NanoSafety Cluster NewsLetter

www.nanosafetycluster.eu Issue No.4 - November 2014

Welcome and overview:

Once again, **thank you** to everyone who contributed to this issue, especially during such a busy time of the year. Importantly, if you submitted announcements of events which had passed by the time this newsletter was issued, please accept our **apologies** for not printing them. Don't forget that events can also be promoted to the community via the channels highlighted on p.32.

This issue highlights the outcomes of the first **NanoSafety Forum for Young Scientists**, held in the beautiful, historical town of Ortigia, Sicily, in October. Jointly organised by the Nanosafety Cluster and the **MODENA COST** action, the event gave a platform and a voice to the young researchers behind much of the work that takes place in the course of the NSC projects. See the images and watch the interviews on the NSC YouTube Channel. The popularity and success of this event has led to plans for a **2016 forum in Sweden**.

In our NSC Projects News section we have wide-ranging reports on exciting outcomes from **current projects**, and we focus on the impact of the successfully completed **NanoFATE** project. You can then read about **JRC-IRMM's** achievements in producing the first certified reference materials, and why MEPs have proposed a moratorium on nps in food.

Our community focus features the **NanoChOp** project and its vital contribution to metrology research and the characterisation of nanomaterials within biological systems. This is followed by an opinion article, which you can go on to discuss via the **NSC linkedIn** and **twitter** channels (see p.32).

2015 offers a large number of **strategic events** for researchers, industry and stakeholders in general, providing opportunities to disseminate, communicate, network and engage with others in the community, as listed in the events section. The final section describes some of the **resources** available for you to facilitate your work.

We hope you find this issue interesting and informative: your contributions and suggestions have been very much appreciated.

Best wishes on behalf of
NSC WG7 Dissemination

Lesley Tobin

Contents:

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Contribute to the NSC Newsletter here:
http://www.nanosafetycluster.eu/news/submit-news.html

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About the Forum

Jointly organised by the Nanosafety Cluster and the MODENA COST action, the NanoSafety Forum for Young Scientists fulfilled its promise of giving a platform to the young researchers who are currently working on a broad spectrum of EU-funded nanosafety projects. The Forum, which took place in the beautiful setting of Ortigia, Sicily, on October 8th and 9th, was attended by almost 100 international participants currently working on aspects of nanosafety in Europe.

The event focused on presentations of young scientists which were underpinned by the highlights of the Forum: the keynote speeches from the established senior scientists. **Dr Gerhard Kasper** gave a keynote on *"Functionality based exposure assessment to airborne nanoparticles"* and **Dr Bengt Fadeel** on *"Nanotoxicology: from biological systems to systems biology"*.

The young scientists' presentations were interspersed with informal mini-meets, networking breaks and "Eat with the experts" sessions scheduled over the two days, giving the young and senior scientists ample opportunity to get to know each other and exchange knowledge.

In the weeks leading up to the Forum, young researchers were invited to submit abstracts under one of the NSC Working Group categories. The presentations were then selected by the scientific programme committee from the submitted abstracts.

The Young Scientists Best Presentation Awards

Over the two days, a remarkable amount of scientific endeavour and achievement was revealed from one presentation to the next, and all attendees were invited to vote for the best presenters in terms of conceived scientific quality and novelty of the research as well as the way the presenters communicated their key message to the rather diverse audience: from material sciences, exposure and human and environmental hazard assessment, databases & modelling, risk assessment to risk communication and dissemination of scientific findings. Interaction with the Chair of the pertinent session during the lunch break mini-meetings was also considered as added value for the scientific exchange.

The jury, which comprised the Chairs of the sessions, collected the votes and added their judgement for the final ranking of the award winners. Although impressed with the high standard of all the presentations and the fact that almost everybody managed to present their work within the 9 minutes given, three presentations were selected for meeting all the criteria. The winners were presented with bottles of superior Sicilian wine.

"And the Winner is…."

First prize was awarded to **Carina Muoth** (EMPA, St Gallen, Switzerland) who is working on an improved human placenta model for particle translocation and toxicity testing. The title of her presentation was "Advanced in vitro placental tissue model to study nanoparticle effects and uptake mechanisms". Although Carina had not yet produced a major finding using nanomaterials, she was able to deliver a presentation that interested a wider audience, and she provided sound answers to questions from the experts. Importantly, her work may lead to a better understanding of NP-placenta interactions to support a safe design of NPs and their potential use in nanomedicine.

Second prize was awarded to **Manuel Correia** (below) from the National Food Institute, Technical University of Denmark, who had the unenviable task of delivering a presentation at the beginning of this two-day event.

Manuel is working on the development of dispersion procedures for surface-functionalized CuO nanoparticles to use in large-scale toxicity studies. He gave a very enthusiastic talk and was able to present a difficult and technically challenging topic in a way that was appreciated by the audience. The key message of his presentation was that in order to obtain small and uniform nanomaterial sizes, one should prefer ball milling with acetic acid instead of the more widely used de-agglomeration procedures with probe sonication.

Third prize was awarded to **Steffi Bohme** (below) who is based at Helmholtz Centre for Environmental Research, Leipzig Germany, and who focused her presentation on the quantification and visualization of nanoparticle uptake in different environmental organisms by ICP-MS. Steffi has used Daphnia Magna and the Zebrafish embryo, and by ICP-MS on thick sections identified a time and concentration dependent uptake in the case of Daphnia and accumulation on the chorion for the zebrafish.

The following people ended up in the top ten: **Sarah Mues, Marcus Levin, Tiziana Tosco, Arianna Maria Marrucco, Sophie Marie Briffa, Yaobo Ding** and **Paola Tassone**

We once again congratulate the award winners and we hope that the next meeting (October 2016, Sweden) will be an even bigger success.

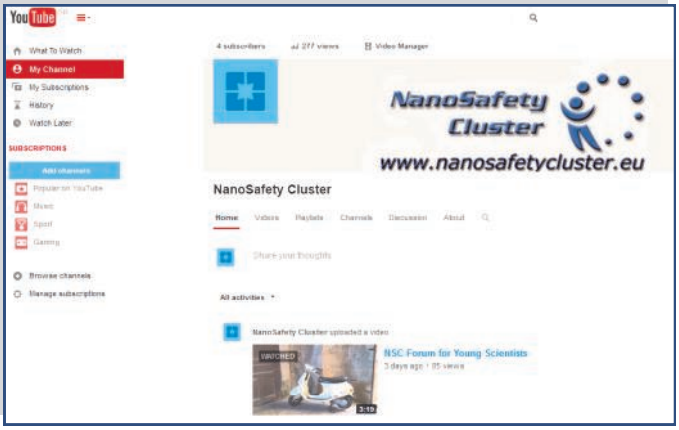
On behalf of the organizers:
Luisa Campagnolo, Antonio Pietroiusti and Flemming Cassee

Find out more:

- **Abstracts and the presenters' details can be downloaded at:**
http://www.nanosafetycluster.eu/nsc-meetings/nanosafety-forum-for-young-scientists-syracuse-2014.html

- Images and video interviews from the event can now be viewed on the newly launched NanoSafety Cluster YouTube channel:

http://tinyurl.com/YouTubeNSC



NSC Meeting—Working Group Reports

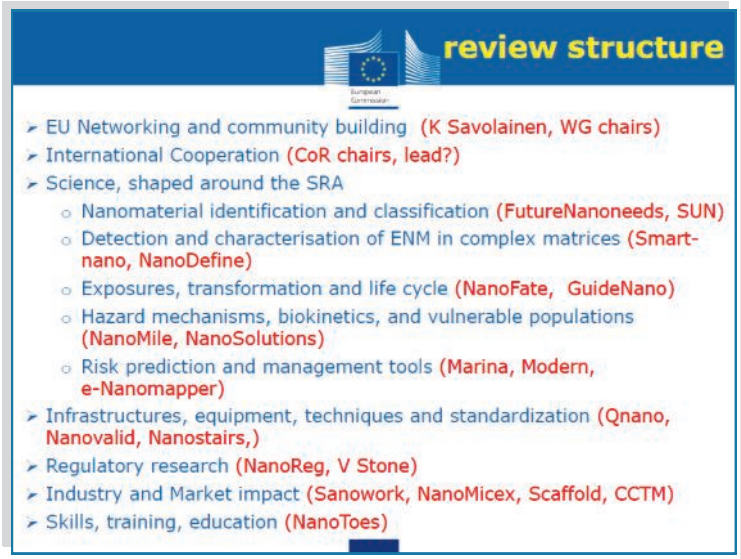
The NanoSafety Cluster Meeting report

The NanoSafety Cluster held its biannual meeting on 7th October at the Palazzo Vermexio in Ortigia. The meeting was opened by the NSC Chair, Dr Kai Savolainen (FIOH), who welcomed everyone , followed by the official opening of the meeting by Dr Antonio Pietroiusti on behalf of the Local Organizing Committee .

The NSC Review

Nicolas Segebarth delivered the first presentation on behalf of the EC, describing the purpose of the forthcoming Cluster Review which will be held in Brussels from the 10th—11th December 2014. He explained that NanoSafety has been funded with 180M€ EU funding (about 50 projects) in FP7 and so the review will critically assess the FP7 contribution to the state-of-the-art, including on-going road-mapping efforts, as well as newly identified issues and future activities.

The review will be open to all project coordinators (or representatives), CoRs and NSC WGs chairs. All running projects should be represented and each will be assigned a task (see below). A group of six task leaders will draft a set of questions and deliver a presentation at the Cluster Review Meeting as well as coordinate and align the work to avoid overlaps. Meanwhile, the PTAs will provide feedback to task leaders.



He concluded that the achievements of the Cluster need to be made visible outside the nanosafety community and this review will contribute to that aim.

For more information, download the slides here:
http://www.nanosafetycluster.eu/uploads/NSCMeetings/Docs/Syracuse/NanoSafety_Cluster_Review.pdf

Working group reports and activities

WG1 Materials

Sergio Moya described how the next steps for the Materials working group will focus on discussing characterization, dispersion, analyzing the concept of metrics, and the availability of SOPs.

Bengt Fadeel reminded the attendees about the Cluster commentary on Nature Nanotechnology regarding the need to define a minimum set of physical and chemical data for characterization of nanomaterials. Nicolas Segebarth noted that if a minmum set can't be agreed on yet, then perhaps the Cluster should agree at least on the key driving principles.

WG2 Hazard

Flemming Cassee gave presentation on the WG's recent activities and future plans. The Hazard WG promotes information exchange on methods, aims for harmonized methods and creates summaries of key results. The WG also has eco-immunosafety, reprotoxicology and genotoxicity focus groups, and aims to produce a check list or best practices to guide study design.

WG3 Exposure

Dr Derk Brouwer noted they have explicitly differentiated between human and environmental exposure and included the LCA perspective.

The WG has promoted between-project collaboration and it has worked on exposure assessment to provide recommendations for industry concerning strategy, metrics, data integration and relevance of exposure libraries for benchmarking. 2

WG4 Database

Egon Willighagen presented the WG's work and recent activities. He noted that the WG has done substantial community building. The WG has regular teleconferences and 91 people are registered to the mailing list at the moment.

The WG organized a survey to summarize the current state of databases, which aimed to collect, organize and share up-to-date information about NanoSafety related databases worldwide. The summary of the survey will be available on the Cluster website. Finally, the WG discussed interoperability of databases, ISA-TAB (-Nano) templates and data rights.

A more in-depth update of the Database WG follows on the next page….

Egon Willighagen reports on the latest activities of the NSC Database Working Group 4

In the past six months, the NSC Database WG has continued the efforts it has been making to deliver its tasks and work plan: we held our monthly teleconference calls (every 2nd Tuesday of the month, 3pm CET/CEST), which are normally attended by around ten participants (a small subset of the 90 participants on the mailing list). Moreover, at the recent NSC meeting in Syracuse, all working groups had a breakout session and ours was fairly well attended with eight participants, of whom three were new members.

