NanoSafety Cluster Newsletter

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Welcome to the 21st NSC Newsletter

Thank you as always to everyone who has submitted content (past, present and future!). In a year that has seen all of us locked down at various times and unable to access our usual places of work, the NSC Community has been incredibly industrious and productive, as reflected in the size of this issue.

The first part of the newsletter comprises a comprehensive report on nanoSAFE20, a week-long event that attracted large audiences to its Education and Training Days. This is followed by 'Breaking News' in which Dr Sean Kelly (NIA) outlines the EU plans to review the definition of a nanomaterial.

In the NSC Project News section, a large number of projects have submitted updates which are well worth a read, including items from our newer projects: ASINA, SbD4Nano, and SAbyNA.

We then move on to our Spotlight for this quarter, provided by Daan Schuurbiers (DPF), who describes how co-creation approaches can be usefully applied in the Risk Governance activities of the 3 NMBP-13 projects. In the second of Daan's articles, he examines the effective integration of societal considerations and how this is central to the advancement of risk governance.

This issue's publications section is substantially larger than usual, reflecting laudable output from two of our maturing projects that are now coming into fruition.

In Resources, JRC is inviting applications to access their laboratories, while in Jobs and Opportunities, a number of vacancies and opportunities show that the job market is healthier than some news reports would have us believe.

Finally, our Events section announces forthcoming workshops which remain virtual early on in the year but by mid-year we are looking optimistically at the return of live events at which we can hopefully meet again.

Wishing you all a wonderful festive season and a very happy, healthy and fulfilling 2021.

Best regards
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WG Dissemination

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The next NSC Newsletter will be published in March 2021. Please submit your news items before the submission deadline on **Friday February 26th.**

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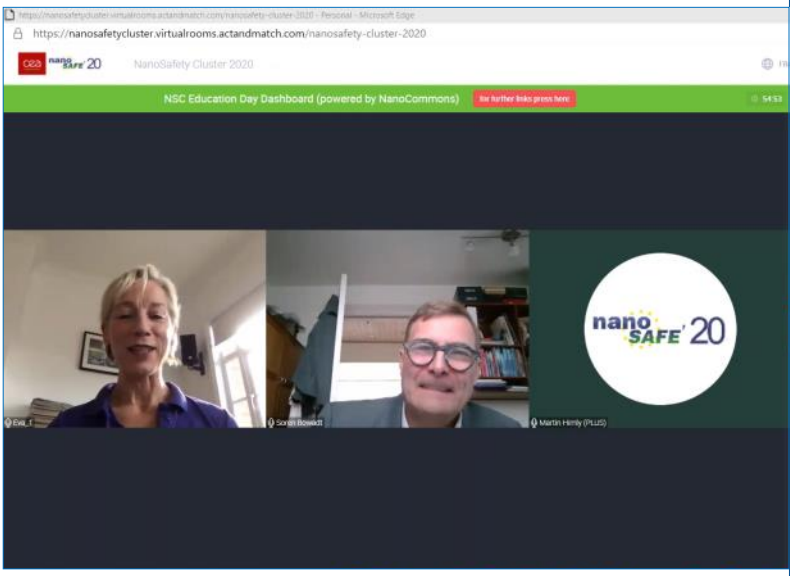
News from the NanoSafety Cluster Coordination Team

The second half of 2020 has been a period when everybody still faced many restrictions. Despite that, the Coordination Team was able to focus on a number of activities. The most prominent ones were the NSC education and training days in connection with NanoSafe2020. Even though meeting "remotely" is never ideal, all the scheduled activities made it possible to convey a message of optimism and progress, which reached a good number of people through the extended workshops and sessions. Martin Himly and Stella Stoycheva have done a great job in organizing these two days including facilitating the sessions during the event days themselves.

There was also strong presence from the Working Group leadership teams, who worked hard to ensure that an attractive program was offered. As part of the NanoSafe2020 satellite events, the NSC had its annual General Assembly (GA), which provided a forum for the nanosafety community to share ideas and suggestions. The GA included a very welcome talk from Soren Bowadt, who presented on the European Commission's (EC) strategic research directions.



Images: Top: the NSC Coordination Team update at nanoSAFE20
Bottom: Éva Valsami-Jones and Soren Bowadt, who presented on the European Commission's (EC) strategic research directions.

During the meeting, all Working Groups presented their activities and plans. These presentations are available on the NanoSafety Cluster Youtube Channel and will be available soon on the NSC website when browsing the related Working Group page. We are also very pleased that after a period of reduced activity from a couple of WGs, the actions planned going forward seem in good shape now.

The Coordination Team also launched the discussion of the future of the NSC at the Steering Group meeting. Horizon Europe will not include a recognizable section on nanosafety, as was in previous framework programs, and much of the relevant research will be embedded in broader programs. There was discussion as to whether the NSC should rebrand itself, but, through discussion, it became clear that the current brand name is very strong, recognizable and respected and should be retained. Instead, it was decided to continue the conversation on the NSC's scope and to what extent its remit should be expanded into 'Advanced Materials' (as one of the terms under discussion) and broaden its focus from fundamental knowledge generation towards integration and application. Dedicated meetings will be organized to discuss this further with the community.

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Cntd → News from the NanoSafety Cluster Coordination Team – December 2020

Somewhat earlier, on the 7th October, the NSC was actively involved in the 4th EU-ASIA dialogue on Nanosafety which resulted in the launch of an international network initiative. The objective of the network-initiative is to establish a sustainable connection and international collaboration between communities from interested countries in order to expand the common knowledge base for materials of regulatory significance to support the needs of various stakeholders including regulatory bodies and industry. This was an expansion from the original EU-ASIA remit, as we were also approached by representatives from many countries in other continents who wish stronger alignment with the NSC. This action is currently led by Andreas Falk on behalf of the CT.

Most of you may now be aware of the so called Malta Initiative, the action to speed up the process to adapt or to develop OECD test guidelines and guidance documents by bringing together information, data, expertise and research capacity. This is a great opportunity for the NSC to demonstrate the applicability of the projects' output and to enlarge its impact. Flemming Cassee is the link between the Malta Initiative and the NSC projects and has recently approached project coordinators with the request to identify which of the scheduled activities the project partners can contribute to. This action is strongly supported by the European Commission.

The coordination team is also in close contact with the representatives of the Commission, in particular Aleksandra Małyska, Alessia Amodio and Soren Bowadt, and support them with advice on the scope of upcoming calls in Horizon Europe, in a way that the NSC's vast knowledge is used optimally in future research.

Thinking about the future, the uncertainty caused by the pandemic makes it difficult to plan face to face meetings. The 10th International Nanotox 2021 meeting (supported by GRACIOUS, PATROLS and BIORIMA) in Edinburgh has been converted to a virtual meeting; whereas the 4th NanoSafety Forum for Young Scientists may still be a face-to face meeting in Venice, as long as circumstances at the time of the event permit this.

And finally, we would like to add that the NanoSafety Cluster depends strongly on the enthusiasm of our members and we want to acknowledge this. During this year we have seen 'personnel' changes of the NSC including working group leaders leaving and fortunately new ones stepping in to replace them. We, however, want to express a special gratitude to Claire Skentelberry, who put a lot of effort and time in project overarching activities and has been one of the key people to link the scientific community. We wish Claire all the best in her career at EuropaBio"

And now we very much wish you a couple of relaxing days at the end of the year, keep up the good spirits and let's hope that things normalize in 2021 in such a way that we can meet and greet in person.

Flemming Cassee, Andreas Falk, Tassos Papadiamantis and Éva Valsami-Jones

thank you!

NanoSafety Cluster Education and Training Days at nanoSAFE 20

The EU NanoSafety Cluster Education and Training Days took place on 16th and 23rd November, respectively, as satellite events during the nanoSAFE 2020 Virtual Conference. These two days, organized by the EU NSC Working Group (WG) A on Education, Training and Communication, aimed to act as guidance for the entire NanoSafety community, including young researchers, and to highlight how individual research projects fit as puzzle pieces into the wider picture. In particular, at the Education Day (Nov 16), it was intended to offer an orientation-giving event depicting the overall strategy behind NanoSafe(ty). At the Training Day (Nov 23) more in depth training on e-tools, a basic understanding of *in silico* models, and insight into advanced cell culture models, were provided in parallel session A. At the same time, detailed Q&A on analytical tools for nanomaterials' characterization, an overview on the activities of WG G on risk governance, and a stakeholder engagement workshop on science diplomacy, were offered in parallel session B (see Table 1 for the detailed agenda at the end of this report).

The following objectives were pursued to achieve this:

- to offer a **WG-overarching education/communication/discussion** event involving the audience *via* interactive sessions
- to lay out ways to **go beyond** anything the nanosafety community have learned/developed to serve the emerging topics of Horizon Europe (emerging contaminants incl. microplastics, nanomedicine, safety assessment of novel/ innovative/advanced materials for tomorrow along their entire life cycle)
- to foster participation in creating better sustainable materials (than *e.g.*, nanosilver in socks), technologies, medical approaches, *etc.*
- to exhibit the perspectives of the NSC Working Groups and the various different ongoing projects;
- to be **as interactive as possible** using **hands-on** activities, *e.g.*, by showing **how-to** operate e-tools, upload/retrieve data to/from repositories and perform models;
- to facilitate dynamic contribution to discussions using survey tools such as Mentimeter, WooClap, VoxVote, *etc.*
- to offer different perspectives in **pro/contra discussions**, *e.g.*, by defining **challenger - defender roles taken by experts on specific topics** or evtl. by dividing attendees into zoom breakout rooms
- to show the application of emerging NRG frameworks or SbD tools;
- to **request feedback** on user interfaces and enable stakeholder involvement.

Thus, the work of several other EU NSC Working Groups was featured by specific interactive presentations underlining current emerging tools, concepts, or stakeholder engagements, as depicted in the slide (Figure 1—right) and highlighted by Martin Himly, Chair of WG A, in his welcome and introduction statements at the start of the Education Day.

Figure 1. Overview of the agenda of the EU NSC Education Day. More details on the programme can be viewed here.

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Cntd → **NanoSafety Cluster Education and Training Days at nanoSAFE 20**

Overall, more than 250 individual attendees were registered by the meeting platform, logging in from several European, Asian, American countries, and even Australia.

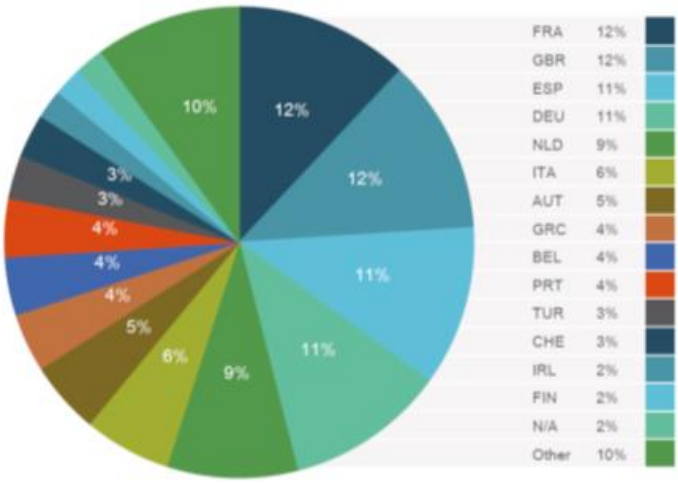

Figure 2. Country statistics of attendees.

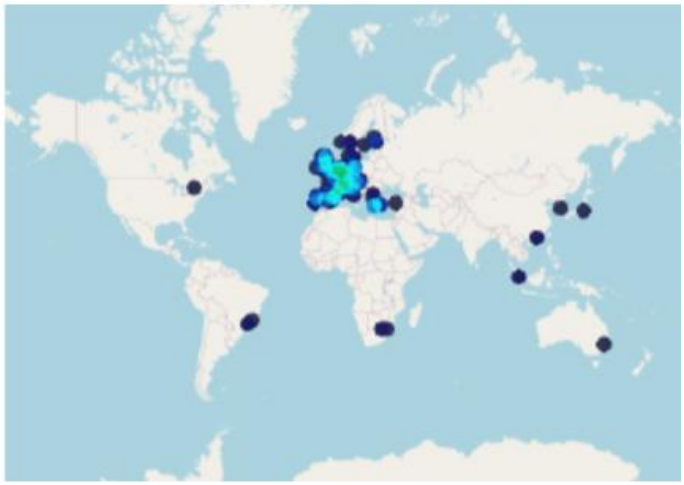

Figure 3. Global distribution of attendees.

As we can see from the global distribution of attendees (Figures 2 & 3), virtual education events can be more inclusive, less cost-prohibitive, and better in line with low carbon-emission policies than physical ones.

NanoSafety Cluster Education Day

During the Education day on the 16th November, the morning sessions had a strong impetus into promoting data FAIRness in the field of nano sciences. Making our data available for *in silico* modeling will greatly enrich the output of our research and facilitate new avenues for the future. Currently emerging concepts, such as AOPs and QSARs were explained, and models and tools for risk (*i.e.* hazard x exposure) assessment were introduced. In this context, the current views and understanding of the attendees were captured through poll questions on certain key elements for translating hazard into risk assessment. For instance, it emerged that about one third of participants were aware of any database or data library dedicated to the release and exposure of nanomaterials, with just a minority aware as to whether these were publicly available. Moreover, a quarter of the attendees knew about templates for collecting and storing data on release and exposure. Later in the session, the attendees' opinions on the state and role of risk governance were captured. Finally, two safe-by-design case studies were presented and discussed; again, the views of the attendees were surveyed using poll questions.

Useful links and information relevant to the Education Day were provided *via* the NSC Education Day Dashboard (powered by NanoCommons). Details on the educational sessions, such as the pdfs of the slides, specific views into the results from polls and interactions of the presenters with the attendees, selected recordings of the oral and online tool presentations and applications, the Q&A sessions and case study discussions, *etc.* are now available: *NSC Education Day@NanoSafe Compilation* at zenodo (DOI: 10.5281/zenodo.4314975); General Assembly; and more will be uploaded to the YouTube Channel when edited.

