



## Welcome to the 6th NanoSustain Newsletter

Dear Readers

More and more stakeholders from society, industry and policy are coming to realise that the early integration of scientifically sound human and environmental safety (HES) measures is not a barrier but a key to the future development of new break-through nanotechnology innovations.

However, the legitimate question remains, what is 'scientifically sound'? Reproducibility is one criterion for which a scientifically sound method has to match; the method must always generate the same or similar results within a defined interval, irrespective of the place and time it is used.

We have all learned during the past decade that reproducibility is indeed critical when assessing the properties (physicochemical, hazard, exposure) and behaviour (availability, mobility, accumulation, transformation) of engineered nanomaterials (ENM). Due to their small size and high surface area, nanoparticles tend to become instable, and aggregate or agglomerate. The many ranges of sizes of primary particles occurring free or bound, in a product or material, make it difficult to generate reproducible results. On top of this, nanomaterials easily change their behaviour when modified (core/surface functionalisation) or exposed to various test media or matrices.

To arrive at a consistent understanding of the reproducibility of the methods we use and of the materials we fabricate and test, and to get a more holistic view of the true nature of nanomaterials, the importance of coordination, cooperation and integration of ongoing and planned research activities in Europe but also globally becomes obvious. And yet, one may get the impression that all the research we do on risk and exposure assessment of ENM is just generating more questions than answers, which makes it difficult to determine "safe levels" for many if not most nanomaterials.

Although being just a small piece of the whole mosaic, NanoSustain strives to substantially contribute to increasing our knowledge of the reproducibility of physico-chemical as well as hazard and exposure data and test methods, e.g. by using a variety of different measurement approaches and by performing inter-comparison studies among participating laboratories. NanoSustain has recently passed its mid-term point (November 2011) and is now going through an intense results-producing project phase. The 1<sup>st</sup> Periodic Report has been submitted to the EU Commission at the end of the last year, with a detailed description of the work done and objectives achieved so far. Good news is that all scheduled deliverables have been generated and milestones met during these first 18 months.

This 6<sup>th</sup> Newsletter continues to successively introduce the NanoSustain expert groups with a presentation of our Danish partner NRCWE and of the Kaunas Technical University (KTU), our partner from Lithuania, on pages 2-5.

On page 6-7 you will find a new update of the work done and of main achievements obtained within the various work packages (WP1-6) during the last 3 months. More details on obtained results can be found on our website ([www.nanosustain.eu](http://www.nanosustain.eu)) for the more interested reader.

On page 8, our industrial partner UPM from Finland is reporting about the start-up of the pre-commercial production of fibril cellulose and about possible new applications, while on page 9 and 10 some recent partner news and dissemination activities are presented. Further news from the Nanosafety cluster can be found on page 10.

I wish you a fulfilling and healthy Year 2012 and hope you will again enjoy reading this Newsletter!

Best wishes

**Rudolf Reuther**

NanoSustain coordinator

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NATIONAL RESEARCH CENTRE  
FOR THE WORKING ENVIRONMENT

### About the NRCWE

The National Research Centre for the Working Environment (NRCWE) is a governmental research institute under the Danish Ministry of Employment working in the field of occupational health and safety. NRCWE's goal is to generate and disseminate knowledge contributing to a safe, healthy work environment in accordance with the technical and social development of the Danish society. Being the national centre for work environment research, NRCWE contributes to securing coordination of Danish working environment research and monitors national and international work environment development and research. Health risks from occupational exposure to nanoparticles are one of NRCWE's five strategic research areas. The total staff presently working in the Nanotoxicology group is 30 persons (18 AWU).