At the Syracuse meeting, the first written output of the working group was announced: the summary of the survey about databases and collection of information about nanomaterials organized in Spring 2014 to summarize the current state of databases and including questions of a more technical nature [Mustad, Axel P.; Smeets, Bart; Jeliazkova, Nina; Jeliazkov, Vedrin; Willighagen, Egon (2014): Summary of the Spring 2014 NSC Database Survey. figshare. http://dx.doi.org/10.6084/m9.figshare.1195888]. This was the first in a continuous biannual effort to collect, organise and share up-to-date information about NanoSafety-related databases worldwide. It included questions about application programming interfaces (APIs), database schema, supported input and output formats, etc.

We also discussed problems with handling of data and how the eNanoMapper project can (and cannot) support the NSC community needs. An important topic covered during the meeting was the relevance of spreadsheet templates for capturing data resulting from experiments. Finally, **Nina Jeliazkova** gave a demonstration of the current eNanoMapper database prototype.

You can find further information on our website at http://www.nanosafetycluster.eu/working-groups/4-database-wg.html.

WG5 Risk

Janeck Scott-Fordsmand presented both the European activities and the EU-U.S. activities in which the Risk WG has been active. European activities include the overview of tools and methods that are available for risk assessment and probing the concepts that are useful for risk assessment, leading to next generation of risk assessment tools. The EU-U.S. activities focus on CoRs, teleconference and web meetings and the coordination of their work.

WG6 Modelling

Rafi Korenstein and **Lang Tran** provided an overview of the aims and recent activities of the working group. The goal is to harmonize the modelling activity and be able to compare methodologies while using the same data. With modelling, quantitative risk assessment can be performed. Dr Tran highlighted that currently 5-6-projects are working together on this and the WG is a great forum for discussing, bringing different aspects together and coordinating the work so that data can be fitted in modelling and thus contribute to regulation work. In addition, Dr Tran introduced the main ideas of the MODENA COST action.

WG7 Dissemination

Lesley Tobin provided information on the Cluster mailing list, newsletter, news and events calendar and encouraged all the WGs to be in contact with the dissemination working group to improve their outreach and communication aspects. The WG descriptions, aims and objectives as well as contact details of the chairs and co-chairs of the WGs need to be updated to the website. It was agreed that all WG chairs send an update of the WG progress for the Cluster Newsletter by 17 October. The WG will also look into the opportunities in creating Cluster identification, Researcher ID, in publications and promoting the publishing of public deliverables. Furthermore, a sub group on training will be established and a training section will be added to the Cluster website.

WG8 Systems Biology

Bengt Fadeel summarized the key points of the recent discussions in the WG. The main aims of the WG include developing and promoting best practices for systems biology approaches in nanosafety research and development of computational tools for the identification of activated pathways from transcriptomics, proteomics or metabolomics assays. Bengt Fadeel also gave an overview of the recent activities of the WG and upcoming events, such as the Systems Biology Conference in Stockholm 9-10 November 2015.

New WG7 Sub-Group for Training

During the course of the NSC Forum, the subject of a strategic working group dedicated to training was raised. The objectives and proposed activities of this new NSC initiative, led by Danail Hristozov, Project Coordinator of the SUN project, are outlined below:

Proposal for a WG7 Sub-group on Training

By Danail Hristozov, University Ca' Foscari Venice

Summary and Objectives

Ongoing research projects continuously push the edge of knowledge in the nanosafety research field, and it is important to disseminate this evolving frontier to young scholars and to professionals across the public and private sectors.

Training courses and workshops are being organised in most NanoSafety Cluster (NSC) projects, trying to provide an understanding of their scientific outputs and the achievements. Although not all NSC projects have specific work packages (WPs) dedicated to training (see Table 1), most of them have budgets to perform either internal training (to ensure a high level of skills and consistency within the consortiums) and/or external training (to transfer the new knowledge to industries, regulators, policy makers and other stakeholders). Internal training typically focuses at the interface of the project's WPs, where partners collaborate across the boundaries of disciplines. External training constitutes a very effective form of outreach & dissemination.

Although many nanosafety training events (both schools and workshops) are taking place in projects each year, until now there has been no coordination of these initiatives on the NSC level.

Therefore, on behalf of the SUN project, we propose to develop and coordinate a NSC Strategic Group (SG) on Training that would fit in the Working Group (WG) on Dissemination:

This SG aims to align training agendas of the NSC projects to achieve the following objectives:

- Perform training where partners collaborate across the boundaries of projects and disciplines.
- Ensure a high level of skills and consistency within the projects.
- Transfer the knowledge generated in the projects to external stakeholders.
- Enhance training offerings through collaboration and sharing of experience.

Activities / Actions

The Training SG will:

- Identify contacts within the different projects involved in training.
- Establish effective communication amongst the projects to identify joint training opportunities:
  - (Bi)Monthly teleconference.
  - Shared calendar/file with planned training activities.
  - Regular dissemination of results through the NSC.
- Create guidelines for running and disseminating training events to ensure consistency among the projects.
- Harmonize and streamline training offerings in order to avoid unnecessary duplication.

SUN
Sustainable Nanotechnologies Project

Project	Work Package	Contact person
eNanoMapper	WP6	Bengt Fadeel, Karolinkska Instituet
Marina	WP17 & 18	Michael Riediker, IOM Singapore
NanoDefine	WP8	Hans Marvin, RIKILT
NanoFATE	WP7	Project finished
nanoMICEX	WP9	Steffi Friedrichs, Nanotechnology Industries Association
NanoValid	WP7	Rudolf Reuther, NordMiljö AB
QualityNano	NA3 Training Hub	Kenneth A. Dawson, University College Dublin
NanoToes	Project about Training	Albert Duschl, Salzburg University
SUN	WP10	Judith Friesl, The REACH Centre

Table 1. NSC projects with work packages (WPs) dedicated to training

Presentations at the NSC Meeting:

♦ Open access in H2020

Nicolas Segebarth gave a presentation on Open access in Horizon2020, which highlighted the main goal of the open access initiative as optimising the impact of publicly -funded scientific research. In short, open access means online access at no charge to the user. This means open access to peer-reviewed scientific publications or to research data. It applies to research that is published, and it undergoes same kind of peer review process than that of any publication. In Horizon2020, there is also pilot on Open Research Data from which projects may opt-out on specific terms.

Providing supplementary data was discussed as it is nowadays quite common feature in high impact journals. Access to raw underlying data allows to checking, reproducing and challenging studies.

♦ Regulatory Research Roadmap

Vicki Stone presented the roadmap and emphasized that the purpose of the roadmap is to identify and structure the research that is needed to deliver effective regulation of nanomaterial safety (excluding nanomedicine).

Dr Stone showed that there are currently 48 research priorities, and the yellow hexagon is a point to assess whether nanospecific regulation is needed. Active input has been given from the U.S. and Brazil which shows global importance of the issue. Dr Stone added that the next step is to share the hexagons with Dr Savolainen's group (on Closer to the Market Roadmap) to discuss core priorities that are relevant to both roadmaps.

Dr Segebarth noted that this roadmap should not be limited to the definition on nanomaterials, but be independent of that, and interrelations of the priorities should be made more visible. This means that people should not receive such impression that to be able to do the final risk assessment you would need to do all the hexagons. As a concrete suggestion it was also noted that ITS (intelligent testing strategies) is currently at the very end of the list, so its position could be changed.

Dr Janeck Scott-Fordsmand noted that there is lack of focus on environmental aspects and this should be balanced out in the final document. Dr Stone summarized that she will take these suggestions into account and send the roadmap for comments. She also encouraged the Cluster members to identify relevant stakeholders to whom the roadmap should be circulated.

♦ Closer to the Market Research Roadmap

Kai Savolainen gave an overview and framework of the Closer to the Market roadmap. He noted that the development of new rules and practices should be based on solid scientific knowledge. Technology, skills, and processes need to be provided based on best practices in nanosafety in order to support the go-to- market aspects. Several actions with expected outcomes were suggested as well as a proposal for an EU- funded CSA topic to better fund the activities.

Dr Savolainen added that information collection on the competence centres in nanosafety in EU have been started and the work is still in progress. It was discussed that the next steps will be to align these two roadmaps and use a similar approach as in the regulatory research roadmap and identify the key hexagons. Dr Cassee noted that it would be good to enlarge the perspective to present also the advantages brought by nanotechnology to balance the view. Dr Segebarth added that the main idea is the safety aiming at benefits. Furthermore, it was noted that market demand is the key, meaning that the views of service-providers and users should be covered.

♦ SIINN ERA-NET

Rainer Hagenbeck gave a presentation about the SIINN ERA-NET initiative, which promotes safe and rapid transfer of European research results in nanoscience and nanotechnology into industrial applications.

The third SIINN Call for proposals was opened on 1st of October 2014. For this call, seven European funding agencies (from Austria, Belgium, Germany, Region Nord-Pas de Calais (France), Portugal, Romania and Spain) and three US funding agencies have together allocated over 6.1 million Euros to fund joint transnational research projects. Project partners will be funded by their national or regional funding organizations according to standard national or regional procedures.

More information about the call is available on the website:
www.siinn.eu

Images from the week

NANOSOLUTIONS

The latest NANOSOLUTIONS Newsletter can now be downloaded here:

http://nanosolutionsfp7.com/nanosolutions-newletter/

In this newsletter you can obtain a clear overview of the NANOSOLUTIONS project and a simple explanation of its main aims and objectives as a whole. Three of the work package leaders (Richard Handy, Dario Greco and Lang Tran) explain the fundamental nature of the Engineered Nanomaterial Safety Classifier (ENM Safety Classifier), which is at the heart of the project. The three explain just what the classifier is, why it is needed and the experimental work taking place in the project that will ultimately deliver it.

As well as this, there are progress updates from different work packages, including Materials (WP3), Life -cycle analysis (WP4), ENM bio-nano interaction in biological media (WP5), Cell-models (WP6), and Disease models (WP8), and finally it takes a look at some of the upcoming NANOSOLUTIONS events on nanotechnology and nanosafety.

Don't forget to follow NanoSOLUTIONS on twitter @Nano_solutions and get in touch via the website for more debate, comments and the latest news about the progress of the project.

> **The main objective of the project is to identify and elaborate those characteristics of ENM that determine their biological hazard potential**

nanodiode

The October edition of the NanoDiode Newsletter is now available for download here:

http://www.nanodiode.eu/newsletter/newsletter-october-2014-2/

In this issue, the article "NanoDiode around Europe: Summary of project contributions to congresses and conferences" describes how Sonja Hartl from BioNanoNet (above) presented the NanoDiode project and highlighted the development of the Austrian User Committee on Nanomedicine, which is a small working group of stakeholders and users discussing the responsiveness of new innovations and technologies in order to respond to societal needs.

In 'The NanoDiode rocked Wroclaw!' you can find out how during the XVII annual Lower Silesian Science Festival in Wroclaw, Poland, NanoDiode presented its NanoGallery and NanoBazaar. The pictures of modern nanoscience issues, applications of high-tech nanomaterials, the presentation of small experiments and NanoDiode videoclips caught the attention of a large variety of visitors.

Aside from enjoying the experiments, the videoclips and the explanations about the usage of nanotechnology in everyday products, the spectators were also invited by experts in the fields of nanophysics and nanomaterials to discuss a variety of nanotech-related issues, such as responsible research and innovation. By means of this multiple perspective approach NanoDiode aims for a better understanding of the issues in all its complexity.

Finally, the newsletter also announces the project's competition in which you can win **a weekend trip to Amsterdam** including flights, accommodation and an innovation-oriented programme for two people. Competition details can be found on the NanoDiode website—t**he deadline for submissions is December 15th, 2014.**

NanoValid's latest (8th) Newsletter, marking the third year of the large-scale flagship project, is now downloadable.