An examination of the feedback (see Figure 4 right) shows that overall, the attendees were satisfied with the educational content presented and the topics that were discussed, as depicted below. The feedback, which we received through the chat function, was very positive.

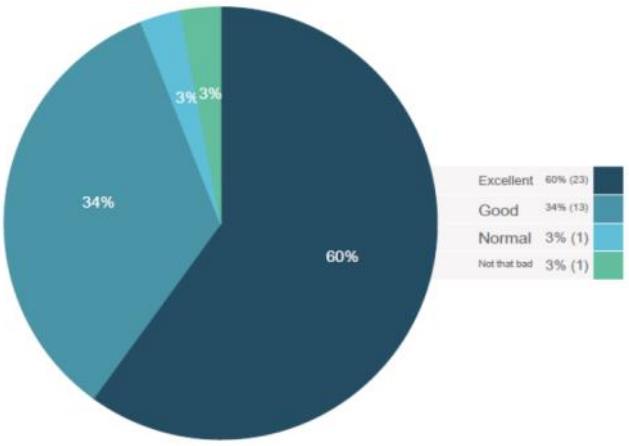

Figure 4. Rating of the entire NSC Education Day given by a share of the attendees.

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Cntd → NanoSafety Cluster Education and Training Days at nanoSAFE 20

Final statement on the Education Day by the WG A Chair Martin Himly (PLUS)

"The focus of today's sessions was on the **gains of individual projects to the entire process** in nanosafety assessment. We aimed to highlight emerging concepts and explain how some selected tools **fit into the wider strategy** and **what remains** after the projects have finished. We looked into **integrated approaches** for relating hazard determination by omics-based analytical workflows into biological effects by adverse outcome pathways; much more detail of these concepts will be on display the following days at the NanoSafe conference and more in depth at the NSC Training Day. We saw that there are models available for translating hazard to risk via upcoming exposure assessment, either by determining, modeling or extrapolating from comparable data. We highlighted the concept of **data FAIRness** and we hope we could provide advice where to find further info to get things **applied in your own hands**. We discussed where our endeavors lead to, i.e. risk governance, how this may by tackled and who would be in charge of it, so what a future "Nanorisk Governance Council (NRGC)" may look like and what types of frameworks are currently in development and how they may serve the NRGC. Ultimately, we would need these approaches for generating safe-by-design (SbD) procedures for **sustainable innovation.** We had the chance to have some SbD concepts applied in two case studies on display today. In future, we all will need to collaborate very effectively and highly productively in getting things (tools, concepts, procedures, models, etc.) applied by the industry to serve the regulators. We will need nano-related basics being translated to the general public, as risk vs. benefit needs to be considered and accepted by all the different stakeholders of this key technology, and this includes foremost our society.

In conclusion, we want to raise your attention again to the broadly ongoing initiative for generating FAIR data in our research and development projects – we need to fill still open gaps, enrich data sets, that we can be able to serve the needs for sustainable innovation in the upcoming challenges, as demanded by Horizon Europe."

The NanoSafety Cluster Training Day—23rd November

The EU NSC Training Day @ NanoSafe Digital Conference was organized in two parallel sessions hosted on 23rd November. As depicted in Figure 5, session A provided hands-on training on nanosafety tools and insight into advanced cell culture models; while in room B, a Round Table including Q&A on analytical tools, stakeholder engagement, diplomacy, regulation and risk governance sessions took place (Figure 6).

Figure 5. Overview of the agenda of the EU NSC Training Day in room A, chaired by Martin Himly, Chair of the WG A on Education, Training, and Communication. More details on the program can be viewed here.

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Cntd → *NanoSafety Cluster* NanoSafety Cluster Education and Training Days at nanoSAFE 20

Figure 6. Overview on the agenda of the EU NSC Training Day in room B, chaired by Stella Stoycheva, Co-Chair of the WG A on Education, Training, and Communication. More details on the program can be viewed here.

Room A focused on *in silico* models and tools for prediction of nano-related hazard and exposure. After an introductory lesson on the concepts of *in silico* tools for risk assessment by Lang Tran (IOM), the day went on with highly interactive sessions giving detailed insight in some online-available e-tools with hands-on activities. These interactive tool presentations were run by Dieter Maier (Biomax) showing the NanoCommons Knowledge Base, Tassos Papadiamantis (UoB) presenting NanoXtract, and Nikos Cheimarios (NovaMechanics) and Samuel Harrison (UKCEH) giving insight into NanoSolveIT human and environmental exposure assessment tools. For optimal support of participants, two break-out rooms were organized by colleagues from UKCEH and experts in running the presented tools were available for a one-to-one consultation.

The second major topic of the day was on advanced cell culture models and dark field imaging. Here *in vitro* models for human lung, GI tract and liver were presented by Kirsty Meldrum (Uni Swansey), Barbara Drasler (Uni Fribourg), Rui-Wen He (RIVM), Angela Kämpfer (IUF), Samantha Llewllyn (Uni Swansea), Marije Niemeijer (Uni Leiden), and Trine Berthing (NRCWE). The program in room A was conducted by project partners of the PATROLs, the NanoCommons, and the NanoSolveIT projects, and chaired by the WG-A Chair Martin Himly.

Room B of the EU NSC Training Day presented a holistic picture of greater overarching topics moving beyond the sole Nanosafety community, such as stakeholder engagement, risk governance and science diplomacy.

The Day started with the ACEnano workshop, which showcased the analytical tools developed by the project which aims to provide analytical clarity and characterisation excellence in nanosafety. It started with brief introductions by Éva Valsami-Jones and Frank von der Kammer addressing the challenges in nanoscale analysis and the approaches and solutions developed during the project. This was followed by two expert round tables, focusing on how the project could address regulator and industry needs, respectively.

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The participants in the roundtables were: Dan Hodoroaba, Abdel Sumrein, Asa Jamting, Sean Kelly, Johanna Scheper and Stella Stoycheva. The roundtables were followed by parallel sessions on specific project tools (based on preferences expressed by those registered to attend) and there was a final session to sum up the parallel sessions, which also included a question and answer session with the attendees. The event was moderated by Antje Grobe.

In the next session, we moved our focus onto the newly launched NanoSafety Cluster Working Group G – Regulations & Risk Governance, which presented the past, current and planned future work conducted within its nine core projects. The WG-G core projects form and carry the WG's planned objectives and activities (as introduced one week earlier, during the NSC Education Day, held on the 16th November 2020), centred on the use of scientific results to inform the review and/or development of policies and policy-harmonisation efforts, such as standards and (test) guidelines. Moreover, dedicated workshops, seminars and written summaries will transfer regulatory (information) needs back to the scientific community in order to help develop targeted research roadmaps; if deemed appropriate, this group may also facilitate the scoping and setting of relevant research priorities for the EU and national research agendas. Steffi Friedrichs, Chair of WG-G, led the governance session of the NanoSafety Cluster Training Day, during which the nine projects presented their complementary work and answered questions from the audience.

At the end of the day, the inspiring Science Diplomacy Workshop (@SAbyNA_eu & @InsSciDE_eu) successfully engaged participants in looking at "practices at the intersection of science, technology and foreign policy… where a greater scientific voice could add value to bi- and multilateral discussions and decisions about our shared global concerns". Drawing a parallel with responsible research and innovation, Adriënne Sips (RIVM) said, *"it is imperative to have individuals who can crosstalk between stakeholders, scientists and the public in order to help innovation meet expectations".*

Useful links and further info relevant for the both parallel sessions of the NSC Training Day were provided *via* the NSC Training Day Dashboard (powered by NanoCommons). Details on the training and communication sessions, such as the pdfs of the slides, specific views into the results from polls and interactions of the presenters with the attendees, selected recordings of the oral and online tool presentations and applications, the Q&A sessions and case study discussions, *etc.* have been deposited as *NSC Training Day@NanoSafe Compilation* at zenodo (DOI: 10.5281/zenodo.4315111). Videos will be available to view on the NanoSafety Cluster YouTube Channel when they have been edited.

"The EU NSC Training Day was an excellent platform to showcase cutting edge tools and discuss global themes, such as risk governance and science diplomac,y representing the broad spectrum of research results developed by the nanosafety community and designed to tackle societal challenges and foster innovation" concludes Stella Stoycheva, organizer of the Training Day.

Author information

Martin Himly (PLUS, Salzburg, AT, martin.himly@sbg.ac.at; http://orcid.org/0000-0001-5416-085X) is the Chair and **Stella Stoycheva** (Yordas GmbH, s.stoycheva@yordasgroup.com) is Co-Chair of the EU NanoSafety Cluster - Work Group A on Communication, Training, and Education.

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Cntd → ***NanoSafety Cluster*** **NanoSafety Cluster Education and Training Days at nanoSAFE 20**

Table 1 Detailed agendas of the parallel sessions during the NSC Training Day held on 30th November

Session A: Hands-on Training on Nanosafety Tools and Models	Session B: NanoSafety Stakeholder Engagement, Diplomacy, Regulation and Risk Governance
9:00-9:05 Welcome of the day – Martin Himly (Chair of NSC WG-A) **09:05-10:00** In silico tools for Nanosafety Research, Lang Tran (PATROLS) **10:00-12:00** Interactive training on "NanoXtract Image Analysis Tool – NanoCommons Knowledge Base", Antreas Afantitis, Georgia Melagraki, Dieter Maier, Andreas Tsoumanis, Anastasios Papadiamantis, Iseult Lynch (NanoCommons) **13:30-14:30** NanoSolveIT tools for assessment of human and environmental exposure to nanomaterials Antreas Afantitis, Georgia Melagraki, Nikolaos Cheimarios, Andreas Tsoumanis, Samuel Harisson, Pantelis Karatzas, Philip Doganis, Harry Sarimveis, Iseult Lynch (NanoSolveIT) **14:40-16:40** Advanced in vitro models of the human lung, GI tract & liver for hazard characterisation, Kirsty Meldrum, Barbara Drasler, Rui-Wen He, Angela Kämpfer, Samantha Victoria Llewellyn, Marije Niemeijer (PATROLS) **16:50 – 17:20** Enhanced Darkfield Microscopy for Localization of Particles *in vivo/in vitro*, Trine Berthing (PATROLS)	**10:00-10:05** Welcome of the day – Stella Stoycheva (Co-Chair of NSC WG-A) **10:05-12:00** ACEnano users' workshop: "You Ask – ACEnano Replies", Éva Valsami-Jones, Frank von der Kammer (ACEnano) **13:30-15:00** Introduction to Nanotechnology Regulations & Risk Governance (NSC Working Group G), Steffi Friedrichs (AcumenIST), Keld Alstrup Jensen (caLIBRAte), Monique Groenewold (Gov4Nano), Thomas Kuhlbusch (NanoHarmony) Maria Dusinska (RiskGONE), Janeck Scott-Fordsmand (NANORIGO) (NANOMET), Miguel Banares (NanoInformaTIX), Antreas Afantitis (NanoSolveIT), Iseult Lynch (NanoCommons) **15:10-17:00** Science Diplomacy: A New Way to Think About Your Role in a Community of Research, Claire Mays (SabyNA, InsSciDE), Guillermo Ort-Gils, Institute for Bioengineering of Catalonia (IBEC)

Where to find the NSC videos and materials:

- **NanoSafety Cluster YouTube Channel** (General Assembly and WG videos are now available. The rest to be available soon)
  NanoSafety Cluster YouTube Channel
- **NanoSafety Cluster Zenodo Community (ppts):**
  NSC Education Day@NanoSafe Compilation at zenodo (DOI: 10.5281zenodo.4314975)
- **NSC education & training materials (other materials):**
  https://nanohub.org/groups/nanosafetycluster

Is your project producing educational or training materials?

The NanoSafety Cluster nanoHUB:

A permanent centralised home for your project's training and education resources

The NanoSafety Cluster has its own education and training materials repository for all NSC projects and related initiatives at the NSC nanoHUB: Your project's educational output can be archived, searched, cited, and linked to from project websites and social media.
See https://nanohub.org/groups/nanosafetycluster/collections/all

How to contribute:

If you would like to create a collection for your project, or would like to register as a contributor or resource user, create an account here: https://nanohub.org and then tell us at news@nanosafetycluster.eu. We can then make you a Hub Contributor so that you can then create a project folder (if there isn't one) and upload resources.

After that, the hub is your oyster!

EU Plans to Review the Definition of a Nanomaterial

Dr Sean Kelly
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The Nanotechnology Industries Association (NIA) cautiously welcomes the European Commission's proposal to review its 2011 nanomaterial definition, which it has committed to do as part of the recently published EU Chemicals Strategy for Sustainability Towards a Toxic-Free Environment.

An update on the nanomaterial definition has been expected for several years and past attendees at the NIA Annual Symposium may remember that this has been a feature of past presentations in talks given by Commission Staff.

The current definition defines a nanomaterial as:

> *A natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50 % or more of the particles in the number size distribution, one or more external dimensions is in the size range 1 nm - 100 nm.*
>
> *In specific cases and where warranted by concerns for the environment, health, safety or competitiveness the number size distribution threshold of 50 % may be replaced by a threshold between 1 and 50 %.*
>
> *By derogation from the above, fullerenes, graphene flakes and single wall carbon nanotubes with one or more external dimensions below 1 nm should be considered as nanomaterials.*

The EU's Joint Research Centre has produced three reports, including recommendations for changing the definition (see especially) which give some ideas about the scope of the changes of the proposed revision. It is also understood that any proposed revision would not result in major alterations, but would allow the definition to be updated to reflect recent scientific developments. Possibly as crucial as the definition itself, is how this would be used across different legislation and ensuring that all EU legislation uses the same definition.

In the EU different legal acts contain specific definitions for nanomaterials such as Medical Devices, Cosmetics, Biocides and Food, and, interestingly, whereas the Commission recommendation is non-binding, product-specific regulations are legally binding and directly applicable in the EU.