At NRCWE Senior Researcher Anne Thoustrup Saber acts as the project manager of NanoSustain and she is also the work package leader of work package 3 (WP3). The overall aim of WP3 is to characterize the hazard and assess the potential impact of elected nanomaterials and associated products. While data is emerging on pure nanoparticles, almost no data exists on how the toxicity and ecotoxicity will change in complex matrices, like products. WP3 will produce new data where there are urgent needs, in particular on how nanoparticles' properties change during a product's life cycle, in relation to possible effects. The new generated data will be added to the project specific database build up and developed in WP2, but



**Figure 1: NRCWE researchers working on the NanoSustain project.**

Back row, from left to right: Marcus Levin, Petra Jackson, Lisbeth Petersen, Maria Hammer, Ulla Vogel, Zdenka Orabi Kyjovska, Lourdes Pedersen, Elzbieta Christiansen, Ulla Tegner, Keld Alstrup Jensen and Michael Guldbrandsen. In front, from left to right: Håkan Wallin, Anne Thoustrup Saber and Ismo Koponen. Nicklas Raun Jacobsen, Signe Hjortkjær Nielsen and Anne-Karin Jensen who are also involved in the project



## The main tasks of NRCWE in the NanoSustain project are:

### Particle characterisation and assessment of occupational exposures

The physical-chemical characterization of particles is performed by NanoSustain partners (KTU, IMT, Nanologica, JRC, NRCWE) under the leadership of Senior Researcher Keld Alstrup Jensen. The characterization of the physical-chemical properties of the nanoparticles will be performed using advanced methods available within the NanoSustain consortium, like Scanning Force and Near-field optical microscopy, Scanning Electron microscopy and Nano-Raman spectroscopy. The dustiness of powders is evaluated by the rotating drum. The NRCWE researchers mainly responsible for this work are Senior Researcher Keld Alstrup Jensen and Senior Researcher Ismo Koponen.

### The production of after production materials for further testing

The generation of sanding dust from life-cycle materials with and without nanoparticles has been performed by sanding painted boards and epoxy plates. The emission of particles during sanding is evaluated before and after weathering. The weathering exposure of glass and painted boards is performed by the NanoHouse partner, GFC Chimica and the Danish paint companies Flügger and Technos. Abrasion test is performed by the NanoHouse partner, CEA-Grenoble in parallel with sanding test at NRCWE. The sanding dusts have been used for toxicological testing in mice and dust samples have been distributed to partners involved in the physical and chemical characterization. The NRCWE researchers mainly responsible for the production of life-cycle material are Senior Researcher Ismo Koponen and Research Assistant Marcus Levin.



Figure 2: Sanding equipment



### Toxicological testing

To test the toxicological effects of nanoparticles and dusts obtained by sanding products with and without nanoparticles, mice were exposed to nanoparticles or dusts. The doses were 18, 54 and 162  $\mu\text{g}$ , and 54, 162 and 486  $\mu\text{g}$  for the nanoparticles and the sanding dusts, respectively. Evaluation of DNA damage and inflammation will be evaluated 1, 3 and 28 days after intratracheal instillation. RNA purification from tissues from mice exposed to pure nanoparticles from the first animal experiment has been performed and RT-PCR on selected genes is ongoing at Veneto Nanotech. Microarray analysis of tissues from mice exposed to two different types of rutile titanium dioxide will be performed by Sabina Halappanavar at Health Canada. Histological characterization of the tissues is performed by Senior Scientist Alicia Mortensen (National Food Institute, Technical University of Denmark, Denmark) and Józef Szarek (University of Warmia and Mazury, Poland).

The NRCWE researchers mainly involved in the toxicological testing are Senior Researcher Anne Thoustrup Saber, Senior Researcher Nicklas Raun Jacobsen, Professor Ulla Vogel and Professor Håkan Wallin.



### Ph.D. student working within the NanoSustain project



Ph.D. student Sarah Søs Poulsen has been enrolled as a Ph.D. student at University of Roskilde, Denmark and will as part of her Ph.D. project perform microarray analysis on tissues from mice exposed to carbon nanotubes. This work will be performed at NRCWE and at Health Canada under the guidance of Professor Ulla Vogel (NRCWE), Professor Håkan Wallin (NRCWE), Senior Scientist Sabina Halappanavar (Health Canada) and professor Ole Andersen (Roskilde University).

