NanoFATE
Nanoparticle Fate Assessment and Toxicity in the Environment

NEWSLETTER
NOVEMBER 2014 /#6

Visit www.nanofate.eu

our impact

- **10** advice notes addressing key regulatory concerns
- **10** pan-European risk maps of **0.7 billion** data points
- **27** publications & **42** to come
- **8** major stakeholder/training workshops, solo or joint
- **33** NanoSafety Cluster collaborations
- **29** conference presentations
- **19** young researchers including **10** PhDs
- **163** specialists responding to our nanotech perceptions survey
- **8** types of well-characterized ENPs supplied
- **12,000+** amazing images of nanoparticle fate
- A wide range of method protocols developed or refined
- Invited contributions to OECD WP on Manufactured Nanomaterials

Plenty of expertise to share
Click here

editorial

by Coordinator Claus SVENDSEN

From Fundamental Questions to IMPACT

Scientific understanding enabling pragmatic solutions

When first developing the proposal for NanoFATE our core team focused on two fundamental questions:
1) How well will our standard risk assessment (RA) tools work for engineered nanomaterials (ENMs)?
2) For metal-based ENMs, would simply inputting ENM tonnage to the standard metal RA work?

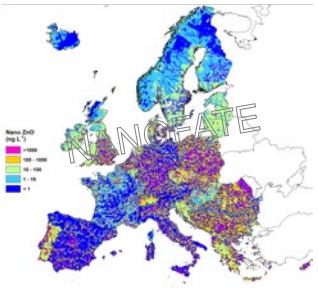
We set out to deliver a systematic study of the environmental fate and toxicity of selected engineered nanoparticles addressing nine Science and Technology objectives. Key in NanoFATE was that the technical and scientific development undertaken to answer the main questions had to be applicable to industrially relevant nanomaterials. The research programme was built around on-market ENMs, with specifically designed particles being used only for validation of technical developments or scientific principles where control was needed.

By close of project on 31st March 2014, through the developments and modifications highlighted in Our Outcomes we can answer the original questions and state with some confidence that: **Yes, the standard RA tools can be used for nano with some minor modifications**, and 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 risk presented by the ENM**. However, while ENM 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 on** ▸▸

Visit our NanoFATE Library to download reports and summaries, identify peer-reviewed articles, and obtain our Advice Notes. You can also view our images and request high-resolution non-watermarked copies for use with citation.

Spotlight paper

Dumont et al. (in press) have produced the first pan-European spatially explicit predicted environmental concentration and risk maps for nanoparticles in fresh waters.



Click here for details about this and our other published papers

editorial

by Coordinator Claus SVENDSEN

the Fate and Exposure side. 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. More observations are found in the NanoSafety Cluster Newsletter released in Nov. 2014.

I encourage you all to visit www.nanofate.eu and learn more about NanoFATE outputs and also to check the intricately detailed experiments and papers behind these overall conclusions and tools.

At the end of 4 years, NanoFATE has allowed 35 scientific experts from 12 institutes to expand their scientific comfort zone, expertise, understanding and vocabulary, as well as to support and/or significantly train a string of 19 new experts who all have matured in their research careers with nanotechnology as a central tenant in their multi disciplinary education. In this 6th and Final Newsletter, it only remains for me to thank the entire NanoFATE consortium for exceptional dedication, collaborative spirit and attention to detail and new opportunities.

CLAUS SVENDSEN
NERC - CEH
csv@ceh.ac.uk

our vision

NanoFATE was conceived to fill knowledge and methodological gaps currently impeding sound assessment of environmental risks posed by engineered nanoparticles (ENPs). Our vision led us to assess environmental ENP fate and risk in selected high-volume products for which recycling is not an option, namely: fuel additive, personal care and antibacterial products. Two market ENPs from each product (CeO2, ZnO, Ag of varying size, surface and core chemistries) were followed through their post-production life cycles - from environmental entry as 'spent product', through waste treatment to their final fates and potential toxic effects. In this way we tested the applicability of current fate and risk assessment methods and identified improvements required for early stage assessment of ENPs.

our uncoated core outcomes ... in a nano-shell

At close of project on 31st March 2014 we looked back with pride on the results achieved by each work package (WP) and our partnership. Work package leaders (photos) below provide nano-scale descriptions of our four years of integrated work. "D" is for deliverable – you can find the public summaries of the reports they mention in our NanoFATE Library online.

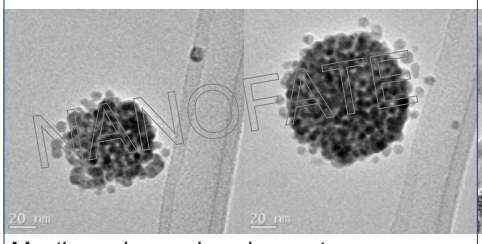
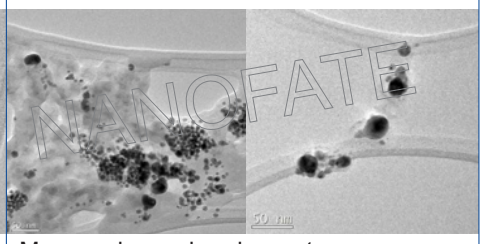
WP 1 Characterisation and tracking of ENPs during processes involved in fate and toxicity

Alison Crossley
U. of Oxford
UOXF.DJ, NT, IHPP, CU, AXME, UGOT

High quality, well-characterised particles were provided by the WP1 partners for the rest of the project consortium and WPs. We characterised and assessed a larger than planned range of commercial ENPs, developing and refining characterisation and imaging methods, and ensuring that supply was consistent and free of significant batch-to-batch variations.