One main aim of the nanomaterial's definition is to be able to provide a legal framework to protect human health and the environment. However, the nanomaterial's definition must be implementable and currently several terms like "particle", "constituent particle" or "external dimension" need to be better defined or introduced in the definition. Likewise, and in spite of the several advances in detection techniques, the 50% by number threshold still encounters limitations regarding analytical tools, with serious challenges associated with detection limits for the smaller end of the range. Vague terminology in the definition could hamper further development of analytical techniques, imply unnecessary extra costs for developers, or lead to inadequate classification of materials, in which case the regulatory framework will fail in its purpose to protect human health and environment. A clear definition will also help in the development of appropriate standards.

It is understood that the European Commission will be launching a consultation on the revised definition by the end of 2020, but a final timeline has not been published. NIA will be consulting with its members to gather their opinions and ensure that it is prepared for the Commission's consultation exercise when it starts.

NIA's Director of Regulatory Affairs, Dr Blanca Suarez Merino commented: "NIA has indeed been asking for a number of years for clarification on the use of the nanomaterial definition across regulatory frameworks and it is great to see that reflected in the strategy. We look forward to hearing more of the Commission's plans and welcome the opportunity to respond in due course on behalf of our members."

NIA
Nanotechnology
Industries Association

https://nanotechia.org/

NanoFabNet Project Launches International Group of Partners—Aims to Establish Hub for Sustainable Nanotechnology

By Dorothy Estrada
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Under European Funding Programme Horizon 2020 a new project named "NanoFabNet" launched in March 2020 with the purpose of creating a strong international hub for sustainable nanofabrication and nanotechnology. As a project, NanoFabNet will run for two years, culminating in the launch of the European and US hubs in 2021, which will continue beyond the project timeframe as an independent organisation called the NanoFabNet Hub. The project is coordinated by AcumenIST in Belgium and involves key nanotechnology organisations from across the US and Europe, helping to ensure valuable activities and information exchange. However, now is the time that NanoFabNet also needs you!

As those in the sector are well aware, for well over a decade, nanotechnology has been one of the fastest-growing high-tech fields and a key enabling technology (KET) for European industries; its innovations have already helped to address several important societal needs, including the viability of renewable energies, medical treatments and early detection, creation of more sustainable consumer products, and even the increase of agricultural productivity. Yet despite this, public awareness and knowledge has remained relatively low. During these times of COVID-19, nanotechnology has been applied in developing better PPE in the fight to protect against the virus, and thus nanotechnology has been thrust forward into mainstream conversation, raising the importance of questions around deployment, validation, standardisation and acceptance of nanotechnologies. This is where NanoFabNet steps in.

NanoFabNet aims to foster better cohesion across the research, industrial, and policy-making sectors. Lead Project Coordinator and CEO of AcumenIST Dr. Steffi Friedrichs explains:

> "NanoFabNet's central objective is to create a strong international network for sustainable nanofabrication, whose structure, business model, detailed strategies and action plans are designed, agreed and carried by its international stakeholders during the project duration. This will help us to create a self-sustaining collaboration platform: the NanoFabNet Hub."

The upcoming online NanoFabNet Hub, which is due to launch in 2021, will serve as a one-stop-shop in delivering collaboration opportunities for large scale high-value industries, as well as provide professional information and guidance to academic laboratories, governmental agencies and SMEs. Expected impacts from the project include the linking of nanotechnology and sustainability resources and their inclusive sharing with a wider community. NanoFabNet services and offers will comprise of virtual infrastructures, skills training, information provision and guidelines for standardisation and harmonisation in different nanotechnology fields.

Fifteen partners from nine European countries and the USA are involved with NanoFabNet efforts; they are supported by an international advisory board comprised of experts and decision-makers from across Europe, Japan, Israel, and the USA. Their task over the two-year project duration will be to develop an international network that builds closer linkages, not only across the sustainability and nanofabrication ecosystems in Europe, but also across the globe. The development of strategies, roadmaps and implementation actions for sustainable nanofabrication will be at the forefront of the project's mandate; the results will be published in several upcoming publicly available reports.

Currently, the NanoFabNet partners are conducting two different surveys aimed at experts across the nanotechnology fields. The first is a value proposition survey, which is seeking feedback on the developments needed within the field of nanotechnology and nanofabrication in order to support strong and sustainable growth.

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Cntd → **NanoFabNet Project Launches International Group of Partners—Aims to Establish Hub for Sustainable Nanotechnology**

A second survey, also now open concerns collecting feedback on validation, harmonisation, and standardization requirements for the sector. We encourage all experts and interested stakeholders from various nanotechnology and sustainability-focused entities to get involved! Please take our surveys (see below), and register to become a Hub stakeholder in order to be among the first to hear and get involved in the network's ongoing work. Registering online is free.

Image: Members of the NanoFabNet project consortium gathered at their kick-off in Brussels.

Help Shape the Sector of NanoFabrication

by Georges FAVRE, PhD
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Co-chair of NSC WG-B "Materials & Standards"
Responsible for *Validation, Harmonisation and Standardisation* within the NanoFabNet Hub
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As previously described, the *International Hub for Sustainable Fabrication of Industrial-Scale Nano Fabrication* – ***NanoFabNet Hub*** – is an H2020 initiative which aims to bring together all the expertise, means/infrastructures & information to support **sustainable nanofabrication at industrial scale**, by making them accessible via a Single Entry Point, and deploying services for which an expression of need will have been made by various interested stakeholders.

In this regard *NanoFabNet* is seeking nanotechnology experts to give their opinions and help shape the sector of nanofabrication.

As things are progressing quickly within the nanotechnology sector, it is therefore essential that the field is founded in strong and secure processes, especially for the validation of technology, harmonisation across developments and a suitable standardisation framework that can ensure trustworthy outcomes.

We therefore need your feedback on how these areas should be developed and how we at NanoFabNet can help align these measures moving forwards.

Link to the survey: (*Estimated time: 15 min*).
https://www.nanofabnet.net/contact-nanofabnet/#validation-survey

NanoHarmony holds successful Workshop on Gap Analysis and Data Requirements to support TG and GD Development

Nikolina Latkovic
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The NanoHarmony project, with the mission to support the development of Test Guidelines (TG) and Guidance Documents for 8 end points determined as critical to nanomaterials development, hosted a global online workshop on November 3-5, with expert sessions following by a public plenary meeting.

The 3-day event delivered 14 expert sessions on 11 topics and included almost 200 experts from 25 countries across 4 continents. The closing plenary brought together a further 150 delegates to hear initial outcomes and share discussion, ready for the next stage of development through the project.

Interested stakeholders can download the slides from each expert topic presented at the public plenary and watch the recordings of each session HERE. Stakeholders can also register for the follow up webinar on December 16, where outcomes from this global workshop will be presented in more detail and a roadmap of actions.

As well, NanoHarmony released its first newsletter. The newsletter covers the first six months of the projects and highlight its many achievements including some very successful webinars and workshops. The NanoHarmony newsletter also includes links to slides and records of past events and announces our upcoming events. Read the full newsletter here.

Follow NanoHarmony and get involved

Interested stakeholders can sign up to follow NanoHarmony through the project newsletter and get involved through the webinars and events scheduled through the project. The project will also host the webinar 'Data requirements in Test Guideline and Guidance Document development for Nanomaterials' on December 16.

About NanoHarmony (grant number 885931):

The NanoHarmony project, funded through Horizon 2020, has the mission to support the development of Test Guidelines (TG) and Guidance Documents (GD) for eight substances where nanomaterial-adapted test methods have been identified as an industrial priority. NanoHarmony will coordinate the collection and use of available data and information to support the finalisation of the test method development and to organise a sustainable network for the needed exchange, also for future regulatory development needs.

www.nanoharmony.eu

Cntd →

Cntd → NanoHarmony news

850 registrants for NanoHarmony's webinar:

'The Pathway to Test Guidelines: from science to standards for nanomaterials'

Nikolina Latkovic
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nikolina.latkovic@nanotechia.org

Over 800 registrations were received for the webinar "The pathway to Test Guidelines: from science to standards for nanomaterials' hosted by the EC-funded projects NanoHarmony and NANOMET

The two projects, launched earlier in 2020, reflect contributions of the European Commission to support development of Test Guidelines (TG) and Guidance Documents (GD) for nanomaterials, through OECD pathways. NanoHarmony is coordinated by BAuA, whilst NANOMET is coordinated by OECD.

The webinar on September 16 was adapted to a new format, following the scale of registration, with three recorded presentations published on YouTube prior to the event, and questions submitted to the live event for discussion and response by the three presenters. The live event was also recorded and all questions will also be published as FAQs through NanoHarmony and NANOMET.

Interested stakeholders can find the recordings and the slides on NanoHarmony's website.

Follow NanoHarmony and get involved

Interested stakeholders can sign up to follow NanoHarmony through the project newsletter and get involved through the webinars and events scheduled through the project. The project will also host the webinar 'Data requirements in Test Guideline and Guidance Document development for Nanomaterials' on December 16.

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About NANOMET (grant agreement No. 887268)

Just like any other chemical substance, nanomaterials have to be assessed for their safety using appropriate tools and methodologies. For that reason, the OECD Programme on Manufactured Nanomaterials and the OECD Test Guidelines Programme collaborate to identify and develop standardised methods that can be used to generate relevant and reliable data. To intensify this endeavor and support the OECD, a three-year project called NANOMET, funded by the European Union has been launched in May 2020.

Initial Approach of the ASINA Project to the Real World

By Sara Attanà
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Anticipating Safety Issues at the Design Stage of NAno Product

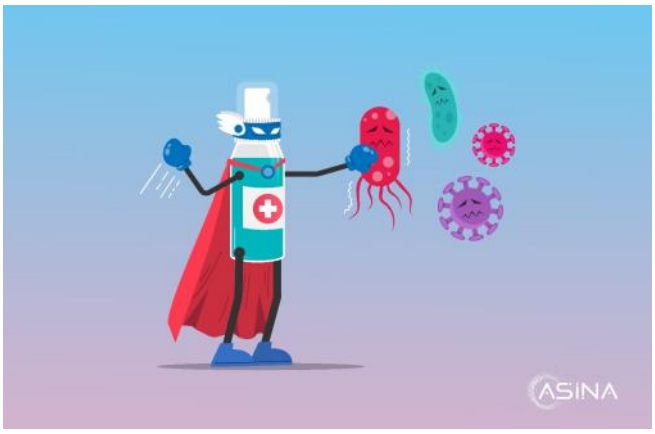
ASINA's mission to use a bottom-up approach to the development of SbD products, thus ASINA's first step has been the definition of real case studies from the two value chains (VC) of the project:

- VC1 Antimicrobial / depolluting coatings
- VC2 Nanostructured capsules delivering active phases in cosmetics

ASINA companies have been asked to offer information about their needs, and problems encountered during the production of nano-enabled products. For VC1, three products have been identified: photocatalytic filters, photocatalytic illumination system and coated textiles, while for VC2, anti-aging and antimicrobial creams are the actual case studies.

For all these case studies, ASINA partners are investigating technical functions as well as the existence of ranges of acceptability, such as safety; life fate of nanomaterials; their potential impacts on human and environmental health; performances; and in some cases the potential for nanomaterial regeneration (VC1); or in other cases their compatibility with other components within cosmetic formulations (VC2); life-cycle impacts and cost evaluations.

Furthermore, ASINA is putting in place a platform of test beds and pilot plants available to ASINA industrial and academic partners, to produce nanomaterials and nano-enabled products, matching safety and sustainability by design criteria. Core technologies available in ASINA partners' facilities (spray coating, screen printing, dip coating and dip padding, spray freeze drying) will be adapted and dedicated to the production of ASINA nano-enabled products (NEPs), providing the physical accessibility to life-cycle scenarios for optimisation trials, prior to the scale-up and validation within ASINA pilot plants.



VC1 Antimicrobial / depolluting coatings

VC2 Nanostructured capsules delivering active phases in cosmetics

About ASINA

ASINA has the ambition to promote consistent, applicable and scientifically sound Safe-by-Desgin nano-practices, considering all the of nano-enabled products design dimensions: functionality, production technologies, safety, environmental sustainability, cost effectiveness and regulatory requirements, in line with research responsible innovation policy.

For more information: https://www.asina-project.eu/

See the latest ASINA vacancy in our Jobs section

NanoExplore Update

By Emily Kay
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The Life NanoExplore project is working to develop and demonstrate the feasibility of an integrated approach to conduct biomonitoring studies, characterise exposure levels and elucidate possible health effects deriving from exposure to engineered nanomaterials (ENM). It aims at an integrated approach for exposure and health effects monitoring of engineered and incidental nanocomposites in workplaces and urban areas. The project is supported by the European LIFE programme and is currently in its pilot phase.

NanoExplore promotes a harmonized approach to overcome current data gaps and barriers limiting the implementation of the REACH regulation and the use of human bio-monitoring data in the protection of human health and the environment when dealing with particles in the nanometer range (1-100 nm) by combining long series of robust data on the concentration of ENMs measured by a wireless sensor network (WSN) of monitoring devices, appropriate biomarkers, and a tailored designed data management application. This approach addresses current environmental, health, and safety questions about ENMs, providing stakeholders from government, industry, NGOs, or the general public, with reliable data on the concentration and effects of particles in the nanometer range (1-100 nm).

Despite COVID-19, NanoExplore is still recruiting companies that manufacture or handle engineered nanomaterials to take part in a research study, aiming to develop long-term health surveillance and worker protection programs.

Be a part of an innovative European cohort in the nanocomposites research field

This information can promote company image and reputation by highlighting its engagement in public health and optimal working conditions.

Receive your company's results for hygiene measurements

Your employees taking part in the study will have the opportunity, upon consent, to receive their individual study results. This will include explanations by a specialist in occupational medicine.

Benefit from sound advice given by industrial hygiene specialists regarding possible exposure to nanocomposites and ultrafine dusts

This can enable your health and safety specialists to set-up specific procedures to control emissions and possible exposure.