**Figure 3.** Ph.D. student Sarah Søs Poulsen

### About KTU



Supported by the European Union FP7 Regional Potential program project “Centre of Excellence for Nanostructured materials (NANOMAT)” the Research Centre for Microsystems and Nanotechnology at Kaunas University of Technology (RCMN-KTU) is a leading nanotechnology research group in Lithuania. RCMN was established in 1998 to stimulate nanoscience and microsystems technology activity in Lithuania and the Baltic region by participating in European and global networks, research projects and by dissemination of information.

Currently, the Centre is funded by the EU FP7 NANOMAT project and participates as a partner in the EU FP7 project NanoSustain which carries out nanotoxicity research and in the EU COST T1002 action “European network on applications of Atomic Force Microscopy to NanoMedicine and Life Sciences”.

RCMN, located in the KTU campus, provides researchers with state-of-the-art single molecule imaging and nanoscale characterization and manipulation tools, such as multi-cell and single cell electroporation and impedance measurement instrumentation, Scanning Near Field Optical Microscopy, wide-field single molecule fluorescence microscopy and photon counting, Scanning Tunneling Microscopy, a BioAFM (combined atomic force and optical microscopy), magnetic force and Kelvin probe microscopy, SPM nanolithography, and UV-VIS spectroscopy. Part of RCMN's objective is not only to provide cutting-edge technology and expertise in nanoscale imaging, but also to develop next generation techniques in this rapidly growing area.

The latest new instrumentation development activities in the Centre are concentrated on scattered SNOM and AFM and confocal micro-Raman integration (Tip-enhanced Raman instrumentation) developments and applications for nanomedicine and material research applications.

RCMN focus includes the broad areas of:

- New SPM methods and development of next generation nanoscale imaging probes and instrumentation (AFM, SNOM, s-SNOM, Nano-Raman spectroscopy and imaging)
- Biomimetics for nanomaterials and nanosensors
- Bionanotechnology and subcellular imaging
- Nanotoxicity

More information on: [www.nano.ktu.lt](http://www.nano.ktu.lt)



### The main tasks of RCMN-KTU in the NanoSustain project are:

- physico-chemical characterization of selected test nanomaterials and products by Raman spectroscopy, AFM, UV-vis and XRD, and quantitative determination of nanoparticles in complex matrices (together with NRCWE, IMT, NLAB).
- development and test an analytical method appropriate to detect and quantify engineered nanoparticles in various environmental matrices (together with VTT).

Concerning the identification of nanoparticles in environmental matrices, RCMN researchers test and optimize a method based on Surface-enhanced Raman scattering (SERS) effect. Standard Raman spectroscopy is a non-destructive method based on inelastic scattering of monochromatic light from lattice phonons and molecular vibrations and it provides the information about chemical composition and structure of investigated material. The low cross-section of Raman scattering and the weak intensity of Raman signals result in low sensitivity and often require too high acquisition time of Raman signal. Using the noble metals such as gold and silver as substrates for nanoparticle characterization, a significant increase in the Raman sensitivity can be achieved. This fact, along with additional methods such as nanoparticle separation or centrifugation, will be used in the NanoSustain project to identify a low concentration of nanoparticles in various environmental matrices.



Figure 4: KTU researchers working on the NanoSustain project.