Rudolf Reuther, the Project Coordinator, describes the current status of the project in his editorial:

If you have followed the development of our project over the past 3 years, you will have seen that NanoValid succeeded in retaining its focus on what it promised: namely to develop robust and validated reference methods for measurement and characterization, dispersion control and labelling, and for human and eco-toxicity testing of engineered nanomaterials.

Although this was always our first priority, a wealth of new knowledge, insights and deeper understanding (and a lot of new perspectives) have also developed on processes, factors and properties that can shed light on the true mechanisms behind what we measure, and that rule the complex interaction and interdependency between our instrumental and experimental design on the one hand, and the nanomaterials, matrices and biological surfaces (such as organisms, cells or bio-molecules), on the other.

Amidst all this intensive ongoing work, the project faces some important events, such as our next (7th) regular meeting, the 2nd technical review meeting, an exciting exploitation strategy seminar, and our first workshop—together with CEN, which will be solely devoted to standardization to identify those validated methods developed in NanoValid which will be proposed to CEN or ISO Technical Committees as future standards. All these events will take place in Brussels during the last week in November 2014 and will make this stage of the project, together with the preparation and submission of the 2nd report for the period M19-36, a really challenging time.

NanoValid is on track regarding the timely implementation and completion of tasks, and the achievement of goals, milestones and results, as documented in the many deliverable reports produced since the start of the project in 2011. Among the numerous ongoing tasks, I would like to highlight the build-up of a project-specific database, which will store and document the enormous amount of data and knowledge already produced and still being generated during the course of the project. This process and the uploading of results from the physical-chemical characterization of test materials (SiO_2, Ag, Au, CNT, CuO, ZnO and TiO_2), and of developed and validated SOPs to the intranet, is almost complete.

It is also worth highlighting the lively debate that has just started among project partners on the applicability and use of the developed methodology assessed through various case studies, and their capacity to improve current risk and life cycle assessment schemes. At this point, thanks should be given to the key researchers from the now completed NanoSustain project (2010-2013), who have made the resulting life cycle relevant data available for the test materials that are also used in NanoValid, such as TiO_2, CNTs and ZnO, not only to determine their final impact, but also the robustness of the methods we validated when used for LCA.

Another main topic, the development of reference materials needed for establishing reference methods, is presently being addressed by the set up of two new inter-lab comparisons to confirm the suitability and use of two2 nanomaterials (TiO_2 and SiO_2) as certified reference materials. As the dispersion of nanomaterials before any biological testing is still a bottleneck in getting reproducible results, another round robin on dispersion control has been recently initiated to arrive at a validated method that is not only applicable to easily dispersible but also to highly aggregated powder, in water and in various eco-toxicologically and physiologically relevant media.

I am happy to mention here that NanoValid has already produced 43 peer-reviewed papers since its start, which bear witness of the productivity and excellence of the research done. The complete list of articles published so far is available on our website www.nanovalid.eu (see NanoValid publications) and abstracts can be downloaded from there.

Now, I hope that you enjoy reading our newsletter and that it provides you with information, insights and ideas that can help you to get a more comprehensive view on the complex and multi-facetted research we carry out in a world where cutting edge technologies based on nanotechnology will play an ever more important role.

Read the latest project news here:
http://www.nanovalid.eu/files/nanovalid-outputs/nanovalid-newsletter-8-oct-2014.pdf

NanoFATE:

From Fundamental Big Questions to IMPACT

With the NanoFATE project drawn to a close, Project Coordinator Claus Svendsen (NERC-CEH, UK) recounts a journey building cross-discipline scientific understanding to enable pragmatic and workable solutions (see www.NanoFATE.EU).

When developing the NanoFATE proposal the core team was focused on two fundamental questions:

> *"How well will our standard risk assessment (RA) tools work for engineered nanomaterials (ENMs)?"*

For metal based ENMs:

> *"Would simply adding the NM tonnage to the standard metal RA work?"*

This developed into the delivery of a project systematically studying the environmental fate and toxicity of selected engineered nanoparticles (ENPs), focused around nine Science and Technology objectives and aiming to deliver *"Tools for mapping environmental risk across Europe from commercial nanoparticles used in consumer products"*.

During the intervening 5 years, 35 scientific experts have applied their specialist skills to nanotechnology in the context of environmental fate and possible risks, sharing their knowledge and expertise. They have all expanded their scientific comfort zone, expertise, understanding and vocabulary, as well as trained a string of at least 18 early stage research experts who all have matured in their research careers with nanotechnology as a central tenant in their naturally multi disciplinary education.

It has been illuminating to see how the consortium, initially somewhat polarized between focusing on nanotechnology as bringing new opportunities (physicists and industry) or possible risks (environmental scientists), gradually developed together a holistic *"yes, but..."* logic to addressing both sides of the risk-benefit equation.

Our wider survey of the European Nano Environmental Health and Safety community clarifies the background of this polarization and suggests how through effective dissemination, the more balanced representations developed in the NanoFATE consortium might be replicated in time across both specialist and general population groups.

A key element of NanoFATE was that the technical and scientific development undertaken to answer the main questions had to be applicable to industrially relevant nanomaterials and not just specifically designed research ENMs.

The research programme was built around on-market ENMs, with specifically designed particles being used only, where necessary, for validation of technical developments or scientific principles. The overall outcome is that through the developments and modifications highlighted in the WP overviews in our 6th and final NanoFATE Newsletter we can answer the original questions and state with some confidence that: (Q1) **Yes, the standard RA tools and systems can be used for nano with some minor modifications**, and (Q2) **In all but one of our 100's of exposures, accounting for the ionic toxicity of the metals involved on a simple mass basis would cover the hazard presented by the ENM.**

Using our worst case assumptions in our initial RAs we observed the Predicted Environmental Concentrations (PEC) in water for Ag and ZnO ENPs to be 10 to 100 times lower than the Predicted No Effect Concentrations (PNEC) while in soils the gap is a factor of 2-300. Thus, while metal EMN hazard on a mass basis is unlikely to exceed that of ionic metals**, we conclude that uptake and short term accumulation might be higher for ENM derived metals and that the real differences lie in the area of Fate and Exposure more than Hazard.** This conviction is based on results from our long term studies showing the environmental fate and biotic uptake and internal behaviour of ENM derived metals to be different to those of normal ionic derived metals. The lines of evidence behind this stemming from our experiments include:

- Media chemistry differences causing pronounced changes in observed fate and effects;
- ENM fate timescales (years in soil) exceeding even the longest periods stipulated by standard hazard tests;
- The high test concentrations needed and used in both our ecotox and characterisation studies shown to lead to environmentally unrealistic chemistries and presenting ENMs in forms (speciation) that organisms would never experience (thus questioning relevancies of the derived acute endpoints and related PNEC values);
- Very reactive ENMs from products shown to be likely to react and transform during waste processes before they reach the environment (e.g. in waste water treatment), suggesting that the ENMs arriving into the environment will be very different (less reactive and toxic, but possibly more persistent) to the "as produced/used and generally tested ENMs".

In the near term, industry and regulatory priorities probably call for research to generate the most relevant hazard data currently needed for product registration (using modified protocols that take media effects and ENM fate considerations into account).

We view that in parallel **the long term research efforts need to focus on generating understanding of** *how ENM properties link to their functional fate behaviour*, and on *how the complexity of ENM assessments can be reduced through categorising them based on their natural functional and behavioural groupings*.

Such overall reduction from the ENM variety seen at production stage will be driven through both "product value chain" processes (i.e. incorporation into product matrix, use, release and waste treatment) and environmental fate processes (e.g. coating erosion and replacement, core transformations, dissolution etc) that will dictate what ENMs turn into in terms of environmentally and exposure relevant forms, and where they end up.

In our future Nano Environmental Health and Safety work, the NanoFATE scientists aim to follow this focus on ENM forms that are relevant in industrial, release and fate and exposure terms.

NanoFATE has been intensely involved in active engagement with stakeholders during the project both through our own events and directly in international efforts , e.g. most recently the OECD WPMN (Washington, Sept 2014) and ECHA (Helsinki, Oct 2014) workshops. We have of course also secured the legacy of our work through ISI publications, of which we expect nearly 50 (with half out already in November 2014), representing extreme efficiency of delivering a paper for every 50k Euro the EU paid us!

I encourage you all to read both our 6th and final Newsletter as well as the preceding ones for an overview of what NanoFATE has delivered and as a good route into the website where you can learn more about the NanoFATE outputs, including the intricately detailed experiments and papers behind these overall conclusions and tools.

At the close of our project, and here in the shared NanoSafety Cluster letter, it only remains for me to thank the entire NanoFATE consortium for exceptional dedication, collaborative spirit and constant attention to detail and new opportunities, as well as the EU for the funding and the Cluster projects for open and engaging collaborations and joint events.

NanOFATE

ModNanoTox dissemination report for the NanoSafety Cluster available online now

ModNanoTox was a €1M EU-US modelling project entitled "Modelling nanoparticle toxicity: principles, methods and novel approaches" with 6 partners (5 EU and 1 US) with a duration of 24 months (November 2011-October 2013). It was the first of the modelling cluster of projects, funded in parallel with EU FP7 NanoTransKinetics (coordinated by UCD) and a US EPA STAR-N1 project, ENPI (Coordinated by Rice University). The project consisted of 6 partners (UoB - coordinator, RU, EAWAG, EMPA, IST and UNL) and the project website is available at: www.birmingham.ac.uk/generic/modnanotox/.

The goals of ModNanoTox were to develop a number of well-documented and technically advanced models describing the behaviour of engineered nanoparticles in organisms and the environment. The background to these models was a thoroughly documented database, constructed based on:

(1) an advanced evaluation of physicochemical properties of nanoparticles and in silico modelling of their reactivity; and

(2) assessment of the characterisation methodologies as well as toxicity protocols used to develop biological responses in toxicological studies.

The whole dataset was evaluated for internal consistency and then compared with other relevant sets. The evaluation stage was followed by development of toxicity models based at the individual organism level, using statistical and mechanistic models, in parallel with models predicting environmental fate.

The toxicity and fate models were integrated in mechanistic models to predict the long term risks of engineered nanoparticles for populations under realistic environmental conditions. The risk assessment model was developed in close collaboration with appropriate stakeholders and end users to ensure their suitability for practical use in relevant legislative contexts.

One of the key aims of ModNanoTox was intended to frame the outputs from the ModNanoTox project in a manner that facilitates knowledge transfer directly to the relevant NanoSafety Cluster Working Groups (WGs) such that ongoing and newly starting projects can build directly on the ModNanoTox platform and learn from the ModNanoTox consortium experiences and challenges.

In this manner the project is fulfilling a key dissemination goal by feeding data forward, and setting a model for how subsequent projects can share data in a meaningful manner, providing signposts to key deliverables and publications, and highlighting aspects of the project that worked really well versus those that presented more significant challenges than initially anticipated.

A modified version of ModNanoTox Deliverable D7.3 (to remove as yet unpublished data), summarising the outcomes from the ModNanoTox project including the various modelling approaches utilised and their outcomes (including what didn't work & why) and the set of resulting recommendations including several focussed on quality and reproducibility issues for studies related to aquatic toxicity of nanoparticles and some proposed revisions to current risk assessment approaches in order to integrate predicted exposure levels with predictions of likely ecological effects, is now available on the project website as a resource guide for other NanoSafety Cluster projects.

Key ModNanoTox outputs and summary exploitation plan

As part of the ongoing dissemination and exploitation activities from the ModNanoTox project, a list of exploitable outcomes was identified, and the stakeholder groups for which they are deemed to be of most relevance, as shown in Table 1 on the next page.

