

ANTHOS'24

Vienna - Austria



Book of Abstract

General Information Location

TWELVE Conference Center

Hertha-Firnberg-Straße 8, 1100 Vienna, Austria



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Day 1

5th March 2024

Science-driven methods & tools for the transformation of Safe-by-Design

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PART 1**



Day 1: Tuesday, March 05th

09:00-09:15 | Setting the scene: Safe-by-Design challenges and solutions

Susanne Resch

(BioNanoNet Forschungsgesellschaft mbH (BNN), Austria)

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This session will provide an introduction for the ANTHOS'24 Summit and introduce the topic of Safe-by-Design and how it has evolved in recent years. It will provide an overview of how the four NMBP-15 projects ASINA, SAbyNA, SabyDOMA and SbD4Nano are addressing Safe-by-Design in various nano-enabled applications and will highlight cornerstones that have been achieved by the nanosafety community in recent years.

Susanne Resch is a research scientist at BNN (BioNanoNet Forschungsgesellschaft mbH) with an academic background in pharmaceutical sciences (University of Graz) and international project & public management. She has been part of the scientific staff of BNN since 2015 and has gained expertise and experience through participation in >20 international projects (FP7, H2020 & H-EU) in the field of nanotechnology, focusing on nanoEHS and related topics, creation and implementation of project-tailored SbD and SSbD concepts as well as dissemination, training and stakeholder engagement. She coordinates the Austrian Technology Platform for Nanomedicine and is plenum member of ISO TC229 & CEN TC352.

09:15-10:30 | Safe-by-Material-Design

This session on Safe-by-Material-Design will focus on different approaches to implement hazard assessment of nanomaterials (NMs) and nano-enabled products (NEPs) and to provide Safe-by-Design (SbD) solutions from an early stage of product development. The speakers will present a series of theoretical and methodological strategies to evaluate and mitigate the potential hazard properties of nanomaterials comprising guidelines on data gathering and generation by integrated toxicity testing strategies, application of new approach methodologies, risk assessment tools and surface chemistry modification.

Ana Candalija

(LEITAT Technological Center, Spain)

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Hazard Assessment Strategy towards Safer Development of NEP in SAbyNA SbD Guidance Platform

Dr. Ana Candalija is a principal researcher in the Human and Environmental Health and Safety team in Leitat Technological Center (Barcelona, Spain). Her research topic is human toxicology using different cellular models and new approach methodologies. She holds a Biotechnology degree, specialised in Biochemistry and Biomedicine, and holds a PhD in Neurosciences.

The hazard assessment strategy built inside the SAbyNA Guidance platform provides the industry with useful guidelines and tools on data gathering and a set of easy-to-use, robust and cost-effective testing strategies tai-

lored for inhalation and dermal exposure for the prediction of potential hazards. This early warning system supports the implementation of safe-and-sustainable-by-design on nanoforms and nano-enabled products and is compatible with early stages of product development and along the whole material's life cycle.

Rossella Bengalli

(University of Milano - Bicocca (UNIMIB), Italy)

- [LinkedIn](#) -

An integrated new approach methodology (NAM) for risk assessment of Safe and Sustainable by Design nanomaterials

Dr. Rossella Daniela Bengalli is a researcher in the field of Nanotoxicology at the University of Milano - Bicocca, Dept. of Earth and Environmental Sciences. She obtained her PhD in Biology in 2015 with a thesis entitled 'In vitro models of the air-blood barrier: a case study on zinc oxide nanoparticles', developing 2D-3D in vitro models of the alveolar space for studying the toxicity of particulate matter and nanoparticles on the lungs. Her present research activities are focused on airborne particulates, engineered nanoparticles and (bio)-nanomaterials toxicity and their mechanisms of action, using new approach methodologies (NAMs), including advanced 3D in vitro models and realistic exposure scenarios.

The new approach methodology (NAM) developed in ASINA for the hazard assessment of nanoparticles (NPs) focuses on the inhalation as the main exposure route to NMs and NEPs production. The NAM proposed integrates the adverse outcome pathways (AOP) perspective, the quantification of real human exposure and novel in vitro testing for hazard evaluation, providing a comprehensive framework for supporting risk assessment based on a more reliable and realistic interpretation of the hazard of new SbD nanomaterials.