**WP1: Project management**

NanoSustain has passed the mid-term point of its three year duration (2010-2013) and is now in an intense data generating process associated with the various ongoing analytical, testing and experimental work. Results produced during the first 18 months and how they will influence the future work were discussed during the last regular project meeting in Venice, Italy, 23rd-25th November 2011. A publishable summary of the main results received so far was prepared as part of the 1st Periodic Report and submitted to the EU Commission in December 2011 for a wider publication. There is also a link on the project website summarizing results received so far: <http://www.nanosustain.eu/files/nanosustain-outputs/NanoSustain-outputs.pdf>

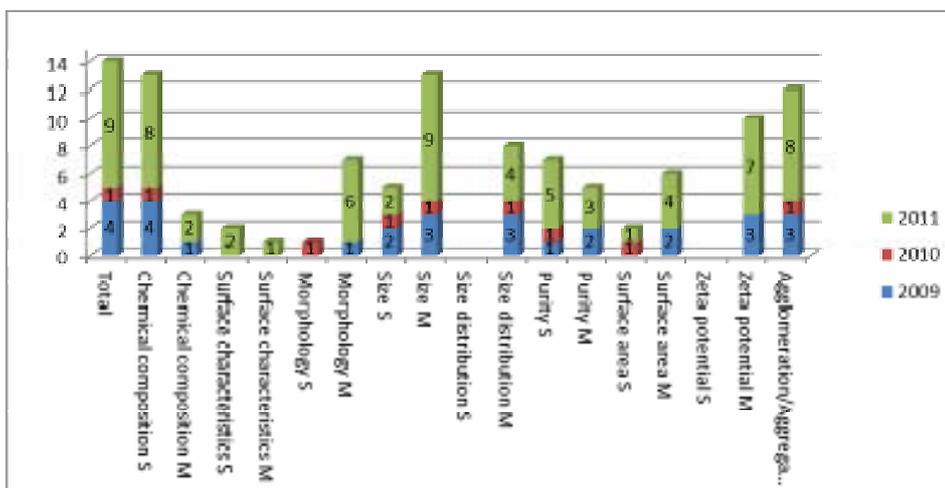


*The project consortium at the mid term meeting in Venice*

The next regular project meeting will take place in Copenhagen on 10th-11th May 2012 to review and assess the first 2-years development and to steer the project in a consolidated way into the 3rd and last project year. In the afternoon before this meeting (9th May 2012), there will be a joint session with NanoValid ([www.nanovalid.eu](http://www.nanovalid.eu)), one of the EU FP7 flagship project on nanosafety, due to the fact that about half of the NanoSustain consortium are also involved in this large scale integrating project and as both projects share the same coordinator (Rudolf Reuther NOMI), to exchange experience and expertise, exchange data and discuss synergies and possible ways to cooperate

**WP2: Data gathering, generation, evaluation, and validation**

As scientific literature on nanomaterials is rapidly evolving, the NanoSustain Literature Database has now selected, compiled, and critically reviewed more than 120 scientific papers and made them available for project partners. The statistical analysis of the analysed papers is still ongoing to identify main trends in the physicochemical characterisation and the use of the various endpoints for hazard identification, as shown for ZnO in **Figure 5**.



**Figure 5:** Total number of papers collected and the frequency of physicochemical properties reported for ZnO per year and regarding ecotoxicological studies. S = Supplier, and M = Measured. Agglomeration/Aggregation is always measured in the exposure media.

NanoSustain has also started to establish and organise the framework necessary for the validation of the scientific data, including the procedure and implementation of the inter-laboratory comparison of results, so that only validated data will finally enter the material database. This database will be designed in a way that makes it easy to become harmonised with and integrated into the database of other collaborating projects in particular into the central database planned within the EU NanoSafety cluster.