Further information can be obtained from:
Prof. Éva Valsami-Jones:
e.valsami-jones@bham.ac.uk

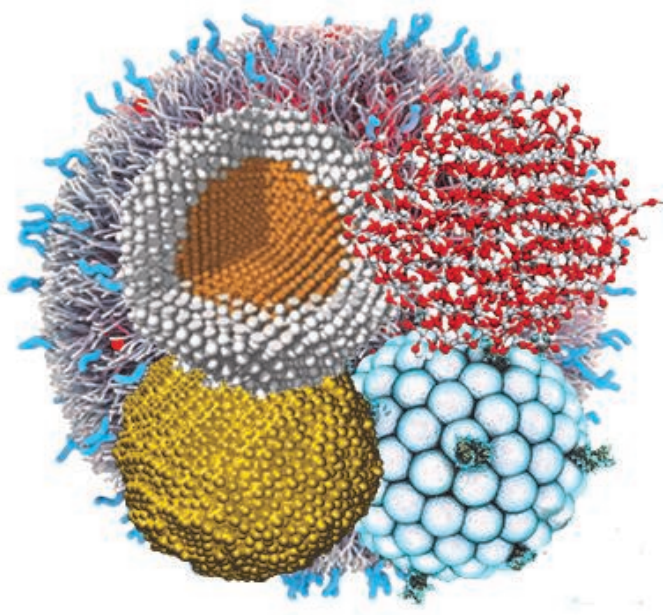
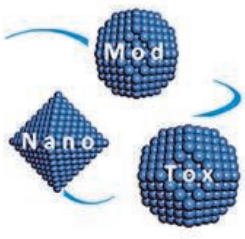


Table 1. ModNanoTox list of identified exploitable outcomes , and the stakeholder groups for which they are deemed to be of most relevance

No.	Outcomes description	Potential Stakeholders / End-users
1	Database (Excel and ISATab formats) of studies relating to Ag NP toxicity to aquatic organisms (99 studies from 2008-2013)	eNanoMapper (FP7) NSC WG4 (databases) ISATab community EU-US CoR Databases & ontology
2	Quality Assurance criteria / classification for degree of NP characterisation in literature studies	NSC WGs 1 (materials), 2 (hazard), 3 (exposure) and 4 (databases) EU-US CoR Databases & ontology Scientific community
3	Adaptions to OECD protocols for aquatic assessment to include temporal information and facilitate determination of internal dose	Scientific community QualityNano (FP7) for Inter-laboratory comparison OECD and CEN Regulatory organisations MARINA, NanoValid, NanoMILE, FutureNanoNeeds & NanoREG
4	Modelling approaches and outcomes Fate & exposure - Bioaccumulation QSAR models -Population models	NSC WG6 (Modelling) EU-US CoRs on modelling Modelling cluster of projects
5	Atomistic modelling data and outputs regarding effect of size on particle stability, and NP dissolution	EU FP7 NanoTransKinetics & FutureNanoNeeds NSC WG1 (Materials) and 6 (Modelling) NP producers / SMEs Regulatory agencies
6	Quality and reproducibility issues for studies related to aquatic toxicity of NPs	Scientific community QualityNano (FP7) MARINA, NanoValid & NanoREG
7	Proposed revision to current risk assessment approach to integrate predicted exposure levels with predictions of likely ecological effects	Risk assessors / regulators including ECHA and EMA Policy makers Industry, including pesticides NSC WG5 (Risk assessment) NanoREG



ModNanoTox

UNIVERSITY OF BIRMINGHAM

EMPA Materials Science & Technology

in silico toxicology

University of Nebraska Lincoln

eawag aquatic research

Highlights from NanoMILE's recent publications: a progress update for the NanoSafety Cluster

By Iseult Lunch, University of Birmingham

FP7 project NanoMILE (www.nanomile.eu) is a unique partnership focussed on developing detailed mechanistic understanding of the interactions of manufactured nanomaterials (MNMs) with living systems.

NanoMILE intends to revolutionise nanosafety research through its robust and novel approaches to the selection and development of test MNMs including environmentally aged variants to represent real-world materials, its technically and computationally advanced integration of systems biology, its thoughtfully balanced toxicological / ecotoxicological approaches, its development of novel high throughput platforms for screening and its feedback loops for development of MNMs that are safer by design.

Together, these approaches will result in a robust framework for classification of MNMs according to their biological impacts. Several important advances have already been made, in the first 18 months of the project, with some highlights presented below.

Towards a strategy for grouping and classification of Nanomaterials

Within NanoMILE, UoB and KIT developed a hypothesis that nanomaterial (NM) toxicity can be predicted as the sum of three "quantifiable" parameters (principle components, as shown in Figure 1) that capture the diversity of modes of action of NMs, namely:

- *Composition* which includes inherent molecular toxicity, charge, hydrophobicity and coating (although also linked to both the intrinsic and extrinsic axes).
- *Intrinsic* properties which are inherent to the nano-form of a material, and include e.g. structure and structural strain. A number of NM physicochemical properties map onto the *intrinsic* axis, including shape, porosity, structural configuration and bandgap.
- *Extrinsic* properties which are those corrected to the surface area of the NM, including e.g. surface interactions and transformations of NM surface and biomolecules (e.g. unfolding, receptor activation, membrane damage, fibrillation etc.) as a result of binding.

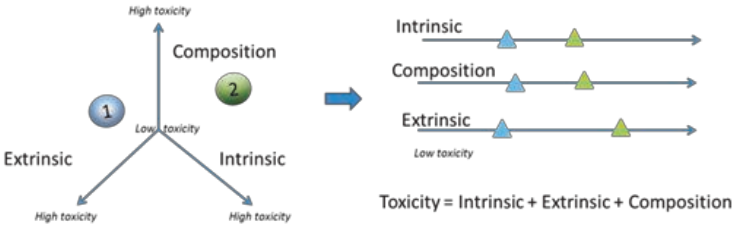


Figure 1: NanoMILE three principle axes that describe toxicity and mode of action.

Key features of this approach are that:

1) it allows separation of modes of action e.g. dissolution is primarily associated with specific NM *compositions*, but can be facilitated by specific *intrinsic* properties such as high strain conformation associated with, for example, pointed structures such as needles or nano-stars, and by *extrinsic* factors such as strongly binding ligands that unfold and expose cryptic epitopes for example; and
2) identities of the major physico-chemical descriptors driving the toxicity from the weight of contribution to each principle component/axes can be explicitly determined (i.e. the loadings), as can the main mode of action as this will be the principle component with accounting for the highest amount of the variability in the data. Thus, we envisage utilisation of a set of scales from low to high (toxicity) for each of the three parameters with the overall toxicity being the sum of the three axes (see Figure 1).

The fact that the same physico-chemical descriptor can contribute to more than one PC is a key feature of this approach, which we expect will enable development of QNARs, facilitate the grouping of NMs on the basis of where they sit in this 3-dimensional space, and support regulatory decision-making.

See Lynch, et al., **Nano Today,** 2014, 9:266. http://dx.doi.org/10.1016/j.nantod.2014.05.001.

Open access platform for modelling and prediction of nanomaterial uptake

In an effort to computationally explore available datasets that will lead to ready-to-use applications one of NanoMILE's SME partners (Novamechanics) has developed and validated a quantitative nanoparticle-activity relationship (QNAR) model for the prediction of the cellular uptake of nanoparticles in pancreatic cancer cells. Their insilico workflow was made available online through the Enalos InSilicoNano platform (http://enalos.insilicotox.com/QNAR_PaCa2/), a web service based solely on open source and freely available software that was developed with the purpose of making the model available to the interested user wishing to generate evidence on potential biological effects in the decision making framework.

This web service will facilitate the computer aided nanoparticle design as it can serve as a source of activity prediction for novel nano-structures. To demonstrate the usefulness of the web service the work exploited the whole PubChem database within a virtual screening framework and then used the Enalos InSilicoNano platform to identify novel potent nanoparticles from a prioritized list of compounds.

See Melagraki and Afantitis, ***RSC Adv.***, 2014, **4**:50713. http://pubs.rsc.org/en/content/articlelanding/2014/ra/c4ra07756c#!divAbstract

Cellular self-organisation and mobility on micro-structured surfaces: towards single cell HTS

Partner LMU has been working on methods to pave the way for automated filling of cell arrays, enabling high-throughput single-cell analysis of cell samples without losses. LMU reported recently on the phenomenon of cellular self-organization, which allows for autonomous positioning of cells on micro-patterned surfaces over time. This was facilitated by preparing surface with a regular lattice of protein-coated adhesion sites surrounded by polymer (PLL-g-PEG) passivated areas, which reduce protein biding and thus cellular adhesion, and studying the time course of cell ordering.

After seeding, cells randomly migrated over the passivated surface until they find and permanently attach to adhesion sites with occupancy levels typically reaching 40-60% after 3-5 h. The time required for sorting was found to increase with increasing distance between adhesion sites, and is well described by the time-to-capture in a random-search model. Further studies assessed cell behaviour (mobility) on polymer surfaces of different composition incubated with fibronectin (FN) using time-lapse microscopy, and correlated adhesion with the amount and location of FN via neutron reflectivity. Cells exhibited 21% increased motility on PLLPEG (5 kDa PEG chains) compared to pure FN layers, and 12% decreased motility for PLLPEG (2 kDa PEG chains), suggesting that by design of PEGylated surfaces cell migration can be controlled.

See Röttgermann et al., ***Soft Matter.*** 2014 Apr 14;10 (14):2397-404. doi: 10.1039/c3sm52419a and Röttgermann PJ et al., ***Macromol Biosci.*** 2014 Sep 10. doi: 10.1002/mabi.201400246.

Comparison of 5-day and 28-day inhalation toxicity responses to ceria nanomaterials

Two ceria nanomaterials (NM-211, NM-212) were tested for inhalation toxicity and organ burdens in order to design a chronic and carcinogenicity inhalation study (OECD TG No. 453). Rats inhaled aerosol concentrations of 0.5, 5, and 25 mg/m³ by whole-body exposure for 6 h/d on 5 consecutive days for 1 or 4 weeks with a post-exposure period of 24 or 129 days, respectively. Lungs were examined in bronchoalveolar lavage fluid (BALF) and histopathology.

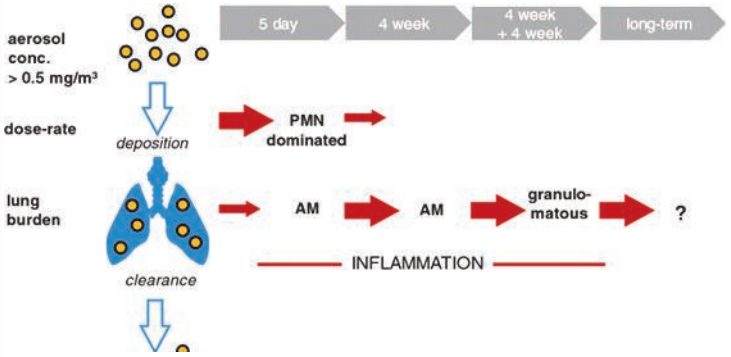


Figure 2: Summary of results after 5 days and 4 weeks of inhalation exposure to Ceria nanomaterials

Inhaled ceria NM-212 was deposited in the lung and cleared with a half-time of 40 days; at aerosol concentrations higher than 0.5 mg/m³, this clearance was impaired resulting in a half-time above 200 days (25 mg/m³). After 5 days of exposure to concentrations >0.5 mg/m³ ceria induced an early inflammatory reaction by increases of neutrophils in the lung which decreased after the exposure was terminated. The neutrophil number observed in bronchoalveolar lavage fluid BALF was also decreased after 4 weeks of exposure (compared to 1 weeks of exposure) and an increase of mononuclear cells, especially macrophages was observed. Macrophages were visible in histopathology but not in BALF. Further progression to granulomatous inflammation was observed after 4 weeks plus 4 weeks post-exposure (Figure 2). The surface area of the two ceria nanomaterials (NM-211, NM-212) deposited in the lung, rather than mass or volume, correlated with the inflammatory reaction after 1 week of exposure. Observing the time course of lung burden and inflammation, it appears that the dose rate of particle deposition drove an initial inflammatory reaction by neutrophils. The later phase (after 4 weeks) was dominated by mononuclear cells, especially macrophages. The progression toward the subsequent granulomatous reaction was driven by the duration and amount of the particles in the lung. The further progression of the biological response will be determined in the ongoing long-term study.