Maria Dusinska

(The Climate and Environmental Research Institute (NILU))

- [LinkedIn](#) -

SABYDOMA SOPs & tools for Risk Assessment

Maria Dusinska, RNDr., CSc., DSc., ERT. has long experience in the environment and health fields, hazard and risk assessment, genetic toxicology, nanotoxicology, advanced *in vitro* models, biomonitoring and biomarkers. She worked at Slovak Medical University as head of Department of Experimental and Applied Genetics in Bratislava and last 18 years at NILU, Norway as Director of GLP laboratory and scientific leader of Health Effects Laboratory. She has over 350 publications, over 17 800 citations, h-score 67 (Google Scholar). She coordinated several EC projects among them the recently finished H2020 NMBP-13 RiskGone (2019-2023, <https://riskgone.wp.nilu.no/>) and is WP leader on Regulation, governance and data management in NMBP-15 project SABYDOMA (<https://www.sabydoma.eu/>).

The SABYDOMA project reviewed and analysed standard operating procedures (SOPs) for hazard and risk assessment of (nano)materials, as well as approaches to and practical tools for SbD. The need for harmonization in data reporting resulted in the co-creation, with modelling experts, of machine learning data-reporting templates to harmonize the evaluation of (nano) materials. The consortium also developed a decision support application, combining SbD methods and Technology Readiness Levels (TRLs), to create a strong framework for assessing safety in technology development. Some of these achievements will be presented.

Mustafa Culha

(Sabanci University (SUNUM), Turkey)

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Safe-By-Design for Nanomaterial Safety: Role of Surface Chemistry

Dr. Culha is currently affiliated with Augusta University, USA, Sabanci University

Nano-technology Research and Application Center, Istanbul, Turkey, and Morsani College of Medicine of the University of South Florida, USA. His current research interest includes elements from chemistry, medicine, material science, photonics, and nanoscience and nanotechnology. He and his colleagues have authored more than 130 papers in refereed international journals, several book chapters and patents in the area of analytical and bioanalytical chemistry, and nanobiotechnology. He is currently the president for The Federation of Asian Chemical Societies (FACS) for 2023-2025.

Among several parameters such as size, shape, and chemical nature, surface chemistry can help to design safer nanomaterials as it is the interface to a biological system. A carefully selected surface modifier without affecting the nanomaterial's function can reduce the potential harmful effects. The presentation covers our effort to use surface chemistry to reduce the adverse effects of nanomaterials used in industrial applications.

10:30-11:00 | Coffee break

11:00-12:00 | Safe-by-Process-Design

This session will focus on Safe-by-Process-Design as a way to assess, prevent and mitigate release and exposure to advanced materials throughout the product's life cycle. The presenters evaluate current gaps in exposure measurement data and models needed by regulators, industry and academics to support the risk assessment process and provide guidance on how to mitigate and prevent exposure by redesigning the process (rather than the material as in Safe-by-Material-Design) considering that exposure plays a crucial role on the risk equation ($\text{Risk} = \text{Exposure} \times \text{Hazard}$) and hence for risk prevention.

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Wouter Fransman

(TNO, The Netherlands)

- [LinkedIn](#) -

Safe-by-Process-Design to mitigate exposure to Advanced Materials

Dr. Wouter Fransman is principal investigator at the department of Risk Analysis for Products in Development at TNO in The Netherlands. His main fields of interest are exposure assessment, risk assessment, computational modelling and risk management. He has extensive knowledge in measuring and assessing (occupational) exposure and statistical modelling, and is involved in a wide variety of projects on computational modelling of exposure and risks of nanomaterials and advanced chemicals. He coordinates studies by combining knowledge development and stakeholder needs with the ambition to turn scientific concepts, methods and results into concrete approaches, guidance and tools to be applied by regulators, industry and society. He has >125 publications in the areas of risk assessment, occupational exposure assessment and epidemiology.

This presentation will focus on tools that provide assessment and guidance on how to prevent and mitigate exposure to advanced materials by redesigning the process in addition to safe-by-material-design.