### ***WP3: Hazard characterisation and impact assessment***

During the last 3 months the following work has been completed:

- Dust samples collected during sanding of epoxy plates with and without CNT and painted boards with and without nanoTiO<sub>2</sub> and subsamples distributed to partners for physical-chemical characterization, which is still ongoing.
- Finalization of dustiness tests of all general NANOSUSTAIN samples
- Second animal experiment has been finalized with mice exposed to sanding dusts from epoxy plates and painted boards with and without nanoparticles (3 doses, 3 time points after exposure), and tissue samples sent to VN for mRNA expression analysis and to Health Canada for micro array analysis.
- In collaboration with the EU FP7 NanoHouse project (GFC Chimica and CEA Grenoble), with Flügger and Teknos, possible weathering effects on emission during sanding is currently tested.
- Weathering exposure tests on glass sheets coated with and without nanoZnO-containing coating, and of painted boards with and without nanoTiO<sub>2</sub> have been finalized at GFC Chimira, Italy and resulting products sent to CEA Grenoble for abrasion testing. In parallel, a set of samples is being exposed to at Teknos, Denmark. The emission from these samples will be evaluated during sanding at NRCWE.

### ***WP4: Life cycle assessment and prospective technological assessment***

Based on an evaluation of the published literature, process models for the production, use, end-of-life and recycling phases (re-use, recycling and/or final treatment and disposal) have been developed by means of the the Umberto LCA software tool. These life cycle models include all relevant material flows of the selected nanomaterials and their applications:

- Nanocellulose as a paper additive, industrial thickener, and rheology modifier
- Nano-TiO<sub>2</sub> paint application
- Nano-ZnO glass coating as UV-Barrier
- MWCNT in epoxy plates.

WP4 has focused during the last months on testing of the models and on first computations of LCA data. In addition, detailed material and energy flow data has been further collected. An essential step towards the quantitative environmental risk assessment of new nanomaterials is the calculation of their prospective environmental concentrations. Using the life cycle perspective, we are now working on the development of exposure models of the selected nanomaterials and their applications. This work will be carried out in co-operation with the Swiss exposure modelling expert Dr. Fadri Gottschalk.

### ***WP5: Development of innovative solutions for recycling and final treatment***

During the last three months the following work has been carried out within WP5:

- Studies on recycling of ZnO nanoparticle containing glass and on the development of an internal nanocellulosic standard sample for quality control, test validation, and reproducibility check, have been finalised.
- Large scale experiments on organic recycling of nanocellulose have been started
- Experiments on incineration of CNT composite were carried out in January 2012
- A study visit of partner KTU (Lithuania) at partner VTT (Finland) took place on 19 January 2012 to discuss detection and measurement of nanoparticles from simulated land-fill leachates

### ***WP6: Dissemination and exploitation of results***

All the latest news and the news archive can be found at [www.nanosustain.eu](http://www.nanosustain.eu). As the project moves into an intensive period of experimentation there will be more regular news on project results for registered users of the website.

NanoSustain is working towards ever closer integration with the NanoSafety Cluster including taking on the role of Cluster events calendar editor and becoming an active contributor to the Cluster newsletter.

Eleanor O'Rourke will be leaving her role as work package leader for WP6 in early February and Lesley Tobin will be taking over and can be contacted at [Lesley.tobin@nano.org.uk](mailto:Lesley.tobin@nano.org.uk)



## UPM has started pre-commercial production of fibril cellulose

(UPM, Helsinki, 15 November 2011 at 10.00) – UPM has started pre-commercial production of fibril cellulose and is currently developing new fibril cellulose applications with industrial partners.

UPM initiated the fibril cellulose product development process in 2008. Pre-commercial production began this autumn at Otaniemi, Espoo, Finland. UPM is now able to provide different types of fibril cellulose for extensive customer testing. UPM's objective is to create the preconditions needed for industrial-scale production of fibril cellulose.

"Fibril cellulose is part of UPM's renewal and our Biofore strategy. We are currently focusing on commercialising fibril cellulose. The first stage mainly consists of developing products used in paper and packaging materials and the concrete and paint industries. We are also looking for new partners to develop new applications," says Esa Laurinsilta, Director, UPM Fibril Cellulose.

The production process used by UPM for fibril cellulose is the result of long-term development. The fibres in the most finely grained products are fibrils measured at the nano scale. The rougher products consist of micrometre fibres. UPM has protected the results of the development work with comprehensive patents that cover the manufacture of fibril cellulose and the applications.