See also: Keller et al. ***Arch Toxicol.*** 2014 88:2033-59. http://www.ncbi.nlm.nih.gov/pubmed/25273020

Reporting on the NANODETECTOR Second Annual Workshop:

The Principles of Plasmonic Detection and Demonstration of a Novel Nanoparticle Detector

Submitted by Alvise Bianchin, MBN nanomaterialia s.p.a.

On the 6th November 2014, the management team of the FP7 project NANODETECTOR held a highly-successful public workshop and dissemination meeting in the Czech Republic, EU. The workshop was held in conjunction with the prestigious NANOCON2014 Conference, one of Europe's largest Nanotechnology conferences with over 450 scientific delegates from more than 30 countries in attendance.

In order to allow as many people as possible to attend the NANODETECTOR demonstration, the management team organised a dedicated workshop scheduled for the second day of the three-day event and they were rewarded with an impressive number of delegates attending the event, possibly one of the best attended sessions of the entire conference.

The opening address was made by Dr Richard Johnson of Upperton Limited, a UK SME specialising in developing biological nanoparticles for use in cancer treatments. Dr Johnson welcomed the audience to the workshop and gave a brief introduction to the participants of the NANODETECTOR consortium.

The event progressed into the technical dissemination with an opening presentation by Professor Vladimir Mirsky of Brandenburg University of Technology, Cottbus-Senftenberg, Germany. Professor Mirsky introduced the audience to the principles that the new technology is based on, namely the application of surface plasmon resonance (SPR) in the detection of nanoparticles. Professor Mirsky explained that whilst the principles of SPR have been known for many years, the use of this physical phenomenon for nanoparticle detection was highly innovative.

I

Professor Vladimir Mirsky presents to the audience

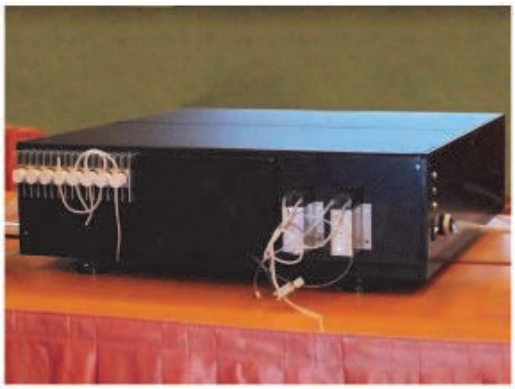
Indeed the new technique was now being exploited by the NANODETECTOR team to detect particles at concentrations lower than had previously been possible.

On closing this first section of the dissemination, it was clear that the audience were intrigued by the new concept, demonstrated by the extensive series of questions and technical discussions on aspects such from the basic principles of SPR through to the design principles on which the new NANODETECTOR machine is based.

The second section of the dissemination event saw Dr Johnson present to the audience on the industrial applications of the new NANODETECTOR machine. Dr Johnson was keen to remind the audience that the new NANODETECTOR had been designed to detect nanoparticles with the purpose of ensuring process and environmental safety, rather than a tool to simply characterise nanoparticles. More specifically he emphasised that the key features of the new NANODETECTOR were its ability to detect small numbers of nanoparticles in both air and liquid, in a highly specific manner.

Dr Johnson used specific examples from two industries in order to illustrate how the machine could be utilised in an industrial environment.

Dr Richard Johnson describing some of the industrial applications of the NANODETECTOR



NANODETECTOR instrument

The two case studies described were for the two end users in the NANODETECTOR project, namely Upperton Ltd (a UK SME developing biological nanoparticles) and MBN Nanomaterialia SpA (an Italian SME producing engineered inorganic nanoparticles on an industrial scale).

In both case-studies, flow diagrams and photographs were used to illustrate how the NANODETCTOR could be used in key stages of the industrial processes to detect and monitor low levels of nanoparticles both in the workplace (safety monitoring) and in process waste streams (environmental protection).

Once again the presentation was followed by a series of interesting discussions from the floor, particularly from industrial representatives who were keen to learn more about topics such as degree of selectivity, levels of detection and modifications required to detect nanoparticles in different types of processing streams.

The final section of the afternoon workshop was a live, real-time practical demonstration of the prototype NANODETECTOR machine by Dr Shavkat Nizamov from the Brandenburg University of Technology, Cottbus-Senftenberg, Germany.

Dr Nizamov has been responsible for the initial assembly and testing of the new NANODETECTOR and showcased some of the early results obtained using nanoparticles made from a wide range of materials, suspended in different solutions.

This initial technical presentation was quickly followed by the highlight of the workshop, a practical demonstration of the NANODETECTOR showing real-time results generated during the testing.

The practical demonstration by Dr Nizamov was notably the first public demonstration of the new NANODETECTOR in working form. Indeed the visual data generated during the live test was immediately seen by the audience as individual nanoparticles in the test solutions were captured on the detector surface and projected onto the auditorium screen.

After a series of live tests the demonstration ended and a lively discussion ensued in the form of an informal question and answer session between the NANODETECTOR team and interested parties.

For many in the audience it was the first time that a nanoparticle detection and visualisation technique had been demonstrated in real time and at the end of the demonstration members of the audience were invited to the front of the auditorium to inspect the NANODETECTOR, resulting in enthusiastic, detailed discussions related to specific aspects of the new machine.

At the end of the workshop there was an opportunity for delegates to view a number of technical posters produced by the NANODETECTOR team to showcase specific

NanoDefine Partners at SETAC 2015

NanoDefine partner Ralf Kaegi (EAWAG) reports on a session that he is co-organising with Patrick Bäuerlein at the SETAC Europe Meeting, Barcelona, 3-7 May 2015

You are invited to submit abstracts for oral and/or poster presentations for:

"Leaving the comfort zone.
The challenge of measuring nanoparticles in complex matrices."

Session Abstract:

Engineered nanoparticles (ENP) are by definition particles with at least one dimension between 1 and 100 nm and can occur in a variety of shapes (spheres, platelets, rods) and elemental compositions (Ag, TiO_2, C-based). Often they are synthesised with different capping agents (citrate, PVP, gum arabic). They are produced and used in various consumer products at increasing volumes. Examples include sunscreens, mouth wash and textiles, but also food packing materials as well as food additives.

Several research reports have already documented the release of ENP into the aquatic environment. However, to develop a scientific understanding of i) the release patterns, ii) the transformation reactions in the environment and iii) the environmental distribution of ENP, analytical tools are urgently needed. These tools must enable the detection, quantification and characterisation of ENM in aqueous matrices, food and soils.

Recently developed and/or substantially improved analytical techniques such as single particle ICP-MS, Orbitrap MS and field flow fractionation (FFF) coupled mass spectrometry, dynamic and static light scattering as well as single particle ICP-MS have opened a new research front in analytical chemistry. Using sophisticated analytical tools and combinations thereof, ENP in both their pristine and transformed state after being exposed to different environmental conditions have been investigated in unprecedented detail.

Due to the enormous progress recently made in this research field ENP can be accurately quantified in simple matrices. The next challenge is to make these highly sophisticated techniques compatible with complex matrices, which ultimately will allow the detection and quantification of ENP in natural environments.

This session aims to integrate contributions focussing on latest developments for nanoparticle analysis including sample preparation techniques and to provoke a discussion about most pressing research questions in that field. We invite researchers from academia, government, industry and research institutes to share their latest findings and experiences on methods used for the detection and characterisation of nanomaterials in various matrices, such as food, soil, surface- or wastewater.

Submission is possible only via the website, http://barcelona.setac.eu, by 30th November. Please feel free to share this with your networks.

Environmental protection in a multi-stressed world: challenges for science, industry and regulators

SETAC Europe 25th Annual Meeting will be held in Barcelona, Catalonia, Spain, from 3-7 May 2015.

The innovative use of chemicals and nanomaterials in new technologies, industry and agriculture challenges many aspects of the ecosystem functioning of the global environment. However, these new technologies and materials also offer opportunities to remediate or minimise these anthropogenic insults. Finding innovative solutions to environmental problems is ever more important in the current economic scenario. For SETAC, this is a challenge we relish.

This international conference brings together experts from government, industry, consultancy and academia to meet this challenge. The conference will focus on the most recent advances in environmental sciences and will provide platforms for implementing this knowledge, for improving the protection of our environment and to shape policies from current viewpoints to future needs.

http://barcelona.setac.eu

A Successful first year for the SUN Project

By Judith Friesl
Marketing Manager &
SUN Dissemination Coordinator
The REACH Centre

In their two day annual meeting, held in Utrecht, The Netherlands, from 22-24 October 2014, 35 partners from 12 EU countries presented their exiting results of the first 12 months of the SUN - Sustainable Nanotechnologies Project.

SUN is a three and a half year EU project, running from 2013 to 2017, with a budget of about €14 million. Its main goal is to evaluate the risks along the supply chain of engineered nanomaterials and incorporate the results into tools and guidelines for sustainable manufacturing.

As a result of the work of the first 12 months, the project consortium has highlighted nanoscale Copper Oxide (CuO) as one of the case studies to evaluate nano-EHS risks. Nanoscale CuO is commonly used in antimicrobial wood coatings. It was decided that CuO will be evaluated as additive in a high-gloss acrylic wood coating, where the anticipated antimicrobial activity of CuO would provide an additional functionality for the coating.

In a first stage, several other case studies – simulating all stages of the life cycle - have been conducted to determine the release of nanoparticles from different product matrices (e.g. Silica from food, TiO_2 from self-cleaning coatings for ceramic tiles, carbon nanotubes from anti-fouling coatings and lightweight, conductive plastics) and to artificially age them by subjecting them to luminosity, weathering, leaching, incineration, and/or immersion.

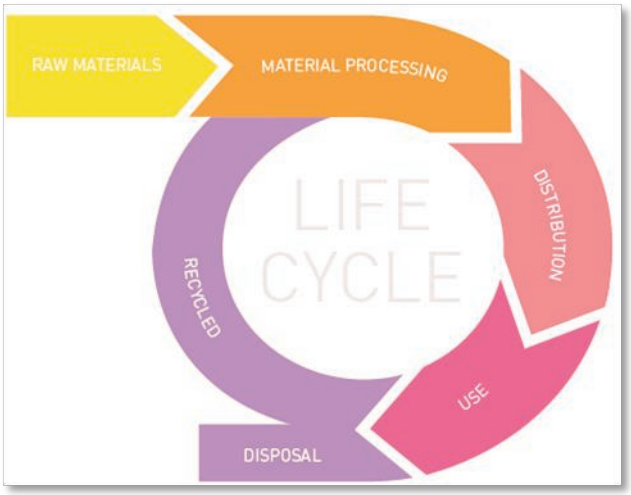
These nanomaterials have been used to test their physic-chemical characteristics, hazard, exposure, risk and environmental impact and to compare the results to their pristine counterparts.

Some environmental studies involved *in vivo* microbial communities, whole organisms (soil, sediment and water invertebrates) and *in vitro* tests with cells. In order to estimate human health risks, inhalation and ingestion *in vivo* experiments were performed.

The first *in vitro* screening results showed relatively low toxicity of most nanomaterials, but some results point to cytotoxicity and pro-inflammatory responses.