Joonas Koivisto

(Air Pollution Management (APM), Finland)

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Industrial-oriented exposure assessment

Joonas Koivisto (PhD, University of Helsinki, 2014) works as an independent consultant in Air Pollution Management (APM) and ARCHE Consulting as a senior research scientist. His expertise is in indoor aerosols, inhalation exposure assessment, safety of engineered nanoparticles, and regulatory chemical safety assessment (Directive 98/24/EC, EU OSH legislation). He also worked with biocompatibility evaluation for external commuting medical devices (ISO 10993),

environmental risk assessment of industrial PFAS emissions and industrial emissions disease burdens. In research (67 peer-reviewed articles, H-31), he has developed methods related to source specific risk assessment, quantifying conditions of use, and assessment of industrial emissions disease burdens, which makes regulatory risk assessment and mitigation more efficient.

This presentation will highlight (1) the extrapolation of exposure measurements to reasonable worst-case conditions and quantifying relevant exposure determinants, and (2) the quantifying conditions of use according to ECHA R.14.

Jesús Lopez De Ipiña Peña

(TECNALIA Research and Innovation, Spain)

- [LinkedIn](#) -

Digital Twin for sustainable manufacturing

MEng. Jesús M. Lopez de Ipiña is Project Manager at the Industry and Mobility Unit at TECNALIA in Spain. His expertise is in manufacturing process automation, industrial safety, nanosafety and QES management. His current research focuses on online monitoring, prevention and control of air emissions and occupational exposures derived from (nano) manufacturing processes. He has worked on several EU projects investigating nanosafety aspects in manufacturing, such as SUNSHINE, ASINA, SABYNA, OASIS, FAST, PLATFORM or SCAFFOLD. He is chairman of the Spanish committee for standardisation in nanotechnologies (GET-UNE 15) and member of ISO/TC 229 and CEN/TC 352.

Digital technologies, such as advanced sensors, IoT, data analysis or AI, are key technologies identified by the European Commission to achieve the green and digital transitions of European industry. Digital Twins (DT) combine several of these technologies and when applied to the field of smart manufacturing, constitute a powerful tool for online prediction and optimization of manufacturing processes. This presentation will focus on how DT can be applied in the (re) design of industrial (nano) proces-

ses to achieve more competitive and also safer and more sustainable manufacturing processes, fully aligned with the approach promoted by Recommendation C(2022) 8854.

12:00-12:15 | Sustainability aspects, including functionality and costs

This session will present simplified strategies to assess key sustainability aspects of nanoforms an nanoenabled products, to be integrated as supporting tools together with other resources for SSbD. The strategies proposed here do not only assess costs and environmental impacts, but also the way functionality affects them. SbD4nano addresses production costs of functionalized and non-functionalized nanomaterials at laboratory and industrial scales, while SAbyNA is focused on Life Cycle Assessment and production costs of nanoenabled products. The simplified approaches proposed in both cases enable companies to identify priorities and hot spots already in early design phases, representing a valuable instrument for a more holistic understanding and decision-making process.

Alina Bisag

(ART-ER, Italy)

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SbD4Nano production cost analysis of modified vs unmodified nanomaterials

Alina Bisag is an Energy Engineer and Ph.D. at Alma Mater Studiorum - University of Bologna with expertise in mechanical design, atmospheric pressure plasmas, characterization techniques for the measurement of liquid and gas phase pollutants, intellectual property protection, 3D printing, machining, aerospace and nanomaterials. Currently she is part of the „Research and Innovation“ area of ART-ER and works in the fields of Mechatronics, Aerospace and Industry 4.0. In particular, she collaborates in four European projects (SbD4Nano, AD-ASTRA, AI REDGIO 5.0 and SUPERHUMAN) on topics related to nanomaterials safety, interconnection between European aerospace

ecosystems, AI-at-the-Edge competitive digital transformation of Industry 5.0 and exoskeleton for labor applications and assisting the workers.

The SbD4nano simplified approach for the evaluation of production costs of functionalized and non-functionalized nanomaterials at laboratory and industrial scales will be presented. This simple approach could be extremely useful for a company during the initial phase of material and process design.