Fibril cellulose can be used in a wide range of applications. UPM's fibril cellulose provides new properties and design opportunities for traditional materials; it can be used to make products tougher, lighter or thinner, depending on the application.

When water is added to fibril cellulose, a strong gel structure is created. Therefore, fibril cellulose can be used in many industrial applications requiring high stabilisation capacity and high viscosity.

UPM's fibril cellulose has proved to be functional in several application tests over the past few years. "In October, we produced the first industrial-scale batch of speciality paper reinforced with fibril cellulose at the UPM Tervasaari mill," Laurinsilta says.

Laurinsilta stresses the importance of the Finnish Funding Agency for Technology and Innovation (Tekes) and the development partners for the new product: "Forty researchers at the Finnish Centre for Nanocellulosic Technologies have developed fibril cellulose for UPM in cooperation with the VTT Technical Research Centre of Finland and Aalto University."

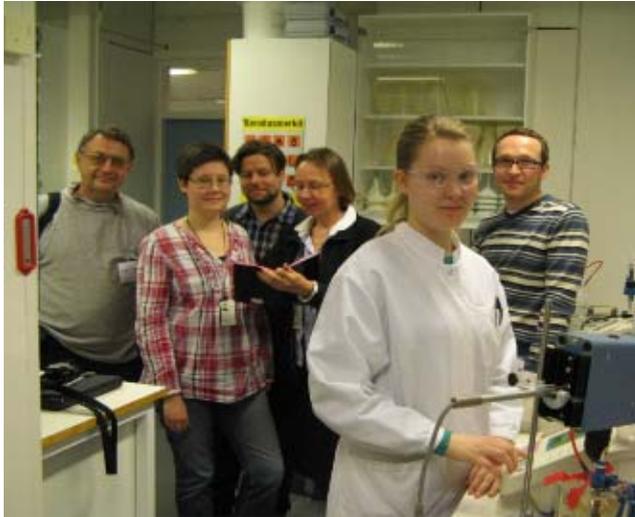
For further information, please contact:

Esa Laurinsilta, Director, Fibril Cellulose, New Businesses & Development, UPM, tel: +358 40 821 0350





### Visit by KTU to VTT January 2012



**Figure 7:** In the photo from left to right: Valentinas Snitka (KTU), Ulrika Backman (VTT), John Bacher (VTT), Margareta Wahlström (VTT), Suvi Aalto (VTT) and Denys Naumenko (KTU).

NanoSustain partners, Valentinas Snitka and Denys Naumenko from Kaunas University of Technology (KTU) visited fellow project partners, VTT Technical Research Centre, in Finland on 19th January 2012. During the visit KTU gave a presentation on Surface Chemistry Mapping with Tip-Enhanced Raman Microscopy. They also discussed common interests and analysis needs in regard to the NanoSustain project. While there, they were also given the opportunity to pay a visit to the laboratories of the Recycling and Materials Utilisation team and the Fine Particle team.

### News from JRC



A subcontract has been signed between the Joint Research Centre and the Italian National Research Council Institute for Microelectronics and Microsystems, Lecce, for Electron Microscopy Analysis of Nanoparticulate Materials. Structural and chemical analysis will be carried out by field emission scanning electron microscopy, high resolution transmission electron microscopy, energy dispersive X-ray spectrometry and electron energy loss spectroscopy.

The existing analytical techniques available at JRC and in the laboratories of the other consortium partners will be complemented by the use of advanced techniques for high resolution chemical analysis and imaging allowing structural and compositional analysis of nanomaterials at the atomic level.

### NCRWE Characterisation Workshop February 2012—Copenhagen



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A “NRCWE characterization workshop” will take place at NRCWE Copenhagen in February 2012 bringing together all partners involved in the physical-chemical characterization to discuss results obtained so far and to organize an interlaboratory calibration study of a number of reference particles.