The final set of NanoFATE particles included:

- ZnO particles: 30nm Nanosun from Micronisers in Australia, with matching Co tagged ZnO ENP by IHPP, with some work on BASF z-cote and z-cote HP1 ZnO (JRC NM-110 & NM-111).
- Amepox 3-8nm Ag ENP and a 50nm Ag NP from NanoTrade.
- CeO2 : Envirox fuel additive from Antaria and a polishing agent from Umicore (JRC NM-211).

Ag-soil pore water Without fulvic acid	With fulvic acid
	
Mostly unchanged agglomerates Some individual particles Very few particles outside 3-8nm size range	Many unchanged agglomerates Frequently individual particles Frequently particles outside 3-8nm size range All coated
4-8% sulphur	10-20% sulphur

NanoFATE WP1. TEM images of Ag ENP interactions with media

Remember, you are invited to browse our exceptional NanoFATE images online and request hi-res versions for your own presentations as appropriate.

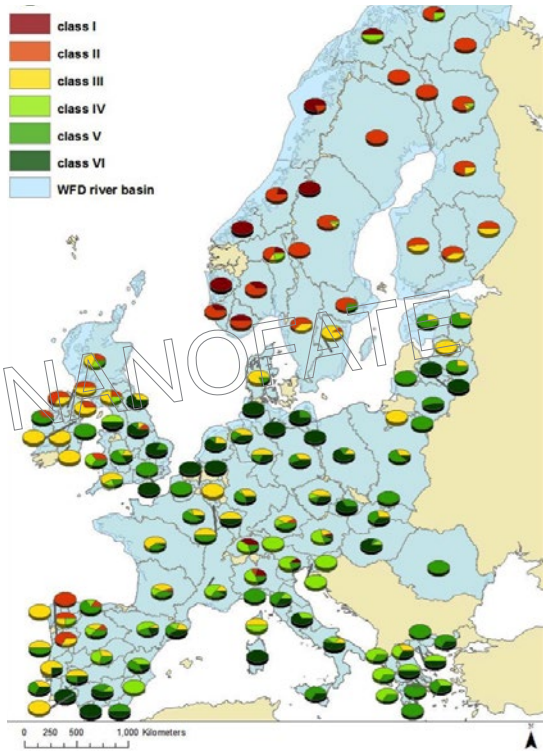
WP 2 ENP environmental behaviour and fate modelling

Martin Hassellöv
U. of Gothenburg

UGOT, NERC, UOXF.DJ, F+B, IHPP, AXME

We identified and prioritised specific properties that need principal consideration during the development, adaptation and validation of environmental fate models for nanoparticles (D2.1). On this basis we developed and validated fate models (with WP6) and supplied numbers on the CeO2 deposition in soils.

Our reports D2.7 & D2.8 detail nano ZnO and Ag influent to sewage treatment works and discharge in effluent and sludge. Important parameters for soil and water PEC estimation were identified (D2.6) and the behaviour of Ag particles in soil was studied utilizing novel FAST spICP-MS-base approaches (D2.4).

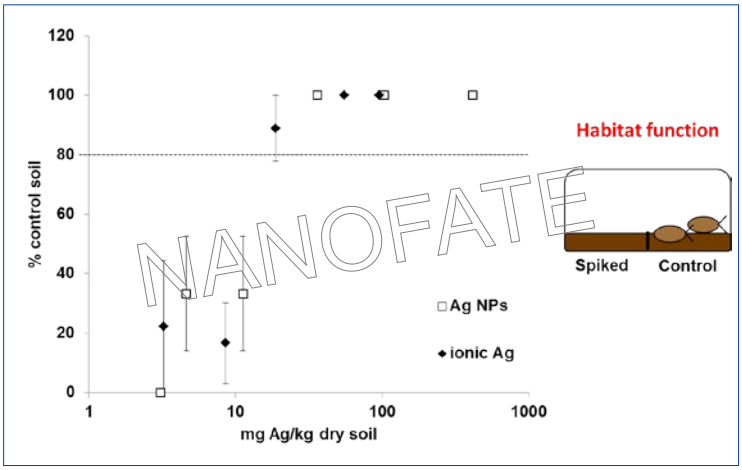


NanoFATE WP2. Microcosm work in six NanoFATE model natural waters representing the EU range, as a platform to investigate hetero- and homo-agglomeration and sedimentation rates (Green = high, Red = low) of ENPs across all EU Water Framework Directive (WFD) basins.

WP 3 ENP ecotoxicology

Susana Loureiro
U. de Aveiro

UAVR, NERC, VUA, UOXF.DJ, UNIPMN, IHPP, CU, AXME, UGOT



We developed improved standard ecotox exposure protocols, principally adjusting properties of test media, media renewal frequencies and soil and food spiking methodologies, to ensure realistic, relevant and homogenous presentation of nanoparticles during toxicity testing. The hazard values needed for the NanoFATE risk assessment and mapping were identified through experiments run according to these improved exposure protocols.

We performed chronic testing of our particles (D 3.2 and D 3.3) and delivered data on bioavailability drivers for WP4. Samples were archived for use in WP 5 and data was collated and used in ecotoxicological threshold estimation (D3.4). Mixture toxicity models were used to determine combined effects of ENP, physiochemical and organic pollutant stressors (D3.5).