At the same time, project partners have developed practices, methods and tools to facilitate safe production, handling and disposal of nanomaterials. First results show, that considering the properties of a NOAA and its uses and exposure, it might be possible to rethink its engineering in order to process a safer product. For example: if the toxicity of a particular nanomaterial comes from its small size, "enlarging" would reduce its toxicity. Surface engineering modification applied to CuO will provide a first strong input for the development of new risk management guidelines.

The knowledge and tools produced will be integrated into the SUN Decision Support System, a software for industry and regulators to estimate the risks from nanomaterials and to evaluate the technical and cost effectiveness of the available technologies and practices in risk prevention and control. Development on the tool has started; the SUN Decision Support System will be launched in 2017.



To find out more about the SUN Sustainable Nanotechnologies Project go to www.sun-fp7.eu

SUN is funded by the EU 7th Framework Programme, contract no. 604305

Contact for Press:
Judith Friesl
Marketing Manager & SUN Dissemination Coordinator
The REACH Centre
Lancaster Environment Centre, Lancaster University,
Lancaster LA1 4YQ, UK
Tel: +44 1524 510728
Email: j.friesl@thereachcentre.com

Topical Scientific Workshop on Regulatory Challenges in Risk Assessment of Nanomaterials, Helsinki, 23-24 Oct 2014

By Claus Svendsen (NanoFATE & GUIDEnano), Teresa Fernandes (MARINA, NanoMICEX, NANoREG, SUN, ITS-Nano & NanoSolutions), and Geert Cornelis (NanoFATE, MARINA & GUIDEnano), the two former NSC Co-chairs for WG3 Exposure and WG2 Hazards, respectively.

ECHA, jointly with the Scientific Committee, organized an interactive workshop aimed at bridging the gap between scientific discovery and regulatory policy, addressing the scientific challenges in regulatory risk assessment of nanomaterials. The programme addressed five key topics covered by 14 invited speakers from Regulation, Industry and Academia (for full details, a list of the presenters and copies of the presentations click here).

All speakers delivered stimulating presentations including results and conclusions from many EU NMP projects (e.g. NanoFATE, GUIDEnano, MARINA, NanoMICEX, NanoMILE, NanoSolutions, NANoREG, SUN, ITS-Nano, NanoDefine, NanoInDex), from national funded projects, and from industry and regulatory programmes.

Each topical session was followed by an interactive panel discussion, which was contributed to by each invited speaker and facilitated by members of the Scientific Committee. Topical questions and issues were compiled prior to, and during, the workshops and these were the main focus during the panel discussions.

The workshop focused on both practical and theoretical aspects needed to make real progress in nanomaterial risk assessment and management, and was therefore highly welcomed by the 200+ strong audience from 26 countries, who represented all stakeholder sectors from DG ENV, DG SANCO, EFSA, US-EPA, EU national regulators, Industry organizations and Companies, NGOs, to researchers from many EU NMP research projects and academia.

It was an intense and very successful workshop, which will serve as the beginning of a closer collaboration between the policy developers lead by ECHA, and both industry and academia in the context of regulatory guidance development and advancement of applied science in this field.

The conclusions from this workshop will form a cornerstone in guidance development and will also feed into developments outside ECHA such as the research community, ongoing policy discussions, OECD WPMN work etc.

The panel discussions and the feedback at the workshop suggest that this event met its aim to generate a good overview as well as provide future directions that will help address both the scientific and regulatory challenges in Risk Assessment and Management of Nanomaterials.

Image: Workshop in progress

JRC releases world's first certified mixture of silica nanoparticles

Production of certified reference materials for nanotechnology

By Thomas Linsinger, JRC-Institute for Reference Materials and Measurements (IRMM)

For the first time a certified reference material containing silica nanoparticles with a distinct bimodal size distribution has been released by JRC-IRMM. It has been designed and produced to support the implementation of the nanomaterial definition recommended by the European Commission (2011/696/EU).

The Institute for Reference Materials and Measurements (IRMM) of the European Commission's Joint Research Centre (JRC) has developed a certified reference material (CRM) that consists of a mixture of near-spherical silica nanoparticles of two distinct sizes (nominally 20 nm and 80 nm in diameter) in an aqueous solution.

Silica nanoparticles have been widely used in numerous established and promising new applications such as abrasives in polishing slurries, food additives for clarification of beer and wine, and as drug delivery systems. However, along with the growing interest of introducing new product features in consumer products via nanoparticles, concerns related to possible particle-induced adverse health effects are increasing.

To support toxicologists in studying and understanding the behaviour and fate of nanoparticles, accurate characterisation of the nanoparticles' physico-chemical properties (e.g., size, shape, surface charge) is a fundamental requirement. This new CRM (ERM®-FD102) is world's first of its kind and allows testing laboratories to validate particle sizing methods in a metrologically sound manner in the nanoscale range (1 nm to 100 nm).

The release of ERM®-FD102 concludes several years of product development, in which the homogeneity and stability of the material were rigorously assessed. The certified and indicative particle size values were determined in collaboration with 30 laboratories from 9 different countries in Europe, America, Australia and Asia, thus bringing together expert knowledge from across the globe. The characterisation measurements were conducted by different measurement techniques, including dynamic light scattering, atomic force microscopy, electron microscopy, particle tracking analysis and centrifugal liquid sedimentation.

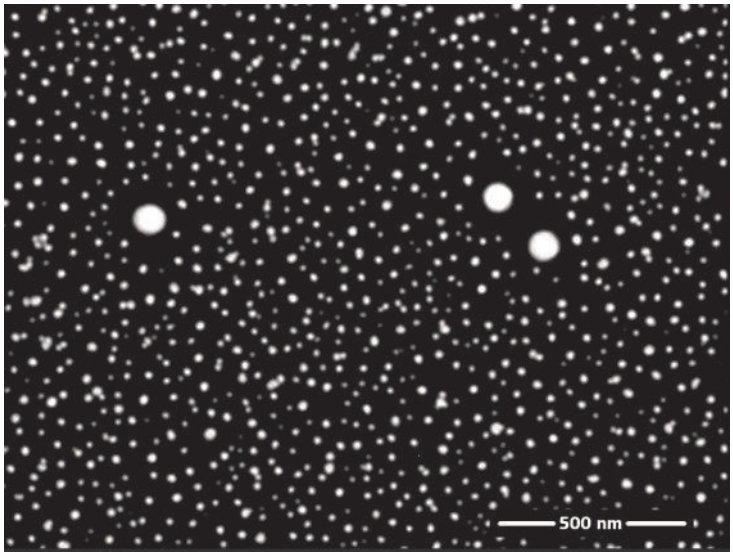


Image: ***SEM micrograph of ERM-FD102***
Credit ***EU, 2014***

ERM®-FD102 is a benchmark that will help to ensure the comparability of measurement results worldwide, thereby facilitating trade and enhancing innovation.

Because of its distinct bimodal particle size distribution, the material is ideally suited to support the development of methods for the implementation of relevant EU legislation such as the European Commission's Recommendation on the definition of 'nanomaterial' (2011/696/EU).

The certification report, together with the certificate, are available in our online catalogue.

Web Link:
https://web.jrc.ec.europa.eu/rmcatalogue/detailsrmcatalogue.do?referenceMaterial=FD102

Further information:
Jrc-irmm-rm-distribution@ec.europa.eu

https://ec.europa.eu/jrc/en/reference-materials/catalogue/order

JRC EUROPEAN COMMISSION

irmm Institute for Reference Materials and Measurements

European Parliament's ENVI Committee votes to approve Moratorium on Nano in Food

Source: http://www.europarl.europa.eu/news/en/news-room/content/20141125IPR80424/html/Novel-foods-MEPs-call-for-moratorium-on-nano-foods-and-labelling-of-cloned-meat

Draft plans to encourage food innovation via a new, simplified authorization procedure for novel foods were approved by the Environment Committee on Monday. MEPs nonetheless amended the text and proposed a moratorium on the use of nanomaterials in food, based on the precautionary principle. They also added provisions for compulsory labelling of cloned food products.

The draft legislation, approved by 57 votes to 4 with 2 abstentions, lays down clear deadlines and definitions for the entire process of placing a novel food on the market.

"I was pleased that the 20 Compromise Amendments passed in last night's vote without any problems, and also with a relatively few members expressing disagreement. I think this was reflective of the atmosphere of cooperation in the meetings I have had with the shadow rapporteurs thus far, and I hope we continue in a similar vein in the trilogue negotiations" said James Nicholson (ECR, UK) who is steering the legislation through Parliament.

"Nevertheless, I am not completely satisfied with the outcome of the vote. There were certain amendments on animal cloning and nanomaterials that passed, which my colleagues in the ECR and I voted against. I have been very clear from the start of this process, that given the history of the Novel Foods proposals it was essential that cloning and nanomaterials be dealt with separately" he added.

Moratorium on nano-foods

Emerging technologies in food production processes may have an impact on food safety, MEPs say. Foods for which production processes require risk assessments – including nanomaterials – should therefore not be authorized until they are approved by the European Food Safety Authority (EFSA), say MEPs. Special attention should also be paid to food packaging containing nanomaterials, to prevent them migrating into food. And in line with the precautionary principle, all novel food should also be subject to post-market monitoring, they add.

MEPs also amended the existing definition of nanomaterials to bring it in line with EFSA recommendations (10% nano-particles threshold for a food ingredient to qualify as "nano", whereas the Commission proposed 50%).

Cloned meat labelling

MEPs amended the scope of the legislation to include cloned meat products. Until specific legislation on food derived from cloned animals and their descendants enters into force, this food should fall under the scope of this regulation, and be appropriately labelled for the final consumer, MEPs say.

Member states would be allowed to ban a novel food temporarily, if new information suggests that it may pose a risk to human health or the environment. The Commission, together with EFSA, should then examine the grounds for concern, MEPs say.

A "novel" food is defined as any food that was not used for human consumption within the EU to a significant degree before 15 May 1997. MEPs tightened up this definition to include, inter alia, food with a modified molecular structure, microorganisms, fungi, algae, food obtained from cellular or tissue cultures, or insects.

Traditional foods from third countries would be allowed on the EU market where its history of safe consumption has been demonstrated for at least 25 years.

Next steps

A mandate for Mr Nicholson to starting negotiations with the Council of Ministers was approved unanimously, with one abstention. The Council has yet to adopt its negotiating position.

Chemical and Optical Characterisation of Nanomaterials in Biological Systems, AKA NanoChOp, is a European Metrology Research Programme (EMRP) funded project, now in its third and last year.

Submitted by Elena Sanchez

The intrinsic properties of nanomaterials are increasingly used by companies to overcome scientific and technical challenges and have led to these materials being incorporated into over a thousand commercial products in a global market worth over €9 billion. Nanomaterials now impact all areas of human life from medical devices and solar cells through to paints, sunscreens and cosmetics.

There is a clear concern in the EC and Member States regarding this widespread use of engineered nanoparticles due to their unknown biological interactions and associated hazard(s). This is compounded by a lack of robust methods to characterise nanomaterials in complex matrices. Generally they are characterised for their chemical, physical and optical properties in their pure form or in simple idealised matrices.

The properties of nanomaterials can change significantly when they are used in complex matrices, such as biological systems, potentially affecting their functionality and behaviour. These interactions could create a potential risk to human health but conversely could be exploited in for example, nanobiotechnology or nanomedical applications.

For example, in some therapeutic applications, protein coated nanoparticles (apolipoprotein E coatings) can target specific locations such as the brain. It is therefore important to be able to demonstrate that a nanomaterial meets a specified functional demand by characterising it within an appropriate system using quantitative measurements traceable to agreed reference systems.

The research in this project addresses this issue through the combined expertise of a consortium of partners to produce measurement techniques which can be used to directly characterise nanomaterials in complex matrices and be further developed as underpinning techniques to support the general nanotechnology community.

