NanoFATE
Nanoparticle Fate Assessment and Toxicity in the Environment

NEWSLETTER
DECEMBER 2010 /#1

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our work

The NanoFATE project will:

Identify and address analytical and technical problems in undertaking environmental risk assessment for engineered nanoparticles (ENPs).

Address how best to perform realistic assessments of effects of ENPs on organisms in soil, freshwater and marine environments. Our data and research will help develop more realistic exposure protocols.

Identify ways to modify existing risk assessment techniques to address the unique challenge of ENPs.

About NanoFATE

editorial

by Coordinator Claus SVENDSEN

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Welcome to the NanoFATE Newsletter.
NanoFATE is a collaborative project with 12 partners from 9 European countries working together to investigate the fate and effects of engineered nanoparticles (ENPs) in the environment. This project is supported by the European Commission jointly under the Environment (including climate change) and NMP Themes of the 7th Framework Programme for Research and Technological Development.

The aim of NanoFATE is to examine post-production life cycles of key nanoparticles, from their entry into the environmental as 'used products', through the full range of waste treatment processes to their final fates (destinations in the environment or in organisms) and potential toxic effects.

The NanoFATE newsletter keeps stakeholders, scientific communities and the interested public up to date with aims and progress of the project. Furthermore, NanoFATE dissemination events will be announced. See our calendar and sign up for our first Open Workshop held in Portugal, 20-22 January 2011. (Please register by 31 December 2010!) Please visit as well our new project website: **www.nanofate.eu** where you will find a large store of information and links.

This first Newsletter issue focuses on the goals of the project and the partners involved. I wish you pleasant reading and hope that you will subscribe to and enjoy the future issues of the NanoFATE newsletter.

CLAUS SVENDSEN

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our people

Dr CLAUS SVENDSEN

Dr Claus Svendsen is a terrestrial ecotoxicologist at Centre for Ecology & Hydrology (Wallingford, UK) with expertise in developing new approaches to chemical and engineered nanoparticle (ENP) effect assessment including ecological function studies and the application of toxicogeneomics. He has managed a number of complex multi-disciplinary projects like NanoFATE. Claus' research centres on issues relating to soil pollution and focuses on:

- Biomarkers: Identification and validation of biomarkers for assessing early biological effects of pollution.
- Mixtures: Developing ways of addressing how joint effects from pollutant mixtures and other stresses can be addressed in detail, and how this will affect the risk they pose to biota.
- Ecological Risk Assessment: The development and testing of biological assays for measuring the effects of soil contamination on biota.
- Environmental Genomics: Understanding how the effects of contaminants at the molecular level translate to effects on the whole individual and the consequences of these effects at the population level.
- Comparative Genomics: Using genomic technology to address all of the above, both in the model organism C. elegans (nematode worm) and the environmental sentinel L.rubellus (earthworm).

The Centre for Ecology & Hydrology (CEH) is the UK's centre of excellence for integrated research in land and freshwater environmental sciences. It is part of the Natural Environment Research Council (NERC).

WP Leaders and WP Broad Description

David Spurgeon
Deputy Coordinator of the project, Dr. David Spurgeon (NERC Centre for Ecology and Hydrology, UK) is involved in the scientific and project management of NanoFATE (**WP8** and **WP9**), using his expertise as a Terrestrial ecotoxicologist experienced in the analysis of the effects of chemicals and ENPs on terrestrial ecosystems.

Alison Crossley
WP1 Leader: Characterisation and tracking of ENPs during processes involved in fate and toxicity. The capacity to differentiate ENPs from the natural background and understand what happens to ENPs in complex environmental systems is crucial to understanding their fate in ecosystems. In WP1 Dr Alison Crossley (Oxford University Begbroke Science Park, UK) will use her wide range of analytical capability to coordinate the full characterization of ENP physico-chemical properties.

Martin Hassellöv
WP2 Leader: ENP environmental behaviour and fate modeling. Studies of the behaviour and fate of selected types of ENPs in different environments will be conducted with focus on wastewater treatment systems and associated sludge and effluents. In WP2 Dr. Martin Hassellöv (University of Gothenburg, Sweden) brings pivotal experience in the analytical area, but also in regard to the fate, partitioning and transport of nanomaterials in fundamental systems.