NanoFATE WP3. Percentage (mean±SD; n=3) of isopods (*Porcellionides pruinosus*) in control soil after 48h in the avoidance behavior test with Ag NPs and ionic Ag (AgNO3). The dashed line represents the >80% avoidance criterion for habitat function.

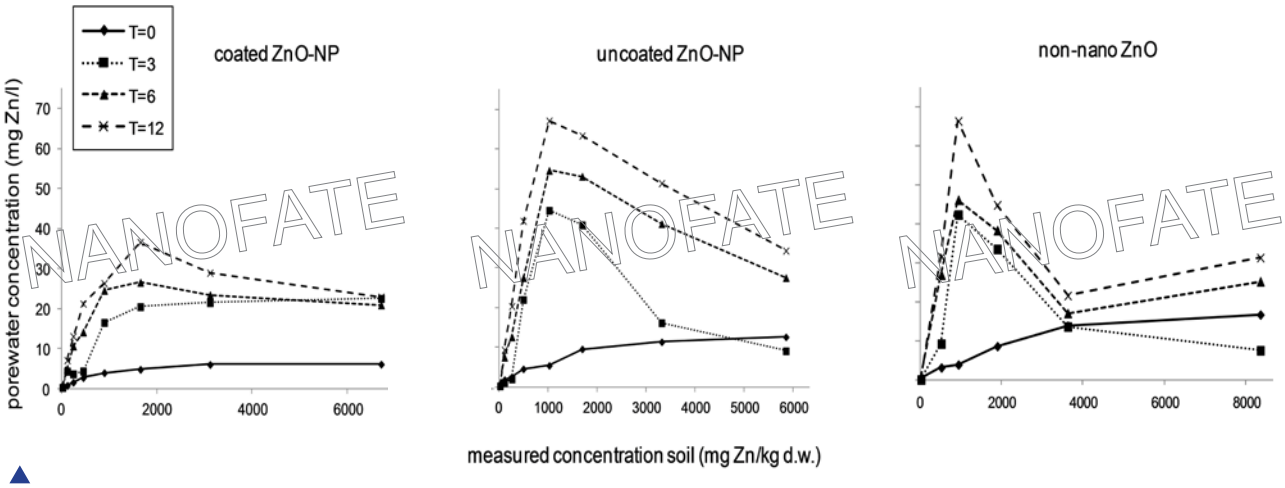
WP 4 ENP bioavailability - relations between soil and water chemistry and particle properties

Cornelis (Kees) A.M. Van Gestel
Vrije U. Amsterdam

VUA, NERC, UOXF.DJ, UAVR, UNIPMN, IHPP, CU, UGOT

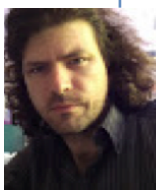
We collected, databased and quality assessed all available information from literature, conferences and other projects to identify the environmental factors having the greatest proven effect on the bioavailability and toxicity of nanoparticles to organisms living in soil and water. On this basis, we implemented bioavailability trials testing for pH, organic matter and cation effects, plus developed additional long-term (12 months) exposures addressing ageing effects on ENP hazard potentials. A database of results for ENP exposure across soil and water types was completed (D 4.2) and summarised in a review paper.

We reported on ENP property-effect relationships to address confounding effects on bioavailability (D 4.3). Report D4.4 teases out the interplay between soil and water chemistry with ENP properties and resulting effects on ENP physical presentation, bioavailability and toxicity.



NanoFATE WP4. Zinc concentrations measured in soil pore water (mg Zn/l) as a function of total zinc concentrations in Lufa 2.2 soil (mg Zn/kg) freshly spiked with coated ZnO ENP (left), uncoated ZnO ENP (middle) and non-nano ZnO (right) (T=0) and after three (T=3), six (T=6) and twelve months (T=12) of equilibration. Taken from Waalewijn-Kool et al. (2013b).