The consortium is formed by LGC, Physikalisch-Technische Bundesanstalt (PTB), National Physical Laboratory (NPL), Federal Institute for Materials Research and Testing (BAM) and the Institute for Reference Materials and Measurements (IRMM),as well as research partners Research Centre Natural Sciences, Hungarian Academy of Sciences (RCNS HAS), Heriot-Watt University and Hamburg University.

The project partners have been working on developing a series of nanoparticle reference materials composed of metal oxide materials (to develop methods for physical and chemical characterisation), fluorescently labelled metal oxide materials (to allow nanomaterials tracking within biological systems to be performed) and a quantum dot nanomaterial (to develop methods for the optical characterisation of fluorescent nanomaterials).

Other technical outputs from the project include the validation of a range of physical and chemical techniques, including chemical analysis by ICP-MS, light scattering (MALS, DLS, NTA), X-ray technologies (SAXS), centrifugal sedimentation (DCS) and nanoparticle charge analysis (SIOS, ELS, Z-NTA). A cell based model has also been selected as a test system for the characterisation of nanomaterials within biological systems.

The impact

The benefits of nanotechnology can only be fully realised if nanomaterials, particularly those for use in nanomedicine applications and consumer products, are shown to be non-toxic. The traceable methods developed in the NanoChOp project will lead to a reduction in the uncertainty of measurements into the potential detrimental interactions of nanomaterials with biological systems.

NanoChop will also impact positively on regulatory bodies and legislators who will be provided with coherent and comparable data recommendations from which to formulate policy.

Finally, manufacturers of nanomaterials will be able to operate under a reasonable, rather than overly stringent, regulatory framework. The consortium partners use their representation on standardisation and metrology committees, where appropriate, to disseminate the results of NanoChOp, which can be used to generate guidelines for the characterisation of nanomaterials in complex matrices.

The NanoChOp is scheduled to be completed in May 2015.

More details on the aims of the project and work packages can be found on http://nanochop.lgcgroup.com/ .

Or contact Elena Sanchez
Training Consultant, Science and Innovation
LGC, Queens Road, Teddington, Middlesex , TW11 0LY, UK
Tel: +44 (0)2089437388

EMRP
European Metrology Research Programme
Programme of EURAMET
The EMRP is jointly funded by the EMRP participating countries within EURAMET and the European Union

Nanosafety research: there's room for improvement—The quest for the gold standard

EMPA
Materials Science & Technology

Credit:http://www.empa.ch/plugin/template/empa/3/152403/---/l=2

Empa toxicologist **Harald Krug** has lambasted his colleagues in the journal Angewandte Chemie. He evaluated several thousand studies on the risks associated with nanoparticles and discovered no end of shortcomings: poorly prepared experiments and results that don't carry any clout. Instead of merely leveling criticism, however, Empa is also developing new standards for such experiments within an international network.

Iron oxide nanoparticles on the surface of a cell

Researching the safety of nanoparticles is all the rage. Thousands of scientists worldwide are conducting research on the topic, examining the question of whether titanium dioxide nanoparticles from sun creams can get through the skin and into the body, whether carbon nanotubes from electronic products are as hazardous for the lungs as asbestos used to be or whether nanoparticles in food can get into the blood via the intestinal flora, for instance. Public interest is great, research funds are flowing – and the number of scientific projects is skyrocketing: between 1980 and 2010, a total of 5,000 projects were published, followed by another 5,000 in just the last three years. However, the amount of new knowledge has only increased marginally. After all, according to Krug the majority of the projects are poorly executed and all but useless for risk assessments.

How do nanoparticles get into the body?

Artificial nanoparticles measuring between one and 100 nanometers in size can theoretically enter the body in three ways: through the skin, via the lungs and via the digestive tract. Almost every study concludes that healthy, undamaged skin is an effective protective barrier against nanoparticles. When it comes to the route through the stomach and gut, however, the research community is at odds. But upon closer inspection the value of many alarmist reports is dubious – such as when nanoparticles made of soluble substances like zinc oxide or silver are being studied. Although the particles disintegrate and the ions drifting into the body are cytotoxic, this effect has nothing to do with the topic of nanoparticles but is merely linked to the toxicity of the (dissolved) substance and the ingested dose.

Laboratory animals die in vain – drastic overdoses and other errors

Krug also discovered that some researchers maltreat their laboratory animals with absurdly high amounts of nanoparticles. Chinese scientists, for instance, fed mice five grams of titanium oxide per kilogram of body weight, without detecting any effects. By way of comparison: half the amount of kitchen salt would already have killed the animals.

A sloppy job is also being made of things in the study of lung exposure to nanoparticles: inhalation experiments are expensive and complex because a defined number of particles has to be swirled around in the air. Although it is easier to place the particles directly in the animal's windpipe ("instillation"), some researchers overdo it to such an extent that the animals suffocate on the sheer mass of nanoparticles.While others might well make do without animal testing and conduct in vitro experiments on cells, here, too, cell cultures are covered by layers of nanoparticles that are 500 nanometers thick, causing them to die from a lack of nutrients and oxygen alone – not from a real nano-effect. And even the most meticulous experiment is worthless if the particles used have not been characterized rigorously beforehand. Some researchers simply skip this preparatory work and use the particles "straight out of the box". Such experiments are irreproducible, warns Krug.

The solution: inter-laboratory tests with standard materials

Empa is thus collaborating with research groups like EPFL's Powder Technology Laboratory, with industrial partners and with Switzerland's Federal Office of Public Health (FOPH) to find a solution to the problem: on 9 October the "NanoScreen" programme, one of the "CCMX Materials Challenges", got underway, which is expected to yield a set of pre-validated methods for lab experiments over the next few years. It involves using test materials that have a closely defined particle size distribution, possess well-documented biological and chemical properties and can be altered in certain parameters – such as surface charge. "Thanks to these methods and test substances, international labs will be able to compare, verify and, if need be, improve their experiments," explains Peter Wick, Head of Empa's laboratory for Materials-Biology Interactions. Instead of the all-too-familiar "fumbling around in the dark", this would provide an opportunity for internationally coordinated research strategies to not only clarify the potential risks of new nanoparticles in retrospect but even be able to predict them. The Swiss scientists therefore coordinate their research activities with the National Institute of Standards and Technology (NIST) in the US, the European Commission's Joint Research Center (JRC) and the Korean Institute of Standards and Science (KRISS).

Further Information

Prof. Dr. Harald F. Krug, harald.krug@empa.ch

European Conference on Nanotechnologies and Nanomaterials: opportunities and challenges

16 December 2014
Renaissance Brussels Hotel, Brussels

CEN/TC 352 Nanotechnologies, for which AFNOR holds the secretariat, is arranging a European Conference open to all interested parties. On the agenda: clarify the intersectoral role of the European mandate, share the initial normative results, future work and links with regulatory requirements.

Do you have an interest in this normative work in the field of nanotechnologies? What can standardization in nanomaterials offer you? How are regulations changing in Europe? What work has been done and what will future work involve? How does this link up with international work? How is the research work organized?

These questions and many others will be answered by speakers at this conference (European Conference on standardization for Nanotechnologies and Nanomaterials: opportunities and challenges) held by AFNOR, CEN-CENELEC and the European Commission on 16 December 2014 in Brussels.

Nanomaterials - infinitesimally small particles (the size of an atom) - exhibit novel characteristics with the potential to generate new innovative products.

New applications of nanotechnologies are found every day in a diverse range of fields such as data storage, electronics, optics, cosmetics, health care and quality of life, energy, textiles, automotive, aerospace, ceramics, composites, rubber, plastics and metallurgy. All the main industrial sectors will benefit from advances driven by these developments.

Given these developments, we need to consider both the risks and benefits for the environment and health while integrating a responsible development approach.

Since the adoption of the European Mandate M/461 "Standardization activities regarding nanotechnologies and nanomaterials" (focusing more specifically on issues of characterization and exposure but also health, safety and the environment), CEN/TC 352 has played a coordination role vis-à-vis the various European and international Technical Committees - also including the electronics sector - likely to work on 46 topics to be standardized listed in the mandate's Roadmap.

To date more than fifty European and international Technical Committees have been identified as having potential involvement with nanotechnologies. In this context, the European Conference will be based on examples drawn from industry and debate will centre on added value and challenges as regards standardization on nanotechnologies and nanomaterials.

At specific sessions on current European projects you will be able to meet the authors of the future standards. Representatives of the European Commission will clarify issues relating to regulatory requirements in Europe. Discussion will also focus on research activities explained to us by representatives of the European Commission involved in Horizon 2020.

This European Conference is intended to bring together experts, researchers and policy makers to discuss the needs and future trends in standardization and harmonization.

For further information and to register to this European Conference on standardization for Nanotechnologies and Nanomaterials: opportunities and challenges...

Find out more about Nanotechnologies and CEN/TC 352 "Nanotechnologies"...

SENN2015

International Congress on Safety of Engineered Nanoparticles and Nanotechnologies 12 – 15 April 2015, Helsinki, Finland

JOIN US IN THE DIALOGUE ON THE NANOSAFETY!

The Finnish Institute of Occupational Health welcomes you to join SENN2015—the 2nd "International Congress on Safety of Engineered Nanoparticles and Nanotechnologies" 12-15 April 2015, Helsinki, Finland

SENN2015 is a great forum for reporting and sharing the latest knowledge on the safety of engineered nanomaterials and nanotechnologies.

The goal of the Congress is to:

- examine and discuss safe practices in handling nanomaterials
- to promote nanosafety at work with an emphasis on detection methods, tools and safer production processes
- to improve the understanding of the biological basis of nanosafety

We warmly recommend you to attend the congress if you are interested in:

- Nanomaterial identification and classification
- Exposure, transformation and life cycle
- Hazard mechanisms
- Risk assessment and management

More information about the programme, practical arrangements and registration is available at:

www.ttl.fi/senn2015

We anticipate an exciting and productive conference, and look forward to seeing you all in Helsinki!

Should you have any questions about the SENN2015 Congress, please do not hesitate to contact us at the organizing committee:

SENN2015@ttl.fi.

Finnish Institute of Occupational Health

Sustainable Nanotechnology Conference

A joint EU-US Conference jointly organised by the EU FP7 Projects SUN and GUIDEnano and the Sustainable Nanotechnology Organization (SNO)

Conference Dates: 9-11 March 2015
Location: Venice, Italy
Submit your abstracts and/or register here:
http://www.susnano.org/conferenceOverview2015SNO-SUN-GN.html

Deadline for submission of abstracts is 10th December 2014.

Topics:

- Life cycle thinking
- Environmental release and fate of engineered nanomaterials (ENMs)
- Environmental, occupational and consumer exposure to ENMs
- Environmental and human health impacts of ENMs
- Safe production, handling and disposal of ENMs
- Regulatory and industrial decision support for sustainable nanotechnologies
- Nanotechnology applications for sustainability
- Societal implications of nanotechnology
- Curriculum and training for sustainable nanotechnology

Important note:
The "2015 CoRs Meeting: US-EU bridging nanoEHS research efforts" will take place 12-13 March 2015, in Venice, Italy (just after the conference).

More information:
http://www.susnano.org/programSNO-SUN_2015.html

On behalf of the Organizing Committee
Judith Friesl
SUN Dissemination & Training Co-Ordinator
e: j.friesl@thereachcentre.com

Nano particle issues and Sangria!

SETAC Europe in Barcelona—3-7th of May 2015

"Environmental protection in a multi-stressed world: challenges for science, industry and regulators".

The Abstract submission for the 25th Annual meeting of the Society of Environmental Toxicology and Chemistry is OPEN. The conference has one of its 9 tracks dedicated to Characterization, fate and effects of nanomaterials which has 7 interesting and very diverse proposed sessions addressing the fields of most of the NSC WGs (see below) now accepting abstracts with a deadline of 26th of November.