Leire Barruetabeña

(GAIKER, Spain)

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Sustainability and Cost Assessment tools in SAbYNA SbD Guidance Platform

Leire Barruetabeña is Senior Researcher at the Recycling and Circular Economy Department of GAIKER. Her main field of expertise covers the application of Life Cycle Assessment for the validation of clean technologies and processes, as well as for the eco-design of materials and products. She has collaborated with public institutions, associations and industries on adapting and promoting LCA methodologies and tools. In this context, her experience also includes the development and implementation of strategies to integrate LCA and Risk Assessment within the SSbD approach, and to enable the evaluation of advanced materials within LCA (EU funded projects Nanoreg2, Nanorigo, SAbYNA, Repoxyble). She is also experienced in the identification and establishment of strategies for Circular Economy within different sectors.

This presentation will give an overview of the approach suggested in SAbYNA to enable a simplified economic and environmental evaluation of nanoenabled products from a life cycle perspective.

12:15-12:30 | Legal aspects of Safe-by-Design

By definition, safe-by-design is a concept that is intended to be integrated into the innovation,

largely before a product is placed on the market. Although this might appear to mean there are few legal issues that address it, the findings from the SbD process can have a significant impact on legal consequences once a product enters the market. This session will summarise these legal aspects and then address the wider dimension of SbD that can save a company value and reputation in the long-term.

Anthony Bochon

(Gil Robles - San Bartolome & Partners, Belgium)

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The legal aspects and challenges of SSbD

Anthony Bochon has been a member of the Brussels Bar since 2011. As a business attorney, his practice is focussed on Economic law, EU law, IP & Innovation Law. Seconded during several years to an international industrial conglomerate and regularly appointed as judicial trustee, he favours a holistic and strategic vision for his clients' legal needs. He is also one of the few lawyers involved in EU-funded projects and he manages the website www.horizoneuropelegal.com. He has also pursued an academic career since 2011 at the Université libre de Bruxelles (ULB) where he is currently an associate lecturer and Ph.D. candidate in Economic law and EU law. He practises in French, Dutch and English.

SSbD is now subject to an EU recommendation which, though being not legally binding, illustrates the slow juridification of the SSbD concept. The presentation will highlight the preliminary findings on the legal aspects of SSbD drawn from the SABYDOMA project as well as point out the remaining challenges with the legal dimension of SSbD.

Neil Hunt

(Yordas Group, UK)

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'Soft' drivers for adoption of SbD

Neil is a Principal Consultant at Yordas Group, working with chemical regulations for over 13 years having previously been a process chemist. He covers all technical aspects of the regulatory services at Yordas, specialising in nanomaterials, risk assessment and authorisation and provides training in all these areas. Neil has worked on a number of projects investigating the risk assessment of nanomaterials including MARINA, GRACIOUS and SUNSHINE and will be presenting his work from the SbD4Nano project today.

If SbD is to achieve the ambitious goals set for it, it will need widespread uptake from all sectors of industry. This means decision-makers will need to see a clear reason to adopt an approach that might appear to introduce increased resource requirements during product development. This presentation will examine how committing a small cost early during innovation can have larger financial and social benefits in the long run.

12:30-14:00 | Lunch

14:00-15:30 | Safe-by-Design tools and technologies for nanomaterials

This session is focused on tools and approaches developed to support the SSbD design process or specific steps within it. SSbD requires multidisciplinary and multidimensional thinking, assessment, optimization and decision making. Dedicated software and hardware platforms will be presented which facilitate end-users in their ultimate goal to design safer, better performing, more cost efficient and sustainable products and processes.

Ralph Vanhauten

(ThinkWorks B.V., The Netherlands)

- [LinkedIn](#) -

SAbYNA guidance platform and SbD4Nano e-Infrastructure to support the design process towards safer nanoforms, nano-enabled products and processes

Ralph Vanhauten is a knowledge engineer (developer of expert systems and models) with a masters in computer science at the TU Delft. He is founder and co-owner of ThinkWorks B.V in the Netherlands. He is the lead developer of the in house developed Intelligent Objects expert system shell which has been used to develop and maintain numerous commercial and research related decision support systems. In the last decade he was responsible for the development of a number of EU-funded and commercial online nano-safety related tools like the GUIDEnano risk assessment tool, the GRACIOUS blueprint (test environment), the ECETOC NanoApp and currently the SAbYNA guidance platform and SbD4Nano e-Infrastructure. During this period, he acquired modelling expertise on various disciplines in the nano safety area, like material characterization, exposure and fate modelling, hazard, risk assessment and safe by design modelling which allowed him to integrate these different focus areas into a single integrated approach.