WP 5 ENP toxicokinetics and toxicodynamics



Francesco Dondero
UNIPMN

UNIPMN, NERC, VUA, UOXF.DJ, UAVR, IHPP, CU, UGOT

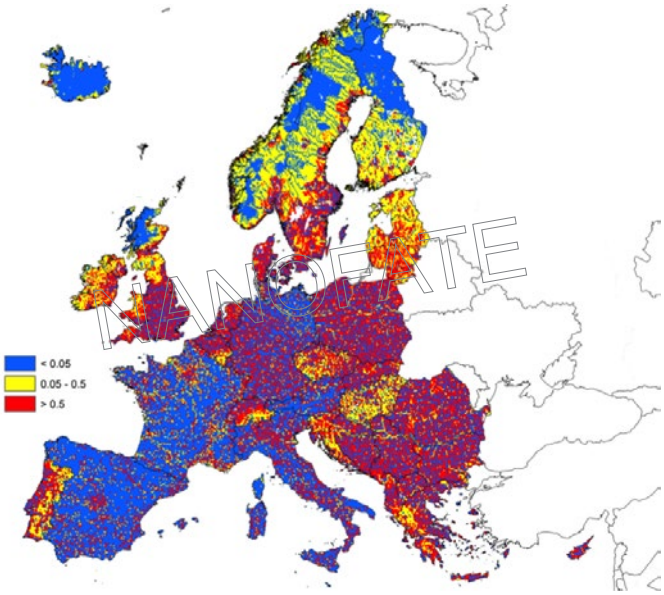
A well-conceived pragmatic tiered approach to the tracking of ENPs in tissues was developed, allowing us to make the most of our technical abilities, fiscal resources and tissue samples, by ensuring that high-end expensive low-throughput techniques were applied only to samples where we had good evidence that ENPs were actually present. Samples were run looking at biological markers of ENP and at dissolved metal effects to develop knowledge of signatures of possible ENP tissue damage. An agreed data structure was developed to allow later cross-species comparison, with a flexible format delivering an excel-based "at the bench" data capture system and ability, as well as enabling data-structure adaptation allowing export to other NanoSafety Cluster databases when agreed.
Toxicokinetic studies were completed for ENPs in soil and aquatic invertebrates (D 5.5). Miami-compliant datasets for gene expression in earthworm, nematodes and mussels in response to ENP exposure were produced (D5.6) resulting in a number of manuscripts detailing systems toxicology of ENPs (D5.8). European shared QualityNano facilities were utilised to extend these studies (D 5.5 and D 5.8). The lessons and findings of WP5 were disseminated and discussed in a well-attended open NanoSafety Cluster workshop on the mechanistic toxicology of ENPs (D5.7 – Birmingham, March 2014).

▲ **NanoFATE WP5 - Transcriptomic profiles of marine bivalves exposed to silver: over-represented biological processes obtained by Gene Ontology analysis of differentially expressed genes found in digestive gland for the effects of 5 nm Ag ENPs.**

WP 6 Integrated risk assessment

Andrew Johnson
NERC-CEH

NERC, VUA, UAVR, F+B, NT, UNIPMN, IHPP, CU, UGOT



▲ **NanoFATE WP6. anoFATE WP6. Predicted sediment loading (mg/m²/y) for nano Ag along EU rivers, using only the expected-case scenario (annual average, Europe).**

To assess ENP production and product incorporation, we surveyed the peer-reviewed and grey literature (reports from R&D projects, reports to governmental authorities, etc.). On this basis we estimated production volumes of silver and zinc or cerium oxide ENPs and reported (predicted) environmental concentrations in surface water, STP effluents, soils and sediments (D6.1). Pan-European maps of predicted soil contamination (D6.2), surface water levels (D6.3) were generated under worst case scenarios and combined with the initial WP3 hazard information for a first iteration of EU level risk visualization for these habitats.

These risk maps were further refined using a species sensitivity distribution approach and incorporating different usage scenarios (D6.4, D6.5 & D6.6). We also completed a critical appraisal of available hazard and exposure assessment methodologies, the identification of vulnerable species and environmental compartments and a gap analysis of available data (D6.7).

WP 7 Dissemination and training

Claire Mays
Symlog
SYMLOG,
NERC-CEH

Our website www.nanofate.eu extensively interlinked with the electronic Newsletters proved very successful in bringing our work to the attention of the research community, and pointing stakeholders to the relevant offerings on the website, thus maintaining good traffic of new and repeat visits.

Our two *International Innovation* articles give a succinct, broad public overview of our work, its meaning and impact.

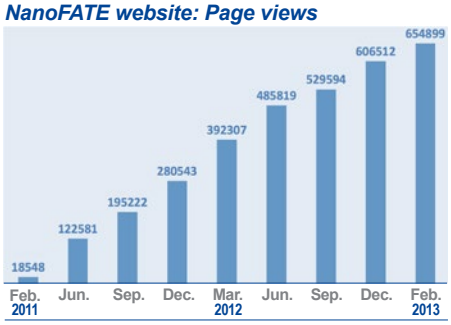
Training activities are described in **Our Engagement and Outreach**.

Get a view of our project and our people by revisiting our Newsletters, e.g.:
- N° 2 – Young Scientists and Supervisors
- N° 4 – Our "Mission Impossible" (*suitable for explaining nanoparticle fate and ecotoxicology to your interested grandma!*)
- N° 5 – The 5 Big Questions and Associated Advice Notes

At project close WP7 submitted to *Journal of Risk Research* a manuscript reporting our European-wide survey of specialists' perceptions (social representations) of nanotechnology. The study provides the first formal demonstration of a 'common sense' assumption, i.e. that specialists construct their views of nanomaterials in terms of a risk-benefit polarity. Feedback on results is below.

NanoFATE website: Unique visitors

NanoFATE website: Page views



▲ **NanoFATE WP7. Steady growth in frequentation of our website across the project lifetime**

Thanks for participating in our 2013 Perceptions Survey – Here are the results!

Nanotechnologies are becoming a larger presence in everyday life, and are viewed by governments and economic actors as a key area for development and growth generation. Still, large surveys indicate that nanotechnologies at present remain relatively little known to the general public. The theory of social representations suggests that specialist representations (ideas, values, practices, communicative codes...) eventually disseminate to shape representations among the public. Thus, today's representations by scientists might hint of what society's perceptions may look like in the future, once the public is more aware of nanotechnologies. Much of the social research to date has framed perceptions in terms of 'risks vs. benefits'. However, the literature has not yet addressed whether representations by a well-informed population (scientists) are indeed structured in terms of a risk-benefit polarity.