## NanoSustain Stakeholder Workshop - new research to support the design and development of sustainable nanomaterials

**25th November 2011, 16:30-18:30, NH Hotel Laguna Palace Conference Centre**

NanoSustain organised a Stakeholder Workshop on the 25th November 2011 within the NanotechItaly 2011 Conference in Venice, Italy (see [www.nanotechitaly.it](http://www.nanotechitaly.it)). Although representatives from relevant stakeholder groups, such as regulatory and standardisation bodies, policy makers, academia, SMEs and industry, have been invited to interact with the project team and to discuss the ongoing research in the light of their needs and concerns, the interest and response for this event unfortunately was rather low. The presentations can be downloaded at: [www.nanosustain.eu](http://www.nanosustain.eu).



Technological Design  
and Development  
University of Bremen

## Dissemination Activities for NanoSustain at the University of Bremen

NanoSustain partner UniHB (University of Bremen) participated at the end of 2011 in a number of events to promote the output of the project. In November UniHB attended a meeting of the "Nationaler Verbändeworkshop" entitled "Nanotechnologie auf OECD-Ebene - Was ist zu erwarten?" that took place in Berlin, Germany. Also, during the NanotechItaly Conference 2011, a poster presentation was provided on 'Life Cycle Assessment of nanotechnology-based products'.

## NRCWE promotes NanoSustain



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- NRCWE was invited to deliver a presentation at a conference in Christiansborg, Copenhagen, entitled "*Vejen til en sund nanoteknologi-udvikling*" on 18th November 2011. In addition, NRCWE provided also a brief overview on NanoSustain on 1 December 2011, in connection with the presentation of the Danish project NanoKem .
- Another dissemination activity was also carried out by NRCWE on 6th December 2011 by giving a talk on '*Nanotechnology: New materials, new risks*' at the workshop on "Emerging contaminants in Europe's waters" held in Copenhagen and arranged by the European Environment Agency.
- An oral presentation was given by Anne Thoustrup Saber (including Keld Alstrup Jensen, Ismo K Koponen, Håkan Wallin and Ulla Vogel) on "*Exposure and toxic properties of nanoparticles in paint and lacquer*" at the workshop "Nano in furniture", Brussels, 17th January 2012. "Nano in Furniture" is a collaboration between the European Federation of Building and Wood Workers (EFBWW), UEA and European Furniture Industries Confederation (EFIC) and is carried out with the financial support of the European Commission.



### NanoSafety Cluster Meeting

The next meeting of the NanoSafety Cluster Group will be held in Dublin, Ireland on March 1st, 2012 at 8:30-13:00 at the UCD Campus. The meeting will comprise two sessions, the first of which will focus on the Strategic research agenda for Nanosafety Vision 2015-2020. This session will be chaired by G. Katalagarianakis and N. Segebarth from the EC. The afternoon session, chaired by Kai Savolainen, will look at the organizational issues of the NanoSafety Cluster. The meeting will be held at the same time as the QNano/ NanoImpactNet Conference (see below).

### BfR-Conference on Nanosilver

Germany 8th-9th February 2012

On February 8 and 9, 2012, the Federal Institute for Risk Assessment (BfR) is holding a scientific conference on the health risk assessment of nanosilver. The aim of the conference is to provide an overview of the current scientific state regarding the production and application of nanosilver in consumer products and food. Therefore, all major aspects will be taken into account like identity, analytical characterisation and exposure, toxicology, bacterial resistance and biocidal efficacy, risk assessment and data gaps.