WP LEADERS AND WP BROAD DESCRIPTION

Susana Loureiro

WP3 Leader: ENP Ecotoxicology. WP3 aims to provide the much needed data on the chronic effects of ENPs on terrestrial and aquatic organisms. It also addresses the important issue of co-exposure of ENPs with other pollutants and/or environmental stressors. In WP3, Dr. Susana Loureiro (University of Aveiro, Portugal) will use her expertise and experience in methodologies for ecotoxicity testing and combined stressors.

Cornelis (Kees) A.M. Van Gestel

WP4 Leader: ENP bioavailability - relations between soil and water chemistry and particle properties. WP4 will establish and model how environment physico-chemical properties in wastewater, natural waters and soil govern ENP parameters such as stability, soil–solution partitioning, downward transport and transformation that each may ultimately affect bioavailability to organisms.
In WP4 Dr. Cornelis (Kees) A.M. van Gestel (VU University Amsterdam , The Netherlands) will use his leading expertise in soil ecotoxicology and bioavailability issues.

Francesco Dondero

WP5 Leader: ENP toxicokinetics and toxicodynamics . WP5 aims to provide detailed understanding of the kinetics of ENP uptake by organisms and the mechanisms that link the uptake of ENPs to observed toxic effects. In later work, a systems toxicology approach will be used that may support the identification of biomarkers of ENP exposure and/or effect. In WP5 Dr. Francesco Dondero (Faculty of Science, UNIPMN, Italy) will use his expertise in biological effects of pollutant in aquatic organisms using highthroughput molecular techniques.

Andrew Johnson

WP6 Leader: Integrated risk assessment. This work package will evaluate the suitability of a number of advanced risk assessment tools for use in deriving predicted environmental concentrations and predicted no effect concentrations, accounting for the effects of ENPs and media properties on bioavailability and visualising the risk of ENPs in river catchments using a GIS based model. In WP6 Dr. Andrew Johnson (NERC Centre for Ecology and Hydrology, UK) will use his expertise in assessing fate, behaviour and effects of chemicals from sewage treatment plants to the freshwater aquatic environment.

Claire Mays

WP 7 Leader: Dissemination and Training. This WP aims to identify the varying stakeholders and their needs, foster good internal knowledge exchange, co-ordinate the dissemination of R&D outputs and ensure the accessibility of NanoFATE outputs through multiple media. In WP7, Claire Mays (Inst. Symlog, France) will use her expertise in social science, stakeholder confidence building, policy and risk analysis and assessment and share good practices in sustainable dissemination arrangements.

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our calendar

December 2010

OUR STATUS

MILESTONES
- Compilation of usage scenarios

PUBLIC DELIVERABLES
- Research report on issues for consideration during development and refinement of fate models
- Report on perceived current and future use of ENPs; based on the feedback from the questionnaire and the compiled literature. This will include a set of scenarios detailing current and prospective future sources of ENP and identified major pathways of release into the environment.

Milestones
Public Deliverables

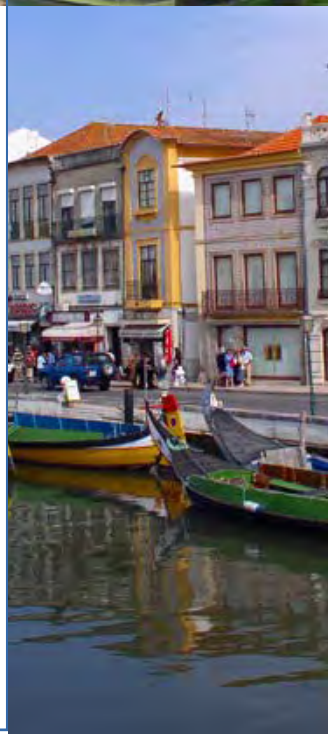
January 2011

meet us here

Meet and interact with members of NanoFATE and also, CESAM, the Center for Environmental and Marine Studies. Visit Aveiro, a magnificent old town in the center of the West Coast of Portugal.