NanoFATE WP7 attempted a systematic assessment of how background knowledge about nanotechnology may influence experts' perception. Our survey of project partners in 2011 delivered the first demonstration derived from a qualitative analysis confirming the existence of a polarized representation of nanotechnologies, contrasting opportunity (medical, economic and technological) and risk. Interestingly risk was distinguished at two levels: that associated with nanomaterial characteristics (toxicity, reactivity) and at the larger scale of impact (health, environment, legislation). Does this polarity indicate a 'yes, but' logic (nanotechnology carries opportunity, but possibly also new risks to be understood), or two clusters of specialists (sensitive respectively to opportunity or to risk)?

To answer these questions, we surveyed the entire NanoFATE Newsletter mailing list, including many NanoSafety Cluster experts, in 2013. Specialists consensually viewed that nanotechnology represents opportunity, but depending on self-described scientific background they did not agree to the same extent that nanotechnology also constitutes a risk. Participants with a physics and chemistry background tended to represent nanotechnologies predominantly in terms of opportunities and not in terms of inherent risks or impacts. In contrast, toxicologists, life and social scientists appeared to explicitly incorporate both benefits and risks in their representation of this new technology. Environmental scientists were a more diverse group, divided between the two patterns of representation. Self-described role (researcher, regulator, etc.) had no influence.

The full peer-reviewed paper (Bertoldo, Mays, Poumadère, Schneider & Svendsen) is expected to be published in Journal of Risk Research *in 2015*

our engagement and outreach

NanoFATE provides robust tools, techniques and knowledge needed by stakeholders to assess, understand and communicate risks associated with ENPs of different physical or chemical properties, including their environmental interactions and toxicity.

NanoFATE has played an active role in European NanoSafety Cluster activities. Consortium members participated in Cluster working groups concerned with materials characterization, hazard assessment, exposure assessment, databasing, risk assessment, modelling and dissemination. In addition NanoFATE members contributed to a wide range of NanoSafety Cluster events, co-organising 6 workshops/training events with sister projects NanoRetox, Ennsatox, NanoTOES, NanoMILE, NanoImpactNet, MARINA and QualityNano, NanoPolyTox and NanoSustain, participating in a further 15 meetings, and collaborating closely with 11 other sister projects including among others ENPRA, NANoREG, NanoImpactNet, NanoSENSE.

The NanoFATE work was regularly presented to international conferences and workshops. At release date for this Newsletter n° 6, 27 peer reviewed papers had been published with a further 42 papers likely to come out. Visit our Library to keep up to date with ongoing publication and also citation, showing which of our papers have the most impact.

We ramped up interactions with the regulatory community, detailed in a Regulatory Input Short Report. We also delivered Advice Notes distilling replies to 5 big questions central to our field.

Through the latter half of the project NanoFATE representatives have contributed to the OECD Working Party on Manufactured Nanomaterials through surveys, workshops and as invited experts at WPMN meetings. Most recently NanoFATE worked on the Scientific Organising Committee helping ECHA's nanoparticle team leaders develop and facilitate a 200 delegate Topical Scientific Workshop addressing the main questions of concern for ECHA, national regulators and other EU agencies (e.g. DG Env., EFSA and JRC) as well as industry associations and major companies with regard to these materials and their effective and accurate risk assessment.

Dr. Pete Kille at partner Cardiff University.

Impact

Fate and toxicity of nanoparticles: How fundamental understanding generated by NanoFATE is disseminated to stakeholders to achieve maximum impact of our studies.

Review our points of impact.

Marketplace

Needs in the nanosciences: How project partners' capabilities developed during NanoFATE can support finding answers today and tomorrow.

Review skills and services.

our people

Congratulations to our freshly-minted PhDs...


NanoFATE PhD Supervisors

Young scientists conducting work for NanoFATE were supervised by outstanding researchers in the fields related to nanotechnology and ecotoxicology.

Click on the image to meet a selection of PhD supervisors who told of the issues addressed in NanoFATE's first year.

Jani Tuoriniemi PhD

became NanoFATE's first Doctor of Philosophy (1st October 2013) with his thesis ***New single particle methods for detection and characterization of nanoparticles in environmental samples*** under the supervision of Martin Hassellöv at University of Gothenburg in Sweden. The principal opponent was Kevin Wilkinson (University of Montreal).

"The risk assessment of nanomaterials requires adequate methods for their characterization. My thesis focused on developing methods for determining the number concentrations and size distributions of particles present at trace level concentrations in environmental matrixes. Single particle ICPMS was developed and validated for characterization of particles in liquid samples, while it was necessary to rely on quantitative ESEM imaging in soil matrixes. These methods enable for instance the study of nanoparticle dissolution at environmentally relevant concentrations, and obtaining proper dose metrics during toxicity tests in soil media."


First line of defense: Jani and an ICP-MS instrument, 1st Oct 2013

Pauline Waalewijn-Kool PhD


NanOFATE NEWSLETTER
our people
Congratulations to Pauline Lydia Waalewijn-Kool, PhD!

received her doctorate on 24th October 2013 – see our 5th Newsletter as well as our extensive write-up (4th Newsletter) of her work which suggests that risk assessment of ZnO ENPs can be conducted with the same current methods valid for ionic zinc.