Aquatic Nanotoxicology: from Freshwater to Seawater - overcoming the difficulties of standard toxicity tests and the implications for higher tier toxicity testing
CHAIRS: Boris Jovanovic, Julian Blasco

Biophysical Interactions at the Bio-nano Interface: Relevance for Aquatic Nanotoxicology
CHAIRS: Ismael Rodea-Palomares, Francisca Fernandez-Piñas

Challenges for environmental risk assessment of nanomaterials: addressing knowledge gaps, protection goals and regulatory perspectives
CHAIRS: Birgit Sokull-Kluettgen, Anu Kapanen, Annemette Palmqvist

Leaving the comfort zone. The challenge of measuring nanoparticles in complex matrices.
CHAIRS: Patrick Steven Bauerlein, Ralf Kaegi

Managing nanomaterials in the environment: lessons learnt to date, state of the art and future perspectives
CHAIRS: Teresa F Fernandes, Mirco Bundschuh, Janeck James Scott-Fordsmand, Stephen J. Klaine, Mark Wiesner

Nanoparticle (NP) speciation and its consequences for NP environmental fate and effects
CHAIRS: Susana Loureiro, Claus Svendsen, Geert Cornelis, Stephen Lofts, Kees van Gestel

When organic contaminants interact with particles: consequences on fate, exposure and effects

Previous years have seen some very strong, well attended and inspiring sessions at SETAC, help us maintain this by entering your abstract.

We look forward to reading your abstracts and creating some great sessions.

On behalf of all the Chairs and Co-Chairs
Claus Svendsen, NERC-CEH (UK)

http://barcelona.setac.eu/home/

EuroNanoForum 2015

10-12 June 2015, Riga, Latvia

EuroNanoForum 2015 is a meeting point for industry, science and policy. Strengthening European competitiveness and supporting its re-industrialisation, the event showcases innovation as driver for economic growth, presents new technologies arising from nanotechnologies and materials, and discusses the new applications and commercialisation potential for these technologies.

The conference will review the status of European nanotechnologies: the latest progress in nanoscience, -technologies and -manufacturing, innovation and associated industrial sectors. The program features also aspects of upcoming H2020 calls, smart specialisation and public-private partnerships, as well as the most important framework conditions – safety, IPR, education, standards, regulations and funding.

Participating in the EuroNanoForum is an excellent opportunity for building partnerships and doing business. The fully integrated exhibition gives access to a variety of companies, projects and other organisations, meetings with potential partners, customers and key decision makers can be pre-arranged for the brokerage day, and the conference dinner and other social events provide an opportunity for more informal discussions and for enjoying Latvian hospitality. This event of 1200 participants is also a unique chance for investors and entrepreneurs or researchers with innovative results to meet and discuss.

The conference is organised by University of Latvia and Spinverse **under the auspices of the Latvian Presidency of the Council of the European Union.**

http://euronanoforum2015.eu/

Sustainable Nanotechnology School - first edition

Understanding the environmental, health and safety implications of manufactured nanomaterials to foster their sustainable applications:

University Ca' Foscari Venice (Italy) | Sunday 11th - Friday 16th January 2015

School purpose

The achievement of safe nanoproducts requires an understanding of the properties, biological interactions, fate, risks and environmental impacts of manufactured nanomaterials. The Sustainable Nanotechnology School aims to transfer the state of the art knowledge on these aspects from key experts to the new generation nano environmental, health and safety (EHS) professionals. In order to do so the school will highlight the best available experimental and modelling approaches and practices for physicochemical characterization, (eco)toxicity testing, exposure, risk, and lifecycle assessment of nanotechnologies, taking various stakeholder perspectives and ethical issues into account. The course is structured to balance breadth and depth in these diverse topics, as well as build an integrative understanding of them, while providing an interactive learning environment and direct access to key experts from Europe and the United States.

The Sustainable Nanotechnology School is organized in the frame of the major EU FP7 projects SUN and GUIDEnano and the MODENA Cost Action.

Target audience

The 1st Sustainable Nanotechnology School is especially designed for personnel from research and academic institutions as well as from industry, governmental agencies and hospital departments, senior researchers, young scientists, PhD students and in fact anyone dealing with nanosciences, nanotechnologies and risk assessment of nanotechnology.

For more information: **http://www.unive.it/nqcontent.cfm?a_id=66712**

GRAPHENE FLAGSHIP

Graphene Week 2015

The Graphene Week 2015 will be held during 22 – 26 June 2015, in Manchester, UK. The conference is commissioned by the Graphene Flagship, with support from the University of Manchester, the National Graphene Institute (NGI), and the City of Manchester.

Its focus is on science, technology and emerging applications of graphene, related 2D materials and heterostructures. The scientific programme of the Graphene Week 2015 will address following areas:

- Fundamental physics of graphene and related 2D materials
- Chemistry and biology studies of graphene
- Applications of graphene and related 2D materials in electronics, photonics, spintronics, and sensors
- Applications of graphene in energy, including photovoltaics, energy storage, fuel cells and hydrogen storage
- Graphene-based nanocomposites: recent scientific studies and applications
- Graphene-related health and environment research
- Overview of graphene in biomedical applications
- Large scale graphene production

Conference Chair: Dr Cinzia Casiraghi
For more information:
http://graphene-flagship.eu/?page_id=554

About the Graphene Flagship:

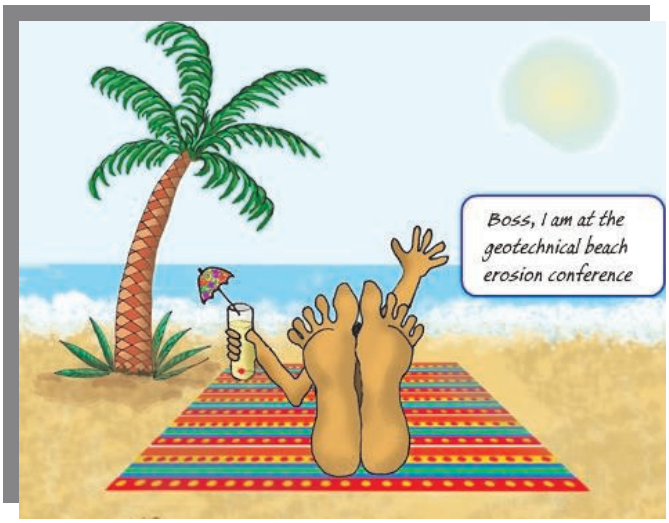
The Graphene Flagship is the EU's biggest research initiative ever, and, according to the European Commission, 'history's greatest distinction for excellent research'. With a budget of EUR one billion, the Graphene Flagship is tasked with taking graphene from the realm of academic laboratories into European society in the space of ten years, thus generating economic growth, new jobs and new opportunities for Europeans as both investors and employees.

With the Graphene Flagship, Europe has launched a new form of joint, coordinated research initiatives of unprecedented scale. The Graphene Flagship brings together an academic-industrial consortium aiming at a breakthrough for technological innovation. The research effort will cover the entire value chain, from materials production to components and system integration, and targets a number of specific goals that exploit the unique properties of graphene.

The Graphene Flagship is coordinated by Chalmers University of Technology, Gothenburg, Sweden.

PROMOTE YOUR EVENT ON THE NANOSAFETY CLUSTER CALENDAR

Submit your events and other news here:
http://www.nanosafetycluster.eu/newsletter/submit_news.html



UNITAR offers new E-Learning Course

"Introduction to Nanomaterial Safety"

The e-Learning course provides interested stakeholders with an introduction to the "sound management of manufactured nanomaterials". The focus is on the special properties of nanomaterials and following implications for human health or the environment.

The course has been developed by the United Nations Institute for Training and Research (UNITAR) based on work under the Strategic Approach to International Chemicals Management (SAICM) and international organizations, such as the Organization for Economic Cooperation and Development.

Image Source: © T.Michel - Fotolia.com

Participants will learn about global, national and sector-specific issues and begin to develop basic skills for recognizing safety concerns and learning about risk management approaches to manufactured nanomaterials. No prerequisite or prior knowledge is needed to take the course.

The target group of the event includes civil servants, industry and SME representatives, researchers, students and interested citizens.

For more information about the event and registration consult the course-flyer or the webpage.

Source: https://www.unitar.org/event/introduction-nanomaterial-safety-unitar-e-learning-course

the innovation society

The LIFE+ Project SIRENA offers a Technological Surveillance System on Nanotechnologies and Nanorelease

The LIFE+ Project SIRENA (LIFE11 ENV/ES/596) has set up a **Technological Surveillance System (TSS)** to trace technical references at worldwide level related to nanocomposites and nanorelease. Captured references (peer reviewed articles, thesis, presentations…) are evaluated and classified into five major topics: nanomaterials used in the production of nanocomposites; real processes that cause the release of nanomaterials; nanomaterials release simulation technologies; related regulatory and standardization actions and nanocomposites market. The list of references is periodically updated throughout the implementation of the project.

Gathered data are made available to the public by means of SIRENA project's website; users must subscribe to receive the periodical updates of the database. At the end of the project, a detailed report on the tendencies observed within the implementation of this technological watch will also be accessible.

The TSS has been jointly developed by INKOA and TECNALIA; so far more than two hundred references have been traced, most of them being related to the technologies and protocols implemented to simulate the release of engineered nanomaterials embedded into nanocomposites, the physico-chemical characterization of the released particulate materials and the assessment of their (eco)toxicological profile.

The main goal of the LIFE+ SIRENA Project is to demonstrate and validate a methodology to simulate the unintended release of nanomaterials from consumer products by replicating different life cycle scenarios to be adopted by a wide number of industrial sectors in order to get the necessary information for exposure assessment. Developed database constitutes a state of the art tool to approach the actual absence of standardised protocols to address nanorelease.

Register here:
http://www.life-sirena.com/index.php/en/technological-surveillance

Safe Handling of Nanomaterials in Car Workshops and Laboratories

Nanomaterials and ultra-fine particles in car workshops and laboratories - learn how to handle them safely by exploring the "Nanorama Car Workshop" and the "Nanorama Lab", which are now available (in German) at http://nano.dguv.de/nanorama/.

The "Nanoramas" are part of the Nano-Platform "Safe Handling of Nanomaterials" (http://nano.dguv.de) by the German Social Accident Insurance (DGUV).

They were developed by the Innovation Society, St. Gallen in cooperation with the German Social Accident Insurance Institution for the woodworking and metalworking industries (BGHM) and the German Social Accident Insurance Institution for the raw materials and chemical industry (BG RCI), respectively.

The emphasis of the "Nanorama Car Workshop" (http://nano.dguv.de/nanorama/bghm/) is on the handling of products containing nanomaterials and on work processes that can lead to the formation of ultra-fine particles.

The "Nanorama Lab" (http://nano.dguv.de/nanorama/bgrci/) offers in-depth insights into the safe handling of nanomaterials and installations used to manufacture or process nanomaterials in laboratories.

In "Nanoramas" - virtual 360° work environments - the user receives useful information about hazard evaluation assessment, the occupational exposure to nanomaterials and necessary protective measures.

"Nanorama" are ideal to approach young workforce. They are time- and place-independent, highly interactive and instigate users to reflect on the conditions in their respective working environments.

So far, three "Nanorama" have been published: The "Nanorama Construction" is accessible (in German) on the Nano-Platform (http://nano.dguv.de/nanoramen/).

Source: The Innovation Society, St. Gallen

Contact and further information:
The Innovation Society Ltd., St. Gallen
Tobias Widler
Tel.: +41 (0)71 278 02 05

Tell us about it....

If you have any news, announcements, events, resources, research positions, updates, comments, opinions, publications, bulletins, blogs, workshops, ideas, jobs, proposals, partnership opportunities, that you want the nanosafety community to know about, here's how you can inform everyone....

www.nanosafetycluster.eu

EventsCalendar

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NanoSafety Cluster NewsLetter

NSC Compendium2014