Find out more **HERE**

At the time of this update (December 2020) NanoExplore project has reached the implementation actions and made great advances in the different work packages.

The NanoExplore web tool prototype has been designed and developed, and the demo version was sent to end-users and stakeholders for feedback. Improvements are in progress.

Tests to the final prototype of the NanoExplore Device built by Ramem are ongoing whereby they are now testing functionalities such as remote measurement, sending data, as well as download and analysis of data.

The project partners recently delivered two successful webinars covering aims of projects and the progress made. On 20th July a virtual webinar 'Human biomonitoring of nanomaterials: Challenges and Achievements,' was attended by 73 attendees from companies manufacturing or handling nanomaterials, health and safety managers, employees handling nanomaterials, persons involved in the safety and regulation of nanomaterials and scientists in the field of nanosafety. On 8th of October NanoExplore: Exposure and Devise webinar was attended by 15 stakeholders.

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Cntd → NanoExplore Update

During these sessions, the partners discussed the aims and achievements of the project, and how they affected attendees and their industry. Discussions also centred on the NanoExplore webtool, covering the following points:

- Design of the NanoExplore web based platform
- Main components and functionalities

Follow on from this topic, the focus shifted to the wireless sensor prototype covering the following points:

- Its main components and function: what and how is measured
- The program of control: how it is operated
- Remote control of the sensor

The videos of the two webinars can be accessed in the links below:

- Part one: **Human biomonitoring of nanomaterials: Challenges and Achievements**
- Part two: **Exposure and Device**

The NanoExplore team also participated in the Nanosafe conference at which they presented two posters during the conference; one was a project overview and the second focused on the biomonitoring studies.

The current situation with the COVID-19 pandemic is strongly affecting the progress of the project, and even more important–the health of all project partners. Delivery bottlenecks for necessary components for the wireless sensor network, closed laboratory facilities, and restrictions on social contacts and travelling present enormous challenges for reaching the desired goals. Nevertheless, the team is working hard on possible alternatives to fulfill the project commitments in time, for example through engagement of companies and stakeholders remotely via conference calls, and more online webinars and training sessions.

SAbyNA—Nanoscientists in Diplomacy: Power of Many Individual Acts

by SAbyNA Project

On 23 November, InsSciDE (Inventing a Shared Science Diplomacy for Europe) brought together a science diplomacy (SD) power team for an open training session targeting nanoscientists. Entitled "Science Diplomacy: A New Way to Think About Your Role in a Community of Research".

The workshop was part of the online EU NanoSafety Cluster Training Day for NanoSAFE'20, as reported earlier in this issue.

Speakers shared their personal and professional journeys through SD arenas, then dialogued with participants in breakout sessions.

The European External Action Service – EEAS, Europe's "foreign ministry" – openly relies on the NanoSafety Cluster to help build scientific cooperation and raise awareness on European goals, values and priorities. This science-diplomatic role engages both institutions and individuals.

In the words of SAbyNA's Claire Mays, the workshop aimed "to help participants think of their roles as centered within an international community of research – and reflect on how stepping out of pure disciplinary roles in order to communicate values may help change the way people and political structures deal with global challenges in their own context."

For more information, **read the full article**

News from the GRACIOUS Project

GRACIOUS' Framework News

By Emily Kay
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GRACIOUS is now at the final stages of its open consultation on the GRACIOUS Framework. Feedback has been received from various stakeholder groups (industry, regulators, academia) from across the Globe via online survey and in depth interviews with key stakeholders such as ECHA, EFSA and SCCS among others. The overall feedback on the Framework was very positive and currently major efforts are devoted to testing the framework via case studies, the GRACIOUS blueprint testing and guidance document development. Should you wish to test the framework with your own case study please contact us at info@h2020gracious.eu!

Professor Vicki Stone (GRACIOUS Coordinator) presented at the NIA Annual Symposium on the H2020 GRACIOUS framework for grouping nanomaterials for risk assessment. If you missed the presentation you can watch our project videos or read the full Framework description in our open access publication **HERE**!

GRACIOUS also had a significant presence at the nanoSAFE 2020 Digital conference, providing a keynote speech, numerous posters, and contributions to the NSC Training and Education Days.

GRACIOUS shows great progress on its 3rd Consortium Meeting

During the 3rd GRACIOUS consortium meeting, held online, on 24-25 November 2020, project partners presented an overview of the results obtained during the last 12 months. The GRACIOUS Framework is now in a very advanced form following a comprehensive second round of consultations with key stakeholders spanning industry, regulatory bodies and academia among others. We are currently in the process of testing the Framework via case studies. Good interest in testing has been generated so far including a case study with ECHA.

Interested to test the Framework? Learn more HERE and Contact us now at info@h2020gracious.eu.

The GRACIOUS WIKI

The GRACIOUS Grouping Framework will be used to develop an open access technical blueprint. Instead of creating just another software tool, this technical blueprint will enable anyone to programme the GRACIOUS Framework into their own assessing tools. In order to support the blueprint development, GRACIOUS partners have developed an online WIKI.

GRACIOUS has taken the decision to share the WIKI with its peers. At this stage other research projects are welcome to use the WIKI. For more information visit graciouswiki.greendecision.eu or contact Dr Danail Hristozov or Dr Alex Zabeo.

Get a quick introduction to the WIKI and leave your feedback check out our stakeholder engagement page HERE.

Cntd → News from the GRACIOUS Project

GRACIOUS release a new publication covering the GRACIOUS Framework for grouping and read–across of nanomaterials

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On the 8th of August 2020, a team of 22 scientists from the Horizon 2020 GRACIOUS consortium published a paper describing a novel science-based framework for grouping and read-across of nanomaterials.

A main objective of the GRACIOUS Framework is to streamline the risk assessment process in order to enable practical application of grouping, leading to read-across and classification of nanomaterials (NMs)/nanoforms (NFs) while reducing time, costs and animal testing. Designed to be compatible with REACH and flexible to incorporate other regulatory provisions, the Framework facilitates steering safe innovation. The concept of the Framework is built around applying grouping and read-across based on hypotheses development and assessment. The Framework provides an initial set of hypotheses for the grouping of NFs which take into account the identity and use(s) of the NFs, as well as the purpose of grouping.

The Framework – Step-by-Step

As a starting point, users define the purpose of grouping and collect basic information about a nanomaterial, followed by a selection of a hypothesis. They then test whether or not the hypothesis is justified using Integrated Approaches to Testing and Assessment (IATA). IATA are structured approaches that integrate and weight different types of data for the purposes of performing hazard identification and/or safety assessment of a chemical or group of chemicals. Users needing to develop their own user-defined hypothesis (and IATA) are also supported by the Framework. In addition, the IATA guides acquisition of the information needed to support read-across. In the final step, if the available data supports the hypothesis, with sufficient certainty for the particular decision context, read-across from similar nanomaterials may be possible.

The GRACIOUS Framework was developed following comprehensive discussions and stakeholder consultations with key stakeholders from regulation such as ECHA, EFSA, Health Canada, industry representative such as BASF, Solvay among others and world-class experts from the academic nanosafety community.

The scientific publication, available on NanoToday, provides more insight into the GRACIOUS Framework and how to use it in practice. The publication is free to access, and can be viewed here: https://www.sciencedirect.com/science/article/pii/S1748013220301109?dgcid=author

NanoTox 2021

H2020 project GRACIOUS in collaboration with BIORIMA and Patrols are organising their final conference under the umbrella of NanoTox 2021 conference, held in Edinburgh between 20th and 22nd April. Abstract submissions for the NanoTox opened on 1st September 2020. Abstracts can be submitted under any of the 6 themes:

1. Hazard Characterisation of Nanomaterials and Advanced Materials
2. Alternative Methods for Nanomaterial Hazard Testing
3. Release and Exposure to Nanomaterials and Advanced Materials
4. Risk Assessments of Nanomaterials and Advanced Materials, and their Governance
5. Safe(r) by Design (SbD) of Nanomaterials and Advanced Materials
6. Open Topics

Authors will be notified of their abstract acceptance on the week beginning the 1st February 2021.
For more details on the NanoTox 2021 abstract process please click here: https://nanotox2021.org/abstracts/

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SbD4Nano Update

By Emily Kay
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A major challenge for the global nanotechnology sector is the development of safe and functional engineered nanomaterials (ENMs) and nano-enabled products (NEPs). In order to minimise the risks to human and environmental health during the engineering of NEPs the goal of the SbD4Nano project is to create a novel e-infrastructure for the definition, performance testing and implementation of Safe-by-Design (SbD) approaches in the nanotechnology supply chains. The SbD4Nano project website was successfully launched in August 2020. Following this, here is the latest news from the project:

1st Public Deliverable Report is Published

One of the first public project deliverables "Data gaps and stakeholders' needs in available exposure measurement data and RMMs" is publicly available on Zenodo! Click here to access the full deliverable.

Value Chain Needs Analysis Survey

The SbD4Nano team is currently working on developing a value chain needs analysis survey to understand the current SbD processes in place and need in the Nanomaterial industry. The results from this survey will help the SbD4Nano project identify the needs and current barriers for SbD implementation declared by actors across the nanotechnology value chain. The survey will be launched soon so if you would like to take part, sign up to our mailing list HERE.

SbD4Nano Project Video

Meanwhile, the SbD4Nano project overview video is now live so that you can find out more about the project and how you can get involved.

General Assembly

On 29-30 October SbD4Nano successfully held their General Assembly Meeting virtually. The project partners presented an overview of the results obtained so far and discussed the next steps in developing the e-infrastructure for Safe-by-Design (SbD) Nanomanufacturing.

The SbD4Nano E-infrastructure

One of the main aims of the project is the development of an e-infrastructure to foster dialogue and collaboration between actors along the nanotechnology supply chain for a knowledge-driven definition of SbD approaches based on hazard, exposure, product performance and cost criteria. The project partners are currently drafting the design of the platform. Several modules are provisioned featuring materials, lifecycle assessment, release & exposure estimation module, safety and hazard profiling module and SbD strategy module.

The aim of the e-infrastructure is to allow different (industrial) actors in the nano-technology value chain to cooperate in improving the safety profile of new or existing nano-enabled product(s).

More information on the development of the e-infrastructure can be found on the SbD4Nano website: https://www.sbd4nano.eu/e-infrastructure

For more information visit https://www.sbd4nano.eu.

PATROLS Project Highlights Progress

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PATROLS
Advanced Tools for NanoSafety Testing

Physiologically **A**nchored **T**ools for **R**ealistic nan**O**materia**L** hazard a**S**sessment

The PATROLS project is accelerating its scientific publications, as the project enters its final year, and the last 6 months have resulted in some excellent results. Read the latest PATROLS publications and discover the project's latest work:

- Single-Cell Analysis by Inductively Coupled Plasma–Time-of-Flight Mass Spectrometry to Quantify Algal Cell Interaction with Nanoparticles by Their Elemental Fingerprint
- A Small-Scale Setup for Algal Toxicity Testing of Nanomaterials and Other Difficult Substances
- Optimization of an air-liquid interface in vitro cell co-culture model to estimate the hazard of aerosol exposures
- Oral toxicity of titanium dioxide P25 at repeated dose 28-day and 90-day in rats
- An Alternative Perspective towards Reducing the Risk of Engineered Nanomaterials to Human Health
- Adaptation of the in vitro micronucleus assay for genotoxicity testing using 3D liver models supporting longer-term exposure durations
- The importance of inter-individual Kupffer cell variability in the governance of hepatic toxicity in a 3D primary human liver microtissue model
- The variances in cytokine production profiles from non- or activated THP-1, Kupffer cell and human blood derived primary macrophages following exposure to either alcohol or a panel of engineered nanomaterials
- Assessment of nanomaterial-induced hepatotoxicity using a 3D human primary multi-cellular microtissue exposed repeatedly over 21 days - the suitability of the in vitro system as an in vivo surrogate
- An In Vitro Lung System to Assess the Proinflammatory Hazard of Carbon Nanotube Aerosols
- An Air-liquid Interface Bronchial Epithelial Model for Realistic, Repeated Inhalation Exposure to Airborne Particles for Toxicity Testing

Moreover, project partners have been busy at scientific conferences as well in the last 6 months, including at Advances in Cell and Tissue Culture and NanoSafe. Watch two of PATROLS presentations from the NanoSafe Training School:

- Advanced Engineered Nanomaterial (ENM) exposure regimes for more realistic dosing scenarios on 3D liver models *in vitro*, Samantha Llewellyn
- Enhanced darkfield microscopy for localization of particles *in vivo/in vitro*, Trine Berthing

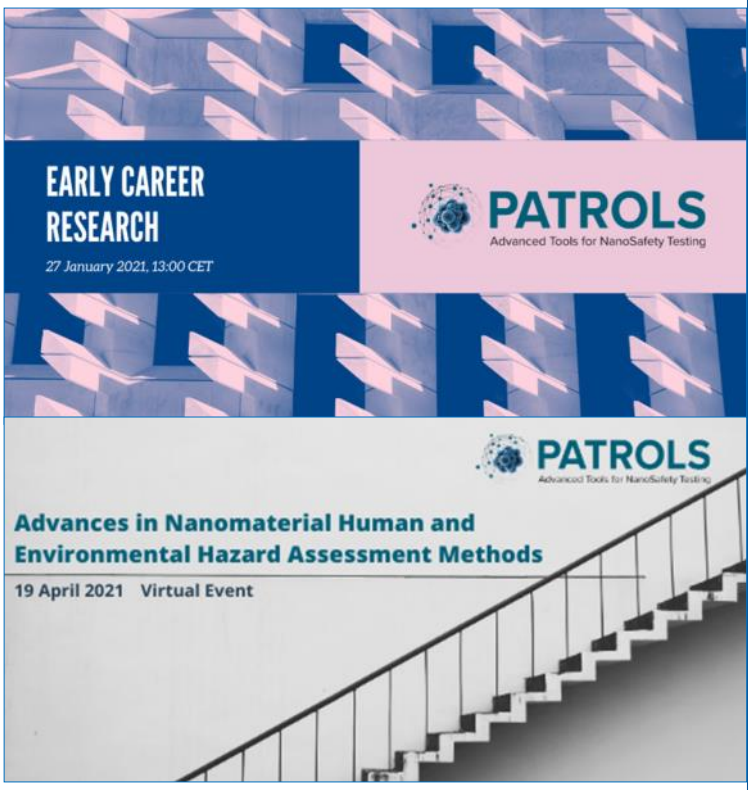
Cntd →

Cntd → **PATROLS Project Highlights Progress**

To kick-start 2021, PATROLS has launched a series of webinars dedicated to our Early Career Researchers' work. We have already released four and we will continue releasing more in January. Watch them here. On January 27, we will be holding a live webinar with all the speakers from the Early Career Research webinars where delegates will be able to engage in discussion and ask questions to the researchers.