NanoFATE supported are trained 19 young researchers at 9 partners, directly funding 15

	MSc	PhD	Post doc
NERC	Laura Heggleund*	Carolin Schultz*	Marianne Matzke* Maria Diez Ortiz* William Tyne Elma Lahive
VUA		Pauline Kool	
IHPP		Jacek Wojnarowic Agnieszka Opalinska	
OXF		Cameron Taylor	
UGOT Env Chem	Julia Hammes	Jani Touriniemi Julian Gallego	
UGOT Ecotox	Kim Klein	Maja Halling	
UNIPMN		Ilenia Saggese	
UAVR		Fabianne Ribeiro Paula Tourinho	Filipa Calhoa

**Researchers with own funding collaborating closely with NanoFATE.*

Julián Alberto Gallego Urrea PhD

successfully defended his thesis on 17th January 2014: ***On the exposure assessment to engineered nanoparticles in the aquatic environment***.

Julián's main supervisor was Martin Hassellöv (University of Gothenburg). The principal opponent was Mark Wiesner (Duke University) and the evaluation committee was composed by Deborah Oughton (Norwegian University of Life Sciences) and Susana Wald.

"*I studied the dynamic behavior of engineered nanoparticles in aquatic environments, generating tools for a physicochemical-based risk assessment that elucidates their transformation and transport. The outcome supports the prediction of environmental concentrations and exposure.*"

"*Being part of NanoFATE has been an enriching experience. I met many interesting persons who have shared their knowledge and expertise in order to improve the outcome of my research.*"

Julián worked short term with Professor Deborah Oughton in Norway before starting a post-doctoral research project at the University of Gothenburg with Professor David Turner.

Fabianne Ribeiro PhD

defended her thesis ***Silver nanoparticles flow in an aquatic trophic chain*** on 31st January 2014.

The thesis completed at University of Aveiro deals with the possible transfer of silver nanoparticles (AgNP) within a model freshwater trophic chain. The toxicity of silver nanoparticles in comparison to ionic silver was assessed in each individual species, and in the final step a full trophic chain approach was developed. Biomagnification of AgNP was found in the intestine of fish exposed via water and food.

"Being part of a project such as NanoFATE was the biggest profit I could acquire from my PhD. Working with people with different scientific backgrounds was a privilege for me, and helped me to face the work with an interdisciplinary point of view, and I think that is reflected in my thesis. I just want to say thank you to all the project partners."

Fabianne intends to continue in research, and is seeking a post-doc position in Portugal.

During the oral presentation.

Susana Loureiro (U. Aveiro, Supervisor) and main opponents Kees Van Gestel (Vrije U. Amsterdam) and Claus Svendsen (UK NERC-CEH).

Ilenia Saggese PhD

successfully defended her thesis "***Ecotoxicological profiles of metal engineered nanoparticles in mollusc bivalve* Mytilus galloprovincialis**" on 12th March 2014. The president of her jury was Aldo Viarengo (University of Piemonte Orientale "A. Avogadro").

Ilenia worked under the supervision of Francesco Dondero (UNIPNM) to study mechanistic effects of silver nanoparticles in marine mussels. She performed an assessment through 6 different levels of biological organization, from silver persistence in seawater to prediction of fecundity by means of DEB modeling.

"*The opportunity to work in this FP7 Project was a highly valuable experience, that taught me a lot on nano-science, allowing me to grow under both a personal and professional perspective.*"

...and those soon to defend!

We have news from two colleagues :

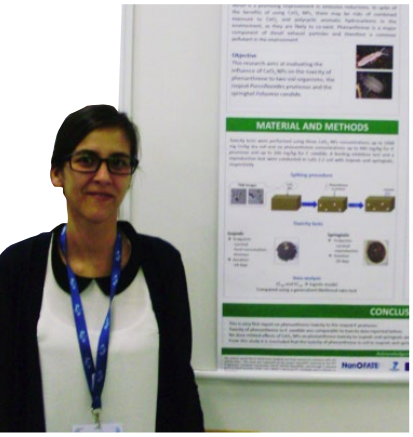
Paula S. Tourinho MSc

hopes in December 2014 to defend her doctoral dissertation ***Effects of ZnO and Ag nanoparticles on the terrestrial isopod* Porcellionides pruinosus**.

Paula's NanoFATE publications may be found at :
http://dx.doi.org/10.1002/etc.1880
http://dx.doi.org/10.1002/etc.2369

Under the supervision of Susana Loureiro (U. of Aveiro) with co-supervision by Kees van Gestel (VUA), Paula's PhD work has covered two topics:

- assess the toxicity of ZnO and Ag nanoparticles in a terrestrial isopod, evaluating the influence of soil properties on nanoparticles toxicity
- determine the internalization of nanoparticles in isopods at different biological levels (organism, tissue and cellular levels).



"*It has been a great pleasure to be part of the Nanofate project. I have learnt so much in the last 4 years! I thank all of the project partners for that, but especially I thank my amazing supervisors.*"

Cameron Taylor MSc

will defend by end of 2014 a doctoral dissertation entitled: ***Characterisation of engineered nanoparticles and their interaction with natural biological and non-biological surfaces***. The thesis should give a holistic overview of how particle behaviour in suspension can affect toxicity to aquatic microorganisms (green algae and cyanobacterial species).

Cameron investigated the short and long term behaviour of suspended ENPs (primarily silver) using a variety of techniques: dynamic light scattering (DLS), nano-tracking analysis (NTA), differential centrifugal sedimentation (DCS), transmission electron microscopy (TEM), and using flow cytometry and fluorescence staining procedures to look at the microorganism effects.