The conference language will be English. Simultaneous translation for German and English will be provided on both days. Please register by sending an e-mail your name and address with reference to "NANOSILVER" to [veranstaltungen@bfr.bund.de](mailto:veranstaltungen@bfr.bund.de)

Website: <http://goo.gl/tlurP> Conference Programme: <http://goo.gl/9TMOX>

### NanoFATE Ecoprojects" Cluster meeting and stakeholder discussion report is now available

Visit our site [www.nanofate.eu](http://www.nanofate.eu) to download the report from the Cluster meeting organised by NanoFATE with Ennsatox and NanoReTox in London, Sept. 2011. Scientists and stakeholders discussed methods, opportunities and needs regarding the assessment of environmental fate and ecotoxicology of engineered nanoparticles.

Coming soon on the same site will be our latest Newsletter giving insight into the advances of our first 18 months.

For further information on NanoFATE please contact Claus Svendsen, CEH, UK [csv@ceh.ac.uk](mailto:csv@ceh.ac.uk)



Joint NanoImpactNet-QNano conference, 27th-29th February 2012, University College Dublin

**From theory to practice – development, training and enabling nanosafety and health research**

*The first call for abstracts closes on 5th November 2011*

Sessions include:

- (1) **Materials for the Future**
- (2) **Eco-Hazard Assessment**
- (3) **From Production to Exposure**
- (4) **Beyond non-specific Hazards**
- (5) **Characterisation *in situ* following exposure**
- (6) **Stakeholder needs and Risk Assessment**

The conference is followed by two training schools on Modelling (1st March) and Good Laboratory Practice (2nd March). Full details on <http://www.nanoimpactnet.eu/> or write to [darren.hart@hospvd.ch](mailto:darren.hart@hospvd.ch)

**NordMiljö AB (NOMI)** is the project coordinator and mainly responsible for the operational management, administration and S/T coordination of the planned work, including progress control and reporting to the Commission.

The **Institute of Nanotechnology (IoN)** will be responsible as WP6 leader for the dissemination and exploitation of the project results through a regular newsletter, training workshops, and dissemination events. In addition, the IoN will also be providing coordination support.

**Veneto Nanotech (VN)** will lead WP2, build up the necessary project-specific database and ensure validation and access of already existing relevant data, and of newly generated data, to all project partners.

The **National Research Centre for the Working Environment (NCRWE)** is responsible as WP3 leader for the production of after-production materials for further testing, for producing human exposure data and for the toxicological testing of the materials in animals

**Universität Bremen (UniHB)** is the leader of WP4 and responsible for the Life Cycle Assessment on selected nanomaterials and nanoproducts and the development and operationalization of criteria and guiding principles for precautionary design of engineered nanomaterials.

**The Technical Research Centre of Finland (VTT)** will develop as WP5 leader innovative solutions for recycling, final treatment and disposal of selected nanotechnology-based materials and products, and carry out appropriate ecotoxicology studies

The **Joint Research Centre (JRC)** will help to fill knowledge gaps related to the behaviour of the selected manufactured nanomaterials in ecosystems. This will contribute to the development and implementation of testing methods and assessment of the distribution, transport, transformation and fate of selected nanomaterials, and their effects on human health and the environment.

**Kaunas University of Technology (KTU)** will participate in the physico-chemical characterization and analysis of the selected test nanomaterials and products, and will develop and test an analytical method appropriate to detect and quantify engineered nanoparticles in various environmental matrices.

**National Institute for Research & Development in Microtechnologies (IMT)** will participate in the physico-chemical characterization and analysis of the selected test materials and products, and in the development and design of new material & product properties and applications, or in new material synthesis for novel applications.

**Nanologica AB (NLAB)** will provide the CNT-composite materials and associated materials data, contribute to their physical-chemical characterization, and support the exploration of treatment and disposal technologies.

**Nanogate (NGAG)** will provide a ready-to-use nano-ZnO based test material and associated product data and contribute to the technical exploration and design of new solutions for sustainable use, recycling and final treatment of the provided test material.

**UPM-Kymmene (UPM)** will supply nano-fibres (nanocellulose) and associated product data, and contribute to the design and exploration of technical solutions for their recycling and final treatment.