Register now.

In addition, H2020 projects PATROLS, BIORIMA & GRACIOUS are joining efforts to organise the 10th International Conference on Nanotoxicology, NanoTox2021. The conference will take place online on 20-22 April 2021. You can register now to engage fully with PATROLS outcomes.



As one of its final dissemination activities, PATROLS will be holding a stakeholder workshop to showcase the tools and advanced methods that have been developed within the project. The workshop will be held online as part of the NanoTox2021 conference on 19 April 2021. Visit the PATROLS dedicated webpage to find out more about the workshop.

To catch up with PATROLS, subscribe to our newsletter as a project stakeholder. You can also, follow the project on LinkedIn for the latest news and opportunities.

PATROLS - Physiologically Anchored Tools for Realistic nanOmateriaL hazard aSsessment

PATROLS is an international project combining a team of academics, industrial scientists, government officials and risk assessors to deliver advanced and realistic tools and methods for nanomaterial safety assessment. PATROLS will provide an innovative and effective set of laboratory techniques and computational tools to more reliably predict potential human and environmental hazards resulting from engineered nanomaterial (ENM) exposures. These tools will minimise the necessity of animal testing and will support future categorisation of ENMs in order to support safety frameworks.

We aim to deliver:

1. Realistic and predictive 3D tissue models of the lung, gastrointestinal tract and liver for ENM safety assessment, reducing the need for animal testing.
2. Innovative methods for safety assessment in ecologically relevant test systems and organisms, selected according to their position in the food chain.
3. Creating robust computational methods for ENM exposure and dose modelling, as well as hazard prediction.

Characterising ENM under relevant experimental conditions dictated by the advanced human and environmental model development.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 760813.

GoNano & NANORIGO Webinar:
Applying co-creation in NMBP-13?

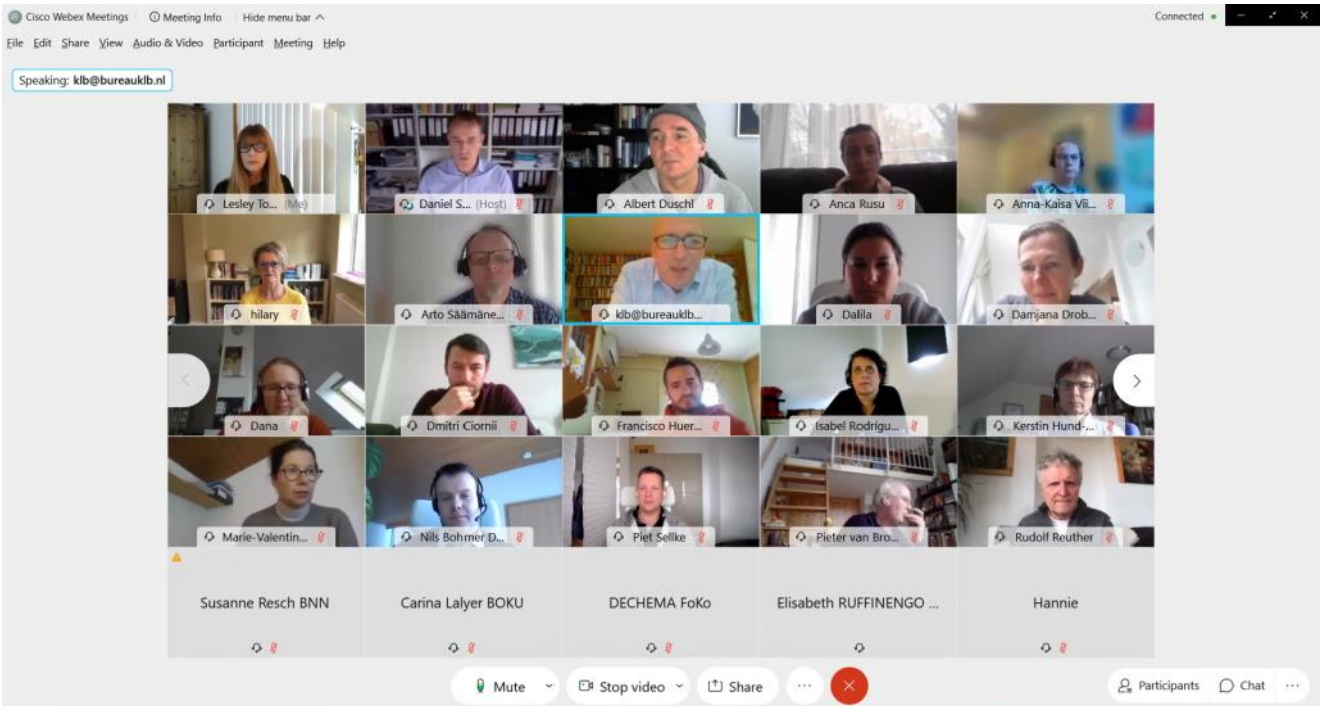
Daan Schuurbiers
Director - De Proeffabriek (DPF)
daan@proeffabriek.nl

DPF organised a combined GoNano/NANORIGO webinar on co-creation on 28 October 2020. The webinar focused on the activities of the three EU-projects funded under the NMBP-13-2018 call on risk governance in nanotechnology: NANORIGO, Gov4Nano and RiskGONE. Due to the COVID-19 pandemic, the workshop was organised as an online event using the WebEx platform.

Stakeholder engagement is an important element in the NMBP-13-2018 call. As the call text notes: "*Significant progress has been achieved in relation to research regarding the safety of engineered nanomaterials and the transfer of this knowledge into regulation. Still, more needs to be done as nanotechnology reaches the market. To fill this gap,* ***transdisciplinary risk governance is required based on a clear understanding of risk, its management practices and the societal risk perception by all stakeholders***" (emphasis added)[1].

Indeed, earlier NANORIGO documents have noted that the successful integration of broader societal considerations in risk governance would constitute a highly innovative and much needed contribution to the advancement of risk governance in general.* This was why the NMBP-13 projects were considered an excellent test bed to explore the business case for co-creation.

NANORIGO partners had already expressed an interest in exploring co-creation as a way to facilitate stakeholder interactions in the project. To ensure that the workshop would address the specific needs of the NMBP-13 projects, the workshop programme was discussed with key partners in NANORIGO during online consortium meetings, including a dedicated brainstorm session on 27 August 2020. In consultation with the NANORIGO partners, it was decided to offer a programme that would first present the main learnings of GoNano in somewhat more detail, and subsequently discuss how co-creation could play a role in three specific NANORIGO activities: the web-based platform, the Multi-Criteria Decision Support Tool (MCDA) and the Risk Governance Framework (RGF).



Cntd → **GoNano & NANORIGO Webinar : *Applying co-creation in NMBP-13?***

41 participants attended the workshop. Most participants were from the NANORIGO project, but several partners from Gov4Nano and RiskGONE attended as well. The meeting was chaired by Dr Kees Le Blansch from Bureau KLB in the Netherlands. After brief introductions on the findings of the GoNano project by Daan Schuurbiers (DPF) and a presentation on trust, co-creation and nano-risk governance by guest speaker Hilary Sutcliffe (from SocietyInside, a non-profit consultancy), participants discussed concrete opportunities to apply co-creation in concrete project activities.

The attendance numbers and ensuing discussions suggest that there is a real interest in co-creation among participants (although there was also some scepticism towards stakeholder involvement alongside the enthusiasm). Particularly the 'abstract' discussions on the relevance and importance of co-creation in general were very fruitful. However, translating this into practical actions within the consortium proved challenging. That said, the developers of the Risk Governance Framework and the web-based platform in NANORIGO are now considering integrating co-creative elements in their activities. In the coming months, these ideas may take further shape. The eventual integration of co-creative elements in the NANORIGO activities would imply that there may indeed be a 'business case' for co-creation in NMBP-13.

Some quotes from the chat log of the GoNano / NANORIGO co-creation webinar:

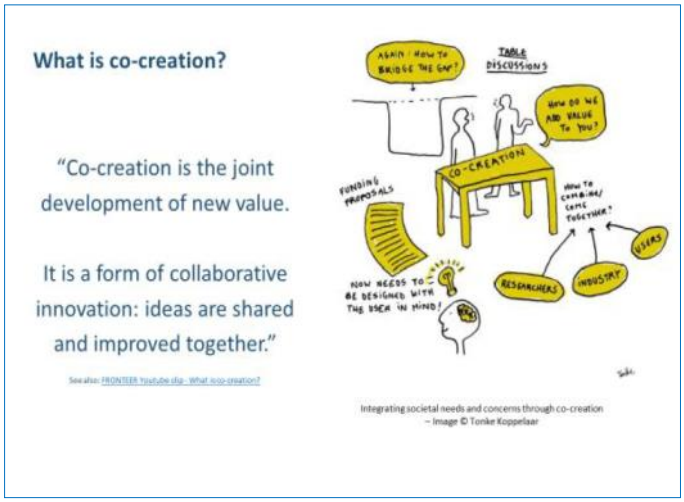
"I like to be involved in the future discussions. This is what we need!"

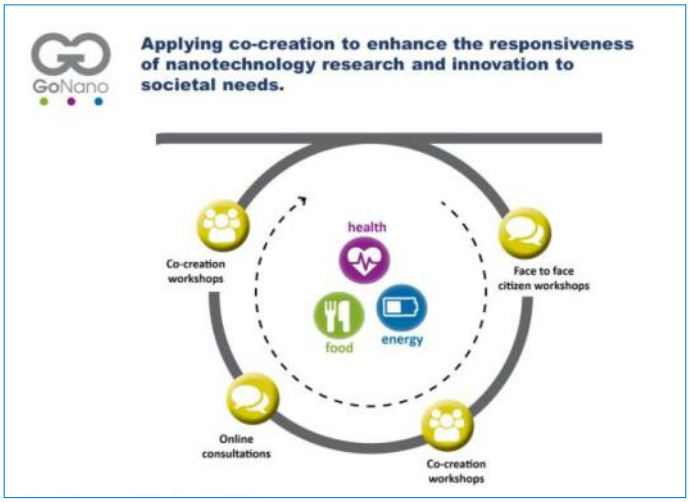
"Very interesting, you should probably continue this discussion in the joint NMBP-13 portal core croup"

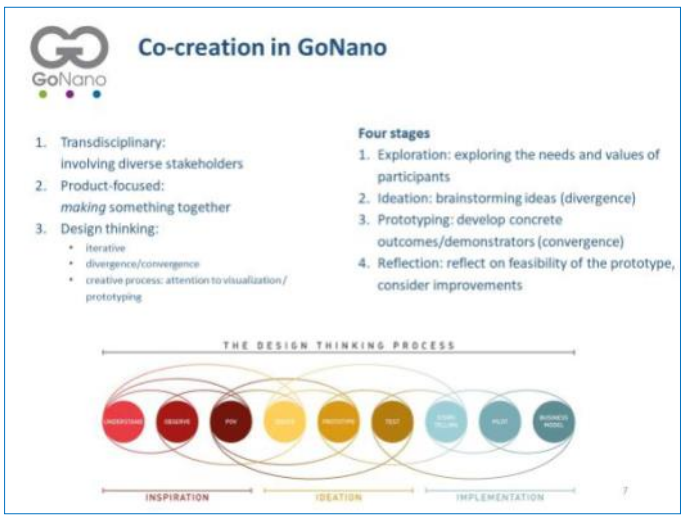
"Inspiring presentation! Challenging, though needed, to use the tool of co-creation within the NMBP-13 development work. Even more challenging to transfer and integrate it in developing the council and framework."

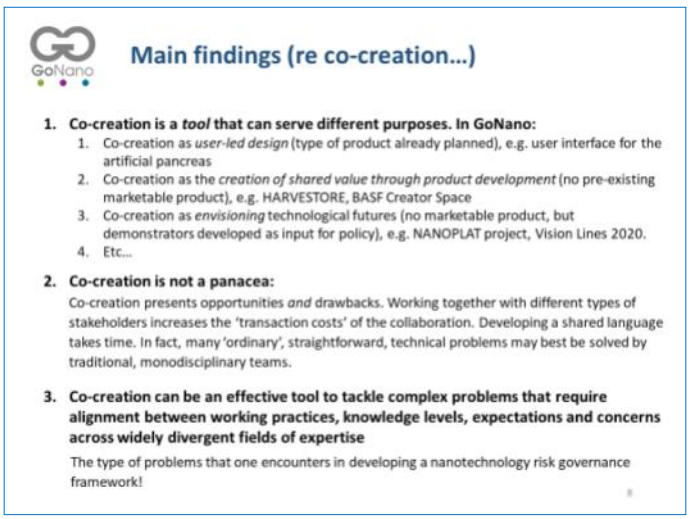
*See also NANORIGO D1.8 - Critical evaluation of governance frameworks - considering the current integration of ethical, environmental, social, economic, legal and/or regulatory considerations.

