health and safety, as well as developments in regulation and standardisation.

The project consortium is made up of 16 partners and is coordinated by the Institute of Nanotechnology. For further information please contact the project coordinator, Dr Mark Morrison, at mark.morrison@nano.org.uk or on +44 141 303 8444.