"*My main supervisor is Dr Alison Crossley at Oxford University Materials Department, but I was also greatly supervised by Dr Marianne Matzke at CEH for the algal toxicity work. I also had a lot of help from Dr Kerstin Jurkschat at Oxford University whose expertise in characterisation techniques (especially TEM) was invaluable.*"

"*It was deeply rewarding to be part of the NanoFATE project and to see how my PhD fits into the context of a greater scientific community. It was great to meet other scientists who are among the best in their field and to listen and learn from them as well as meet other PhD students working in similar topics, but coming at the issues from different angles. The travel for meetings and workshops and seeing amazing cities such as Sevilla, Genoa and Aveiro was also pretty exciting.*"

After defending his thesis Cameron will probably travel and then find a job in the environmental sector.

we were here

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

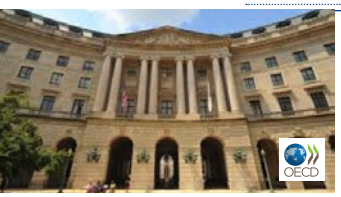
NanoFATE made a significant contribution to this Topical Scientific Workshop. Coordinator Claus Svendsen served on the Scientific Committee, and was joined at the meeting by Dr Geert Cornelis from University of Gothenburg.

Geert Cornelis was invited by ECHA to present on "*Environmental fate modelling and measurement of nanomaterials*" while Claus Svendsen presented the overall framework and approach developed by NanoFATE in a presentation entitled "*Bringing it all together: Comparing a 'classical' ERA based on standard endpoints and approaches with a more informed and nano-specific ERA for ZnO and Ag nanoparticles*". Both presentations received a good set of questions at the time and during the follow up Panel discussions and the wrap-up session.

NanoFATE also presented 4 posters at the event:

1. Diez-Ortiz, M. et al: *Uptake routes of silver nanoparticles in earthworms.*
2. Matzke, M. et al: *Toxicity of silver nanoparticles to 8 different bacteria.*
3. Laycock, A. et al: *Low concentration soil exposure to ZnO nanoparticles by stable isotope labelling.*
4. Svendsen, C. et al: *Nanoparticle fate assessment and toxicity in the environment; Findings from the NanoFATE project.*

All are available to download from our Posters page on the NanoFATE website (www.nanofate.eu).



OECD WORKING PARTY ON MANUFACTURED NANOMATERIALS OECD Expert Meeting on Categorization of Manufactured Nanomaterials *Washington D.C. 17-19 September 2014*

NanoFATE coordinator Claus Svendsen jointly with Dr Iseult Lynch from NanoMILE participated in this OECD WPMN Expert Meeting held in collaboration with US EPA. They contributed a Stimulus presentation covering the topic of "Nanomaterial classification considerations for environmental fate" to Session 4 on ENVIRONMENTAL FATE.

The main conclusions NanoFATE and NanoMILE fed into the debate were that:

- It is more important to measure the functional nano-effect of nanomaterials (NM) in real media than their pristine Phys-chem properties.
- Categorisation has to relate to when nanospecific effects / functions occur rather than to just when they theoretically might occur.
- To categorise NM in the most useful way for estimating effects we need to know how NM look when at the exposure site, which comes down to time and location developments on speciation / bioavailability / biopersistence etc.

Visit our Events page for more details.

9th International Conference on the Environmental Effects of Nanoparticles and Nanomaterials (ICEENN) in *Columbia, South Carolina (USA), September 2014*

NanoFATE results were shared in two platform presentations:

- *Comparison of bioavailability and effects of nano and ionic metal amendments to soil invertebrates – influences of soil properties and biosolid aging* (Dr. C. Svendsen et al.)
- *The influence of soil properties on the bioavailability and toxicity of Ag and Zn nanoparticles* (Dr. E. Lahive et al.)

SETAC Basel May 2014

Here NanoFATE led the organisation and chairing of the full day session on fate and effects of nanoparticles under environmentally realistic conditions as well as separate sessions, specifically '*Fate and effects of nanomaterials in soil*', '*Mechanistic toxicology of engineered nanomaterials*' and '*Environmental risk assessment of nanomaterials*', all in close collaboration with other NSC sister projects. In addition, seven presentations (four platform & three poster presentations) were given by both experienced researchers and PhD students.

Further details of NanoFATE's contribution can be found in our meeting report, downloadable from our Events page on the NanoFATE website, and our posters can be accessed from our Posters library.

going forward/call for abstracts

SETAC Europe Meeting – *Barcelona, 3-7 May 2015*

Call for Abstracts

NanoFATE WP3 leader Susana Loureiro helped by Claus Svendsen, Geert Cornelis, Steve Lofts and Kees Van Gestel will hopefully be here chairing a strong session, namely: **"Nanoparticle (NP) speciation and its consequences for NP environmental fate and effects" (under Track C: NANO - Characterization, fate and effects of nanomaterials)**.

We encourage you all to submit your abstracts online at http://barcelona.setac.eu) by the **deadline of 26th of November 2014** so we can have a strong and fruitful session again in 2015. Whether we get enough abstracts for a full day as we had in 2014 in Basel, is up to you!

Please see below the summary description of the session.