Images: What is co-creation and additional explanatory slides from the webinar









Integrating societal considerations in nanotechnology risk governance

Transcript of a presentation at the 9th Nano Conference on 13 November 2020

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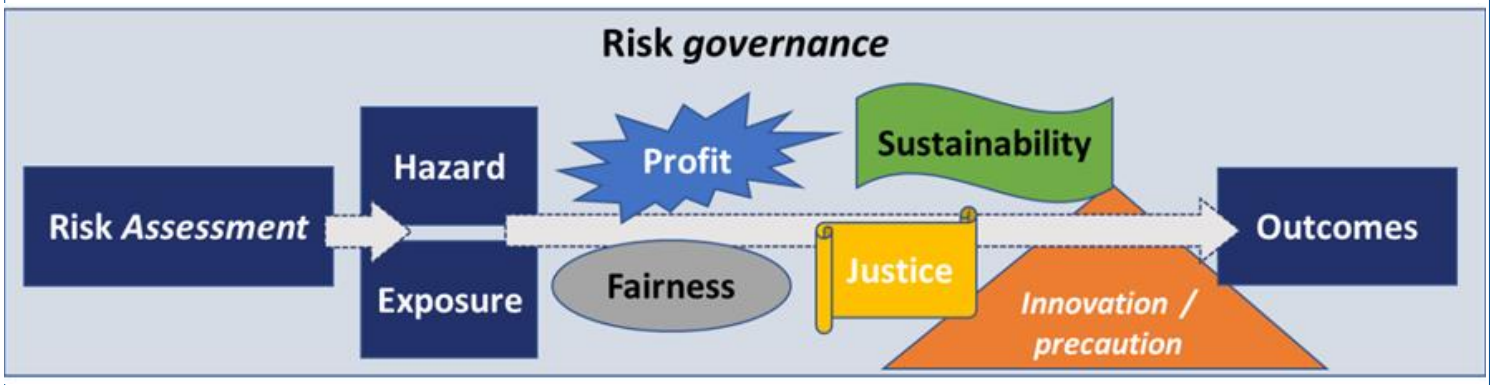
In this presentation I will argue that the effective integration of societal considerations, or 'other concerns', as they have been called in the NANORIGO project, is an essential condition for the success of the nanotechnology risk governance framework that is currently being developed by the three projects funded under the NMBP-13 call on risk governance in nanotechnology (NANORIGO, GOV4NANO and RISKGONE).

To understand the reason why 'other concerns' matter to risk governance, I would like to go back to the original call text from the European Commission that gave rise to the NMBP-13 proposals, which says:

"Significant progress has been achieved in relation to research regarding the safety of engineered nanomaterials and the transfer of this knowledge into regulation. Still, more needs to be done as nanotechnology reaches the market. To fill this gap, transdisciplinary risk governance is required based on a clear understanding of risk, its management practices and the societal risk perception by all stakeholders."1

There are a few important observations that can be gleaned from the text:
1. The Commission considers that risk governance includes more than understanding the risk of engineered nanomaterials;
2. It sees risk governance as a *transdisciplinary* endeavour;
3. It recognizes the relevance of the risk perception of all stakeholders for risk governance.



So the image that emerges looks something like this: we've made a lot of progress on risk assessment of engineered nanomaterials in the last 15 years or so, assessing potential hazards and exposure pathways. But as nanomaterials reach the market, we find that the actual, quantifiable risks are only one consideration among many that determine the use of nanomaterials. Other considerations like profitability, sustainability, fairness or justice play equally, if not more important roles in determining the uptake and impact of nanomaterials in society. In other words: risk assessment is a scientific activity, but risk governance is a social process.

To understand how society responds to new technologies, we must broaden the horizon of risk governance. Johanne Patenaude, a Canadian medical ethicist, has suggested that:

"There must be a shift in our approach to risk governance. Not only the toxicological impacts of nanotechnologies must be considered but also the social impacts of the various uses of nanoproducts. Moreover, such a shift also implies re-examining the role of values and value judgements in the process of ethical assessment and understanding how they operate in decision-making. Finally, it challenges democratic societies to open up to public debate the social choices involved in developing a specific technology." 2

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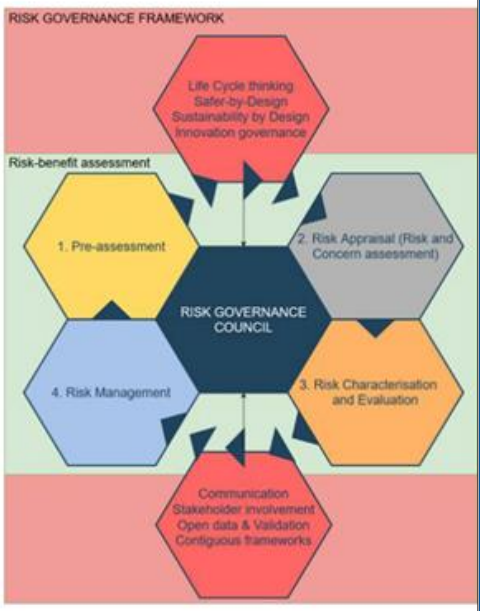
Developing a technology is a social choice, and those choices are determined by values – and different stakeholders hold different values. And the whole process of risk governance, is about making choices based on the consideration of all these different values.

So, the million-dollar question for the three risk governance projects funded under the NMBP-13 call for proposals is: how on earth do we integrate all those different values from all those different stakeholders in a Risk Governance Framework, as a basis for our social choices to promote or regulate nanotechnologies?

How (on earth) to address 'other concerns' in the Risk Governance Framework(s)?



I argue that this question constitutes the real innovative contribution that the NMBP-13 projects have to offer. This is not to downplay the complexity of all the challenges around hazard and exposure assessment, life cycle, environmental and social impact assessments data quality, interoperability, FAIRness, and so on. These questions are difficult enough as it is – let alone collaborating with more than 80 partners. And yet I insist that beyond all the scientific challenges, the question of the social organisation of the risk governance framework is the fundamental challenge.

The sobering conclusion is that what we need doesn't exist yet. Despite the importance of integrating societal considerations in risk governance, a recent literature review by NANORIGO on tools to integrate societal considerations suggests that we still have a long way to go. We haven't succeeded yet in linking quantifiable evidence on risk with inherently qualitative societal concerns - yet that is precisely what we need to become better at if we want to govern nanotechnologies.

What we've seen in the biotech area at least in Europe, is that if societal concerns are not channelled through institutional arrangement, it results in what you might call 'governance by brute force': public resistance results in outright banning or blocking of the technology. We must do better in nanotechnologies.

That is exactly why the current work on a Risk Governance Framework and Council in NMBP-13 is so endlessly fascinating. This is an opportunity to build a better governance framework that doesn't repeat the errors from the past. But it requires truly innovative thinking, a willingness from all actors to get out of their comfort zone, and deep institutional change – and none of these are easy.

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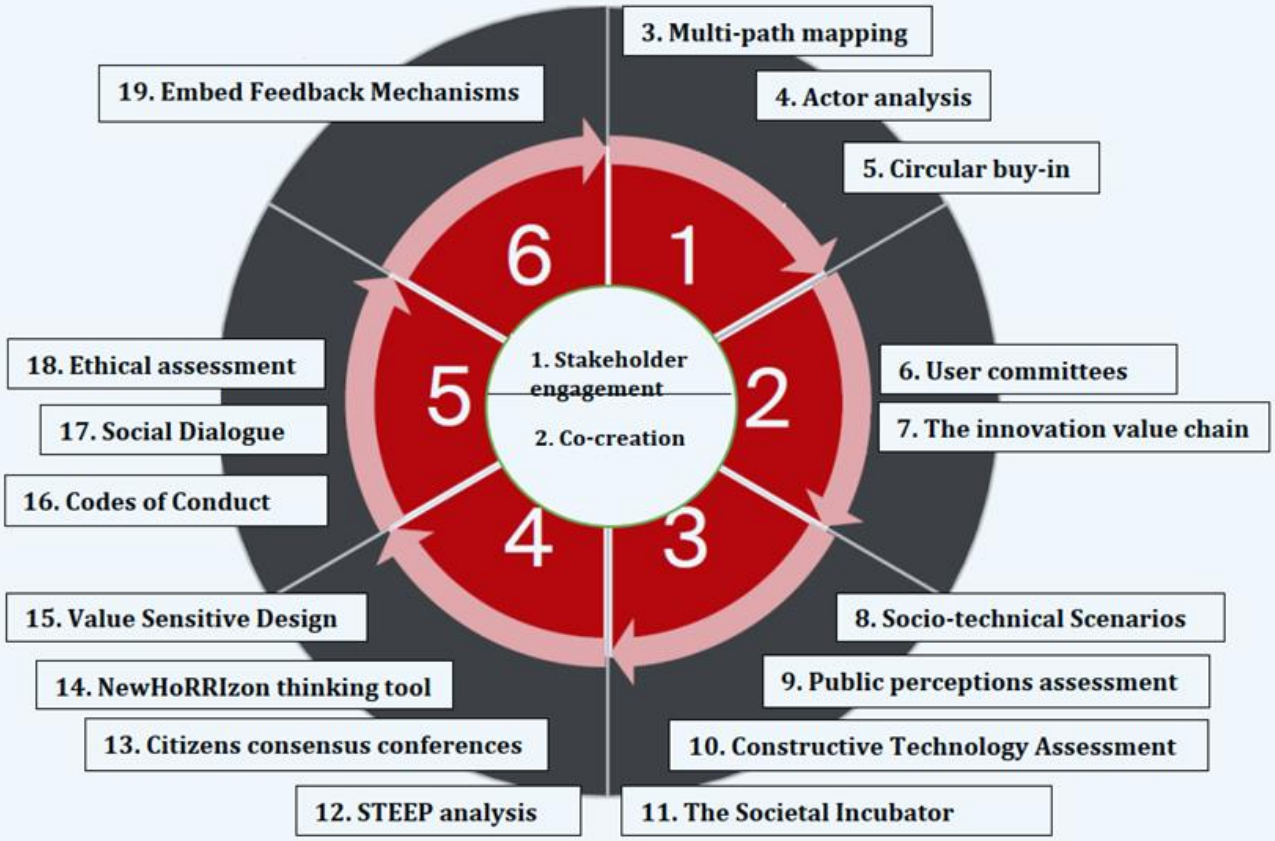
As a first step towards finding what solutions might work to integrate societal considerations in the risk governance framework, the NANORIGO project is currently reviewing existing tools, and mapping them onto the framework.



We are also looking into some intriguing examples from the biotech area that we might learn from - the Dutch Committee on Genetic Modification in the Netherlands has developed building blocks for an assessment framework for the cultivation of genetically modified crops (see table on next page). This framework considers several dimensions of new biotechnologies, including safety, economic considerations, environmental impact, and broader social values like cultural heritage and freedom of choice. This will need to be translated to the area of nanomaterials, but it could be a useful starting point to think about how to address the seeming incommensurability of quantifiable scientific data and inherently qualitative social concerns.

The forward-looking regulatory framework for Genetically Modified Organisms, GMOs, from the Norwegian Biotechnology Advisory Board offers another example. This framework proposes assessment of GMOs based on the judgement of an expert committee on the extent to which a GMO is ethically sound, is beneficial to society and contributes to sustainable development:

1. If a GMO has strong ethical justifiability, it will go through expedited risk assessment
2. If a GMO has moderate ethical justifiability, it will go through standard risk assessment (current Norwegian system)
3. If a GMO has a weak ethical justifiability, it will not go through risk assessment (the application is denied) 3

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Building blocks COGEM 2009	National cultivation proposal grounds	Non-exhaustive list of components
1. Benefit to society*		*Overarching: found in one or more of the other building blocks
2. Economy and prosperity	Socio-economic Agricultural policy objectives	☐ employment ☐ efficiency of production processes ☐ productivity ☐ income ☐ competitive position ☐ export (balance of trade) ☐ damage to reputation ☐ Intellectual Property Rights (IPR)
3. Health and welfare	Socio-economic	✓ human rights ✓ working conditions ✓ employment terms ☐ recreation ± food quality
4. Food supply & food security	Agricultural policy objectives	☐ ecological footprint
5. Cultural heritage	Spatial (town and country) planning Land use	☐ landscape changes ☐ changes in land use
6. Freedom of choice & co-existence	Preventing cross-breeding Agricultural policy objectives	✓ consumer freedom of choice: labelling ± manufacturers' freedom of choice: co-existence ☐ damage to reputation/conflicts ☐ regional food production
7. Safety		✓ food and environmental safety
8. Biodiversity	Environmental policy objectives Agricultural policy objectives	☐ agrobiodiversity ✓ protection of biodiversity
9. Environmental quality	Environmental policy objectives Agricultural policy objectives	☐ energy consumption ☐ emission of hazardous substances to soil, surface waters and atmosphere ☐ soil fertility, and resilience ☐ Integrated Pest Management (IPM)
	Public policy*	*Overarching: together with one of the other grounds

✓ Covered by legislation and regulations in force
± Partly covered by legislation and regulations in force

Table: Integration of COGEM 2009 building blocks with national cultivation proposal grounds.

Source: https://cogem.net/en/publication/building-blocks-for-an-assessment-framework-for-the-cultivation-of-gm-crops

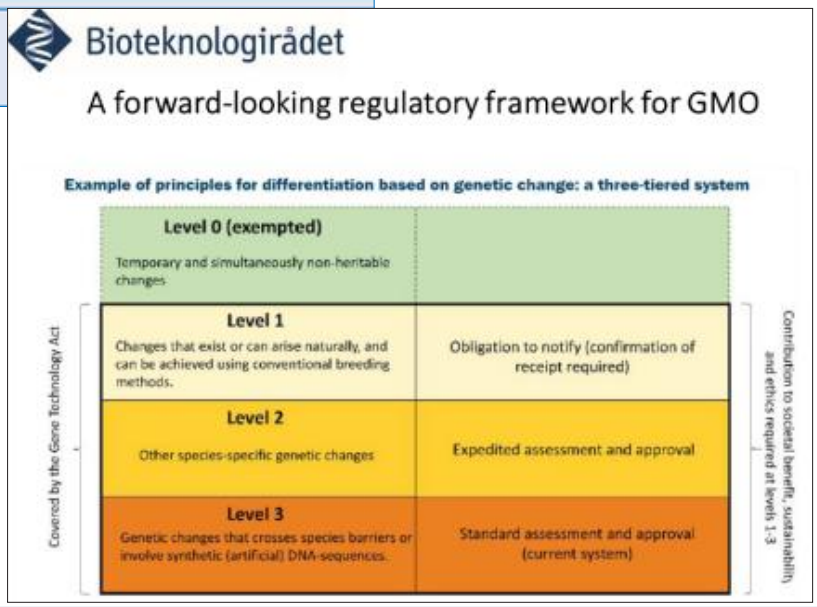

Image right: The forward-looking regulatory framework for Genetically Modified Organisms, GMOs, from the Norwegian Biotechnology Advisory Board

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To conclude: as you all know, the answer to the Ultimate Question of Life, the Universe and Everything is 42. This answer was calculated by the supercomputer Deep Thought after seven and a half million years of thought. And this led to the construction of an even larger supercomputer, named Earth, which was tasked with determining what the question was in the first place.