Nanoparticle Fate Assessment and Toxicity in the Environment
Advanced Workshop 20-22 January 2011
Department of Biology - University of Aveiro - PORTUGAL

This is the first open workshop organized by NanoFATE. It aims to provide knowledge on nanoparticles characteristics and their consequent environmental fate and toxicity to aquatic and terrestrial organisms.
The course is addressed to scientists and PhD and M.Sc. students with a background in Biology, Natural and Environmental Sciences, Chemistry, Physics, Environmental engineering or related fields, members of consulting companies and of private and public institutions responsible for environmental management.
Register now at : CESAM www.cesam.ua.pt
Download the Workshop announcement and practical information



NanOFATE
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our current offerings for you

In this first Newsletter, we provide you with phrases and general information about NanoFATE so that you can get more familiar with this European Commission-sponsored research project. Visit our project website to learn more

If you are a citizen

Is it possible to judge today whether the product benefits of nanotechnologies make them preferable to existing technologies? How will potential environmental risks influence that judgment? Only by being able to compare the risks involved with using ENPs in products with the risks of existing technologies will it be possible to make an informed judgment. It is the aim of NanoFATE to produce the tools that can assist in conducting such comparisons. The multi-disciplinary NanoFATE consortium will have a nearly unique perspective in understanding present and future environmental risk. Visit our website for links to informative sources about nanotechnologies in general. Watch the Newsletter to learn more about NanoFATE's specific progress and results.

If you are a researcher

NanoFATE is made possible by bringing together a critical mass of internationally recognised researchers with complimentary expertise from different disciplines. Expertise from the physical, chemical and biological sciences is represented, covering theoretical aspects of nanoscience, environmental chemistry, environmental toxicology and risk assessment. These together bring the needed experimental, analytical, modelling and dissemination skills required. NanoFATE will generate data from specifically designed and systematically conducted studies and at term provide coherent information to stakeholders within the nanosafety and wide nanotechnology areas. This will open up understanding not only of the nanotechnology area, but also of the risk assessment approaches, their inherent assumptions and their precautionary nature. Future issues of the Newsletter will inform you of how to access our results as they become publicly available.

If you are a journalist

With its wide partnership from across Europe, consisting of SMEs, universities and research centres, NanoFATE will create a network and a critical mass of research in the area of ENP environmental fate, effect and risk assessment. Further, through its existing connections and contacts with national governments, regulatory bodies and Scientific Committees of the EU, NanoFATE will act as an expert pool of knowledge to inform policy makers about nanotechnology risk and possible impacts on society.

If you are in industry

NanoFATE focuses on existing practices for assessing ENP fate, effects and risks. Industry needs such assessments so as to properly address current public and expert concerns about nanotechnologies. NanoFATE's development of a risk based framework will contribute a sound basis for a sustainable movement of approved nanotechnology applications from the laboratory to the market. The assessment framework can help the nanotechnology industry to address any potential risks upfront, by indicating which types of data are required for proper assessment, and by providing the tools to conduct the assessments. In this way, NanoFATE may contribute to improving the competitiveness of the European nanotechnology industry while protecting EU citizens. Watch the Newsletter for information on this framework as it grows.

our jargon explained

ENP - Engineered nanoparticle. This refers to an intentionally designed and manufactured particle of nano size (between 1 and 100 nanometers, or billionths of a meter). This definition distinguishes the ENP from other nanoparticles that might be encountered in the environment, such as those naturally produced by biological and weathering processes, fragments of man-made products, or unintended by-products.

NMP - "Nanotechnology and nanosciences, knowledgebased multifunctional Materials and new Production processes and devices" – a research programme area of the European Commission.

GIS - Geographic Information System, in which a scientific model is "mapped onto" a real landscape. In the case of NanoFATE, for instance, hydrological calculations and predictions will be made which relate to real rivers and towns (rather than to a theoretical or ideal environment).

WP - Work Package – grouping a set of NanoFATE partners around a specific set of tasks.