Nanoparticle (NP) speciation and its consequences for NP environmental fate and effects

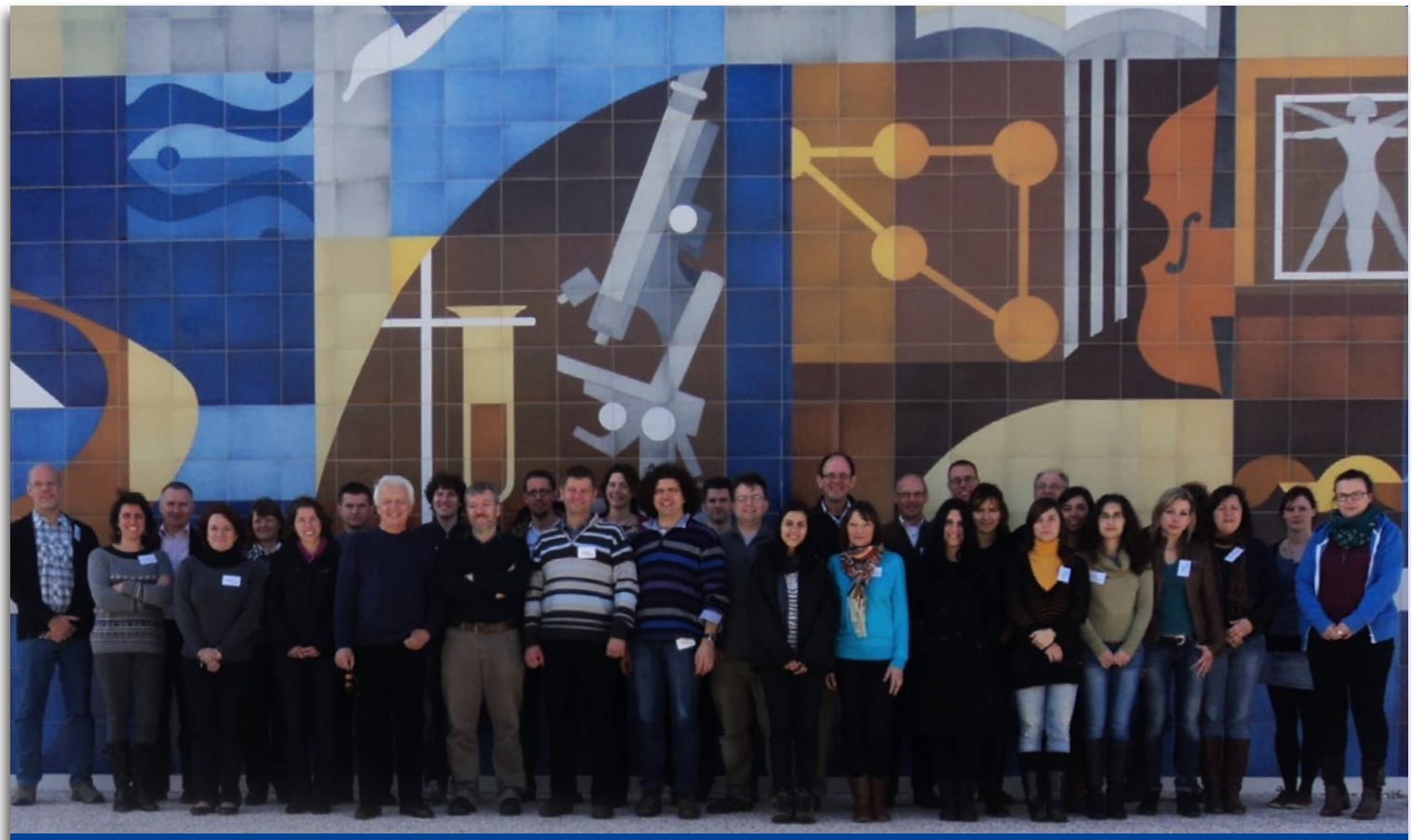
In waste management facilities (e.g. waste treatment plants) nanomaterials may be subject to transformation processes (e.g. coating transformation/loss/replacement, partial dissolution, and chemical modification) that influence their physicochemical properties and subsequent behavior following release to the environment, including further transformations. Understanding the behaviour, bioaccumulation and toxicity of such transformed nanomaterials, as opposed to the as-manufactured materials, is a clear priority for nanomaterial environmental research since the transformed materials represent the nanomaterial actually released into the environment. Subsequent nanomaterial transformations within environmental compartments are important for accurately understanding nanoparticle fate and toxicity, so information on nanoparticle (NP) speciation is of major importance to understand to what extent and via what pathways they will reach biological receptors. This session will focus on in-situ studies that relate fate, uptake and effects in organisms to nanoparticle physicochemical form (speciation) in the environment, both by experimental and/or modelling approaches. This session relates to nanoparticle speciation in different environmental compartments and their transport in and between these compartments, both abiotic (soil, sediment and water) but also including internalization in organisms, accumulation and potential recycling into the environment.

Key-words- nanoparticles, speciation, bioavailability, monitoring

new projects!

NanoFATE partners are currently involved in further ongoing NanoSafety Cluster projects as well as EU/US and national and EU regional projects all drawing on NanoFATE data and ensuring the legacy of the project is put to maximum use. These ongoing Cluster projects include MARINA (www.marina-fp7.eu), GUIDEnano (www.guidenano.eu), ENTER cost action (www.es1205.eu).

Many partners are involved in H2020 proposals to keep the progress in NanoSafety research moving ahead.



On Behalf of the Coordinator and the NanoFATE Consortium, your Newsletter and Website Editors

Claire Mays (Symlog) and Lee Walker (CEH)

Thank All Our NanoFATE Readers

Paris, France and Lancaster, UK, November 2014

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