The reason I'm paraphrasing Douglas Adams's 'Hitchhikers Guide to the Galaxy' is that we will never be able to quantitatively weigh scientific risks against societal impacts: risk governance – making choices on the development of nanotechnologies based on the consideration of social values - has to be the result of a process of deliberation, not calculation.

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1 *https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/nmbp-13-2018*

2. Patenaude, J., Legault, G., Beauvais, J., Bernier, L., Béland, J., Boissy, P., . . . Tapin, D. (2015). Framework for the Analysis of Nanotechnologies' Impacts and Ethical Acceptability: Basis of an Interdisciplinary Approach to Assessing Novel Technologies. Science and Engineering Ethics, 21(2), 293-315.

3 Many thanks to NANORIGO-partner Kees Le Blansch (Bureau KLB) for suggesting these examples.

The NMBP-13 Projects

Gov4Nano, NANORIGO and RiskGONE are three H2020 projects that have joined forces to address the same goal: to ultimately ensure a sustainable and equitable Risk Governance Framework and Risk Governance Council are developed for nanotechnology in Europe and beyond. While each project has its own unique approach and objectives, all share common goals and visions which will be strengthened by constructive cooperation involving all stakeholders.

The partners involved have a long history of research to understand the impacts of nanomaterials on human health and the environment, and have participated in all major European and National projects dealing with these topics. This ensures a strong and comprehensive knowledge base and engagement with all key stakeholders.

Over the projects' lifespans, the partners are working to develop and establish a robust public policy framework for the use of nanomaterials, based on scientific evidence supporting a clear understanding of risks, their assessment, and management within wider societal considerations.

Gov4Nano
meeting the needs of nanotechnology

Website www.gov4nano.eu/
Coordinator: Monique Groenewold
Institution: National Institute for Public Health and the Environment (RIVM), NL

NANORIGO

Website: www.nanorigo.eu
Coordinator: Janeck James Scott-Fordsmand
Institution: Aarhus Universitet (AU), DK

RISK GONE

Website: https://riskgone.eu/
Coordinator: Maria Dusinska
Institution: Norwegian Institute for Air Research (NILU), NO

These projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 814425, 814401 and 814530

Recent scientific outputs of NanoSolveIT H2020 project

Contact Dr. Antreas Afantitis afantitis@novamechanics.com
NanoSolveIT H2020 Project Coordinator
NovaMechanics Ltd

During the first 20 months of the project, significant and remarkable collaborative work of the NanoSolveIT (Innovative Nanoinformatics models and tools: towards a Solid, verified and Integrated Approach to Predictive (eco)Toxicology) project has been published.

- Thirteen (13) articles have been published in peer-reviewed journals, providing an insight on the ongoing efforts towards advancing nanoinformatics and the challenges that are planned to be addressed within the scope of the project.
- A systematic NanoSolveIT review has been published in the 'Computational and Structural Biotechnology Journal' (link), describing the state-of-the-art in computational modelling for nanomaterials and the view of the consortium towards the development of innovative and integrated tools for *in silico* nanosafety assessment.
- In parallel, the coordinator of NanoSolveIT, Dr. Antreas Afantitis, together with the coordinator of NanoCommons, Prof. Iseult Lynch, have showcased in the 'SCITECH Europa quarterly issue' (link - pdf) and the journal of 'Combinatorial Chemistry & High Throughput Screening - CCHTS' (link) the research e-infrastructure of the two projects, which is under development for knowledge management and hosting of nanoinformatics tools and will support in silico nanosafety assessment, and the prospective developments envisioned for the new decade respectively.
- A series of review articles has been published in the journal 'Nanomaterials' to present the state-of-art on transcriptomics in toxicogenomics (TGx), specifically presenting the advances in Experimental Design, Technologies, Publicly Available Data, and Regulatory Aspects (part I) the Pre-processing and Differential Expression Analysis for High Quality Data (part II) and Data Modelling for Risk Assessment (part III).
- A case study for analysing the moderation of exposure medium and particle ageing on the toxicological effects of nanomaterials has been performed and the results have been published in the 'Environmental Science: Nano' journal (link), providing an insight on more realistic exposure scenarios for nanomaterials using *Daphnia Magna*.
- In close connection, a deep learning model for predicting the effects of exposure of *D. magna* to engineered nanomaterials has been developed and proposed. The workflow applies two different deep learning architectures on microscopic images of *D. magna* for the automatic detection of possible malformations. At the same time, classification models assign specific objects to classes and statistical validation of the models illustrates the usefulness of deep learning technologies in the nanoinformatics field. The results of this work have been published in the 'SMALL' journal (link).
- A study on the prediction of zeta potential based on a read-across model using input data from image descriptors derived from TEM and calculated using the NanoXtract tool within the Enalos Cloud platform has been published in 'SMALL' journal (link).
- An opinion article on 'New Approach Methodologies' (NAMs), which is an interesting new concept in nanosafety and nanoinformatics due to the possible regulatory acceptance of safety data generated under NAMs, and how NAMs can be used towards rigorous materials production has been published in 'SMALL' journal (link).
- A paper exploring the heterogeneous interactions between silver nanoparticles (AgNPs) and primary immune cells, through the use of Mass Cytometry and Single-Cell RNA-seq Profiling has been published in the 'SMALL' journal (link).
- A review paper exploring the great advances in the development and application of PBPK models for hazard assessment and risk assessment of NMs, despite the many challenges still present, has been published in the 'Nanomaterials' journal (link).

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***Cntd* → Recent scientific outputs of NanoSolveIT H2020 project**

The latest development within NanoSolveIT project is the Tindermix approach, which is proposed for modelling the effects of time and dose on the transcriptome to investigate the course of molecular alterations exerted in response to the exposure. The approach is showcased through a dual analysis and has been published in the 'GigaScience' journal (link).

We hope that this short overview of the results of the NanoSolveIT project so far can spike your interest to the project and we look forward to receiving your ideas, input or questions in relation to nanoinformatics, so feel free to contact us!

The project has received funding from the European Union's Horizon 2020 research and innovation programme under the grant agreement n°814572.

Recent publications

Afantitis, A., Melagraki, G., Isigonis, P., Tsoumanis, A., Varsou, D. D., Valsami-Jones, E., ... & Lynch, I. (2020). NanoSolveIT Project: Driving Nanoinformatics research to develop innovative and integrated tools for in silico nanosafety assessment. Computational and Structural Biotechnology Journal. ISSN 2001-0370, https://doi.org/10.1016/j.csbj.2020.02.023

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BIORIMA—Latest Publications

The BIORIMA Project has recently issued a comprehensive list of its publications which is provided below. If you would like to engage in discussion with the authors and experts, BIORIMA has deployed a project forum as a discussion platform, where researchers, end -users and stakeholders can directly engage with the project, exchange and share views and ideas, or just give your feedback on issues relevant to your business or research.

If you would like to join the Forum, please register **here.** Then choose a discussion board or topic and enter your comment, idea or question.

- The Right Stuff: On the Future of Nanotoxicology
- Environmental hazard testing of Nanobiomaterials
- Adverse Effects of Engineered Nanomaterials - Chapter 6 - Biomonitoring
- Hide and seek: Nanomaterial Interactions with the Immune System
- Pro- and anti-oxidant properties of near-infrared (NIR) light responsive carbon nanoparticles
- Comparative in vitro toxicity of realistic doses of benchmark multi-walled carbon nanotubes towards macrophages and airway epithelial cells
- Nano delivery systems and stabilized solid drug nanoparticles for orally administered medicine - current landscape
- Silver nanoparticles modulate lipopolysaccharide-triggered Toll-like receptor signalling in immune-competent human cell lines.
- Evaluation of microbial shofts caused by a silver nanomaterial - Comparison of four test systems
- Nano-bio interactions: a neutrophil-centric view [invited review article]
- The toxicity of silver nanomaterials (NM 300K) is reduced when combined with N-Acetylcysteine: Hazard assessment on Enchytraeus crypticus
- Identification of the physical-chemical properties that modulate the nanoparticles aggregation in blood
- Meta-analysis of pharmacokinetic studies of nanobiomaterials for the prediction of excretion depending on particle characteristics
- Graphene-based nanomaterials in soil: ecotoxicity assessment using Enchytraeus crypticus reduced full life cycle
- Risk and Life Cycle Assessment of Nanoparticles for Medical Applications Prepared Using Safe- and Benign-by-Design Gas-Phase Syntheses
- Chapter 10 - Evaluation of potential engineered nanomaterials impacts on human health: from risk for workers to impact on consumers
- Length Dependent Toxicity of TiO2 Nanofibers: Mitigation via Shortening
- Latest advances in combining gold nanomaterials with physical stimuli towards new responsive therapeutic and diagnostic strategies
- ALI multilayered co-cultures mimic biochemical mechanisms of the cancer cellfibroblast cross-talk involved in NSCLC MultiDrug Resistance
- QSAR modeling of the toxicity classification of superparamagnetic iron oxide nanoparticles (SPIONs) in stem-cell monitoring applications: An integrated study from data curation to model development
- In Vitro Alternatives to Acute Inhalation Toxicity Studies in Animal Models – A Perspective
- Probabilistic modelling of nanobiomaterial release from medical applications into the environment
- No small matter: a perspective on nanotechnology-enabled solutions to fight Covid-19
- Multilayered Cultures of NSCLC cells grown at the Air Liquid Interfaceb allow the efficacy testing of inhaled anti cancer drugs
- Risk Management Framework for Nano-Biomaterials used in Medical Devices and Advanced Therapy Medicinal Products
- Biotransformation of food-grade and nanometric TiO2 in the oralgastro-intestinal tract: driving forces and effect on the toxicity toward intestinal epithelial cells
- Brave new world revisited: Focus on nanomedicine

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- Cell culture of adherent cells, cells in suspension, human cell lines, animal cell lines, primary cells, stem cell technologies
- In vitro assays for genotoxicity, immunotoxicity and cytotoxicity, uptake studies, transcriptomics
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- JRC Nanobiotechnlology Laboratory: video and 360° Virtual Tour
- More info on open calls here

The European Crucible

The forthcoming **European Crucible** is a leadership and development programme for "research leaders of the future" taking place online in February and March 2021. European Crucible builds on the award-winning success of the national 'Scottish Crucible' programme and aims to create a new, interdisciplinary network of research leaders from Scotland and Europe.

Early/mid-career researchers working in European Universities and institutions are encouraged to apply for a place on this virtual programme by the deadline of **13th January 2021**. Further details are available on the European Crucible webpages: https://scottishcrucible.org.uk/european-crucible/ and, for those awarded a place, all training costs of participating in the virtual programme will be covered.

Only 25 researchers from Europe will be competitively selected for the prestigious European Crucible 2021 programme. They will join the 25 outstanding researchers from Scotland who have already been selected (prior to Covid):
https://scottishcrucible.org.uk/european-crucible/scottish-cohort/ and
https://www.hw.ac.uk/news/noticeboard/EU-crucible-launch.htm

The European Crucible is sponsored by the Scottish Government via the Scottish Funding Council and is being run in collaboration with the Luxembourg National Research Fund (FNR), University of Luxembourg and other partner organisations in Scotland and Luxembourg:
https://scottishcrucible.org.uk/european-crucible/affiliates/
Please share this information with your colleagues and any one who may be interested in this unique opportunity.

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@EuroCrucible

Scotland's Future Research Leaders

Ever wondered what a biochemist and a mathematician might have in common, or how a social scientist and a particle physicist could work together? **Scottish Crucible** is designed to help you find out just what great minds and creative thinkers can do when they come together!

Scottish Crucible is all about helping researchers to see the bigger picture. It aims to help researchers think differently and send participants back to their work inspired. The programme has been put together with the express goal of helping participants discover skills and attitudes likely to make their research more innovative. We want participants to return armed with a greater understanding of how science can benefit society and how thinking creatively can really make a difference to their work and their career

Scottish Crucible – Leadership and Development for Research Leaders

Career opportunities at the Institute of Occupational Medicine (IOM)

The IOM is expanding its team.

Current vacancies:

- Technical Engineer (PPE Testing),
- Principal Scientist (Human Factors),
- Database Analyst & Programmer,
- Senior Exposure Scientist,
- Exposure Scientist,
- Senior Aerosol Scientist.

For more information and to apply, visit https://www.iom-world.org/careers/
Sharon Crocker: sharon.crocker@iom-world.org

The CEA Grenoble, SyMMES laboratory (CIBEST team) seeks post-doctoral research associate

Project: development of Adverse Outcome Pathways related to nanomaterial toxicity to humans

Background

In the frame of the ASINA H2020 project (NMBP-15-2019), an 18 months post-doc position is available at the SyMMES laboratory, CEA Grenoble, France. ASINA has the ambition to promote consistent, applicable and scientifically sound Safe-by-Design nano-practices, considering all the nano-enabled products design dimensions: functionality, production technologies, safety, environmental sustainability, cost effectiveness and regulatory requirements, in line with research responsible innovation policy (https://www.asina-project.eu/)

It is focused on two value chains in which nano-enabled products are used: anti-microbial/anti-biofilm/depollutant coatings in clean technology (VC1) and nano structured capsules delivering active phases in cosmetics (VC2). In this context, the post-doc will be in charge of evaluating how some modifications of the physico-chemical characteristics of these nano-enabled products would lead to safer processes and products. This evaluation will be based on the Advanced Outcome Pathway methodology.

Responsibilities:

- Literature search and review on the human toxicity of TiO_2, TiO_2-N, Ag nanoparticles and lipidic nanocapsules in the context of realistic exposure scenarios in occupational settings defined in the ASINA project
- Search for already existing Adverse Outcome Pathways (AOPs) in AOP wiki and the literature, relevant to the identified toxicity mechanisms
- Structuration of the results as new AOPs or amendment of already-existing AOPs
- Definition of in vitro assays to validate each identified Key Event or Associated Event of the AOP

Profile of the candidate:

- PhD in the field of life science, if possible in toxicology
- Strong background in cell biology and nanomaterial physico-chemistry
- Ideally some experience in in vitro assays and skills in bioinformatics for omics database searches
- Fluent communication in English, written and oral
- Highly motivated, teamwork, pro-active team player

Please send CV and motivations to: marie.carriere@cea.fr

Research Fellow – Life Cycle Assessment (LCA) - (Ref.12.20.64)

International Iberian Nanotechnology Laboratory (INL)
Braga, Portugal
Group/Unit: Nanosafety
Required Education: Ph.D.
Employment Type: Full time
Contract Duration: 30 months
Open Date for Applications: December 14th 2020
Closing Date for Applications: January 11th 2021, 23h00, Lisbon Time

Organisation Description

The International Iberian Nanotechnology Laboratory – INL (http://www.inl.int), is the first and only International Intergovernmental Organisation in the world entirely focused on Nanoscience and Nanotechnology. It was founded under an international legal framework to perform interdisciplinary research, deploy and communicate nanotechnology for the benefit of society. INL aims to be a recognised leading global nanotechnology innovation hub.

Project Specifications

This project is funded by COMISSÃO DE COOORDENAÇÃO E DESENVOLVIMENTO REGIONAL DO NORTE (N2020)
Name of the project: SbDtoolBox - Nanotechnology-based tools and tests for Safer-by-Design nanomaterials
Reference number: NORTE-01-0145-FEDER-00004

Introduction

Are you an experienced Researcher in Life Cycle Assessment (LCA)? Would you like to be a key player in the development of the LCA competence at INL? INL is seeking a qualified Researcher in the field of computational analysis of life cycle, to evaluate the environmental impact of nanomaterials. The selected candidate will be working with a multidisciplinary group within a project dealing with "food nanostructures", "environmental impact of nanomaterials" and "in vitro nanotoxicology". The selected candidate will be part of the Nanosafety Research Group.

Job Role & Key Responsibilities

The Research Fellow will undertake the following main activities and responsibilities:
- Evaluation of the Life Cycle of nanomaterials used in the SbDToolBox and other projects applying ISO 14000 standards — specifically, 14040 and 14044M;
- Integration of the data from the different projects of the SbDToolBox project leading to LCA analysis;
- Development of new LCA models adapted to nanomaterials;
- Writing reports;
- Writing original articles as leading author, related to the LCA analysis within the SbDToolBox project;
- Participate in the writing of grants to push forward the LCA competence at INL.

Qualifications

PhD Degree in Chemistry, Environmental Sciences, Computational Sciences and related areas.

Experience and Technical Skills

- Experience in the field of Life Cycle Assessment, showing independence in the handling of data and publication of scientific articles.
- Experience in environmental sciences.
- Understanding of environmental toxicology.

For further requirements, more information and to apply, visit OUR VACANCIES – INL Job Portal

Junior Fellow – Computational Methods on Nanomaterials - (Ref.12.20.63)

International Iberian Nanotechnology Laboratory (INL)
Location: Braga, Portugal
Group/Unit: Nanosafety
Required Education: MSc
Employment Type: Full time
Contract Duration: 30 months
Open Date for Applications: December 14th 2020
Closing Date for Applications: January 11th 2021, 23h00, Lisbon Time

Organisation Description

The International Iberian Nanotechnology Laboratory – INL (http://www.inl.int), is the first and only International Intergovernmental Organisation in the world entirely focused on Nanoscience and Nanotechnology.
It was founded under an international legal framework to perform interdisciplinary research, deploy and communicate nanotechnology for the benefit of society. INL aims to be a recognised leading global nanotechnology innovation hub.

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Name of the project: SbDtoolBox - Nanotechnology-based tools and tests for Safer-by-Design nanomaterials
Reference number: NORTE-01-0145-FEDER-00004

Introduction

Are you an experienced Junior Researcher in computational methods? Would you like to be a key player in the development of in silico models to evaluate the effects of nanomaterials? INL is seeking a qualified Researcher in the field of computational evaluation of nanomaterials. The selected candidate will be part of the Nanosafety Research Group.

Job Role & Key Responsibilities

The Junior Research Fellow will undertake the following main activities and responsibilities:
- Developing in silico models to evaluate the potential effect of nanomaterials;
- Working on the integration of data to identify characteristics of nanomaterials responsible of adverse effects;
- Assisting on the writing of scientific reports and projects.

Job Requirements

Candidates should meet the following requirements:

Qualifications

MSc Degree in Computational Chemistry, Pharmaceutical Chemistry, Environmental Chemistry, or related areas.

Experience and Technical Skills

- Experience in handling large amount of data;
- Knowledge in handling software such as Python, R and symilars;
- Experience and/or knowledge on QSAR, QSPR and similar assessments will be considered as an advantage.

How to Apply

For further requirements, more information and to apply, visit OUR VACANCIES – INL Job Portal

Nanotechnology Development Workshop — Pre-registration is open!

The 2nd NanoFabNet Development Workshop has been confirmed to take place on the 20th-21st January 2021 and, this time, it will be held online.

Offering nanotechnology stakeholders the opportunity to discuss the challenges and opportunities currently facing the sector, as well as the chance to connect to other professionals and researchers to build the nano community, this exciting event will focus this time around on ethics, sustainability, infrastructure and skills.

The event programme is currently being developed and further information will be released over the coming weeks, however, the event is being designed to bring the sector together and help drive forward a sustainable nano future.

Make sure your save your place by pre-registering your interest in attending here.

We will then contact you with further information about the event as it develops.

We look forward to seeing you there!

Nanosafety Training School: From Basic Science to Risk Governance
4th NanoSafety Forum for Young Scientists

New dates: 20th June 2021 - 25th June 2021!
San Servolo Island, Venice, Italy

After careful consideration we came to the decision that the Nano Safety Training school will take place on 20-25 June 2021. In order to allow more participation in the cases in which attendees will not be able to travel we are provisioning live streaming of the event. The event will take the same format as planned and accepted participants will not lose their seat.

Find out more here:

This year the Venice Nano Training School celebrates its 10th anniversary.

The School will feature keynote speeches, hands-on sessions and a dedicated Young Scientist Forum Day during which early career researchers (PhD students, PhD candidates and Post-Docs) will have the opportunity to present their work.

The School week will include a variety of hands-on sessions aimed to transfer state-of-the-art knowledge on a variety of topics from key experts to the new generation of nano-environmental, health and safety, and biomedicine professionals, using **interprofessional education**.

A variety of networking activities (a special 10th anniversary welcome cocktail, social event and a social dinner) will enable plenty of time and opportunities for you to widen your network and foster academic exchange.

NanoTox 2021

PATROLS
Advanced Tools for NanoSafety Testing

BIORIMA
BIOmaterial Risk MAnagement

gracious

10th International Conference on Nanotoxicology
Assembly Rooms, Edinburgh, UK
20th—22nd April 2021

NanoTox 2021 is a forum aimed at personnel from research and academic institutions as well as from industry, governmental agencies, and other relevant organisations interested in:

- Nanotechnology
- Hazard and risk assessment of nanomaterials and advanced materials, and their governance
- Alternative methods for nanomaterial hazard testing, release and exposure.
- Safe(r) by design (SbD) of nanomaterials and advanced materials.

The 2021 Conference is jointly organised by three leading EU Horizon 2020 Projects, focusing on development of novel tools for evaluating human and environmental hazard, and strategies for nanomaterial characterisation, classification, grouping and read-across for risk analysis – BIORIMA, PATROLS and GRACIOUS. We plan to welcome over 400 delegates to the conference with international experts from Europe, the United States and Asia confirmed as speakers.

Abstracts:

Abstracts for NanoTox 2021 can be submitted from 1st September 2020 under any of the following 6 themes :

1. Hazard Characterisation of Nanomaterials and Advanced Materials
2. Alternative Methods for Nanomaterial Hazard Testing
3. Release and Exposure to Nanomaterials and Advanced Materials
4. Risk Assessment of Nanomaterials and Advanced Materials, and their Governance
5. Safe(r) by Design (SbD) of Nanomaterials and Advanced Materials
6. Open Topics

The deadline for abstract submissions is Tuesday 5th January 2021.
Notification to authors : week commencing Monday 1st February 2021.

For accepted abstracts pre-recorded presentations need to be submitted no later than Monday 8th March 2021, more details will be sent in notifications to the authors.

- Abstract submission: nanotox2021.org/abstracts/.
- Registration: https://nanotox2021.org/registration/
- Keynote speakers: https://nanotox2021.org/ |
- Programme: https://nanotox2021.org/programme/

Delegates can be reassured that the Scottish and UK Governments along with international colleagues at the World Health Organisation have been working in close collaboration to monitor and manage the situation here in the UK. The Organisers of NanoTox 2021 will adhere to the advice of the Scottish and UK Government and World Health Organisation and will provide an update to delegates if anything evolves. Attendees from outside the UK should make themselves aware of advice from the Scottish and UK Governments, keep up to date, and follow the advice, the following links maybe of interest. Health Protection Scotland | UK Government Foreign & Commonwealth Office

If you have any further questions, please do not hesitate to contact the conference team by email at nanotox2021@in-conference.org.uk.

Thank you and we look forward to welcoming you to Edinburgh, UK
Shareen Doak, Coordinator of PATROLS, Swansea University
Lang Tran, Coordinator of BIORIMA, Institute of Occupational Medicine
Vicki Stone, Coordinator of GRACIOUS, Herriot Watt University

EUROTOX 2021

Toxicology of the next generation – Combined efforts in the quest for safer chemicals and medicines 26 - 29 September 2021, Copenhagen, Denmark

The Danish Society for Toxicology and Pharmacology in conjunction with EUROTOX is honoured to organize EUROTOX 2021 in Copenhagen, the capital of Denmark. The congress will take place from 26 to 29 September 2021.

The venue is the Tivoli Congress Center, located in the City Center, 12 minutes by Metro from Copenhagen airport, and within walking distance of central city locations such as the Tivoli Garden Park and the railway station.

Copenhagen hosts the European Environmental Agency that surveys the state of the environment and environmental health in the European Union, and is a dynamic student hub, with 10 university campus areas across the city. Furthermore, Denmark is the headquarters of several pharmacological companies and has strong regulatory-based research in human health.

Important Dates

17 November 2020
Registration and abstract submission open

31 March 2021
Abstract submission deadline

17 May 2021
Early registration deadline

26–29 September 2021
EUROTOX 2021
Copenhagen, Denmark

Copenhagen is a historic city that founded in the 10th century as a small Viking fishing community. The historic palaces, feature ancient atmospheres that are perfectly suited to contemporary architecture. The cultural and historic settings have inspired to the most innovative trends in fashion, design and architecture.

Copenhagen has a strong connection with its waterfront and a number of bridges connecting the various districts; parks and promenades and tourist attractions including Tivoli Gardens, The Little Mermaid statue, the Royal Castle Amalienborg and Christiansborg Palace, Rosenborg Castle Gardens, Frederik's Church, and many museums, restaurants and nightclubs.

In these enchanting surrounding the EUROTOX 2021 participants can engage with Continuing Education Courses, scientific symposia, and workshops and enjoy ample network opportunities. We will also host an international exhibition of trade and society stands.

The congress theme "Toxicology of the next generation – Combined efforts in the quest for safer chemicals and medicines" is reflected in the congress programme. This covers a variety of topics dealing with the safety of drugs and environmental chemicals, new and emerging technologies, personalized medicine, human health effects caused by exposure to chemicals as well as safety issues arising from climate change.

On behalf of the Danish Society for Toxicology and Pharmacology and EUROTOX, it is a great pleasure to welcome all participants to Copenhagen for EUROTOX 2021.

https://www.eurotox2021.com/

About the NanoSafety Cluster

The EU NanoSafety Cluster maximises the synergies between European-level projects addressing the safety of materials and technologies enabled by the use of nanoparticles. The studied aspects include toxicology, ecotoxicology, exposure assessment, mechanisms of interaction, risk assessment and standardisation.

The NSC is an initiative of the European Commission Directorate-General for Research and Innovation (DG RTD), which sponsors these large projects. Overall, Europe targets safe and sustainable nanomaterials and nanotechnology innovations. Cluster projects contribute to assuring environmental health and safety (EHS) of this Key Enabling Technology.

The Cluster also is an open platform for dialogue and exchange. Researchers, regulators, administrators, industry, civil society representatives... if you have an interest in EHS and nanotechnology, you are very welcome to participate in Cluster activities whether or not you are a partner in formal European projects.

This site is your gateway to the NSC Projects as well as to the Working Groups formed to address transversal concerns. The structure of the NSC can be found here.

How to stay in touch or get involved:

Explore the menu, subscribe to our rich Newsletter, keep up to date with events, submit your own nano-EHS related news or invitations to meetings...

Submit news and events to our website

Submit news items and events to our Newsletter

- News
- Announcements
- Events
- Resources
- Research positions
- Project updates
- Publications
- Opinions

Subscribe to the community to receive our Newsletter

Help keep our calendar up to date with your events

Join the NanoSafety Cluster LinkedIn Group

Follow us on twitter @EUNanoSafety