Two nano specific SbD platforms under development in the SAbYNA and SbD4Nano projects will be highlighted in a combined presentation as they share a common core architecture each with their own complementary resources and dedicated SbD modules focusing at different steps in the safe by design process. Both online tools support end-users in their quest to design improved nanoforms, nano-enabled products and processes more efficiently taking key design criteria like product performance, costs, release potential, exposure and hazard potential along the entire life cycle into account in an integrated approach. The joined core architecture and the different developed SbD decision support modules will be briefly introduced.

Massimo Perucca

(Project-Hub360, Italy)

- [LinkedIn](#) -

An integrated quantitative approach in Safe and Sustainable by Design decision support systems: from ASINA to INTEGRANO Expert Systems

Dr. Perucca, MD Physics, PhD in FluidDynamics, starting from fundamental research in fusion plasmas at MIT, Boston-MA, he devoted his efforts to the industrial applications of plasma technologies and nanotechnologies, targeting safe and sustainable-by-design (SSbD) solutions. With almost 25 years experience in modelling, Life Cycle Assessment (LCA) and Life Cycle Costing Dr. Perucca is involved in the investigation of circular models for bio-based and nano-composite materials. In 2005 he founded the company Project HUB 360. Currently maintaining the role of co-owner he manages the team of Project HUB 360 developing custom tools for sustainability assessment, algorithms for artificial intelligence and support tools for multi-criteria decision based on quantitative models. Since 2010 he is technical director of the Italian magazine "Trattamenti e Finiture". He actively contributed to more than 20 European large research projects and several national and transnational projects; he counts several scientific and technical publications in plasma technology, nano-composite coatings, environmental and economic sustainability.

Development of nano-enabled safe and sustainable solutions relevant to the industrial sector imply simultaneous consideration of performance levels in different dimensions: functionality, environmental and economic sustainability, and safety. In each dimension several key performance indicators need to be addressed to achieve a comprehensive assessment of nano enabled products through their life cycle, which comprises nano-forms synthesis, their incorporation onto/into conventional material matrices to obtain nano-enabled products, as well as their use phase and end-of life. Beyond Safe and Sustainable by Design (SSbD) intrinsic complexity what makes it even more challenging is that, despite the impressive work done on nano-safety, to-date

there are no nano-specific impact categories obtained by dedicated characterization factors which may account for nanoforms effects on environment and on human health. Within ASINA project a quantitative approach to SSbD has been proposed supported by a dedicated decision support system empowered with artificial intelligence, which allowed identifying the set of SSbD design cases within specific design case studies. This was achieved through simultaneous maximisation of functionality, cost effectiveness, environmental sustainability, and human safety KPIs. Paradigmatic SSbD ASINA design case studies supported by the ASINA expert system will be presented. ASINA legacy will be leveraged within the INTEGRANO project. INTEGRANO perspective will be presented including the multiple integration aims: (a) integration of safety and sustainability assessments by exploiting existing standards and methodologies, (b) integration of nano specific impact categories to the set of standard impact categories related to bulk materials in life cycle assessment, (c) SSbD data integration of the extended nanoforms portfolio targeted to a larger application domain.

Athanassios Nikolakopoulos

(National Technical University of Athens (NTUA), Greece)

The SABYDOMA Safety by Process Control approach for the Production of Safe & Sustainable by Design Nanomaterials

Athanassios Nikolakopoulos is Research Associate at the School of Chemical Engineering of the National Technical University of Athens (Greece). He is a Chemical Engineer by training with research and industry experience on Process Design, Optimization and Control. He holds a PhD in Process Systems Engineering and his research interests include process synthesis, modelling, optimization and control.

This presentation is about the development and application of model predictive control (MPC) and dynamic matrix control (DMC) for the production of safe and useful nanomaterials (NMs). It covers the following topics: (1) The scope and purpose of control for NMs production, including

a scenario where product characteristics deteriorate and need to be restored; (2) A live example of the actual vs modelled system, and the performance of open loop and closed loop control under different disturbances and set points; and (3) The contents and methods of the first principle models, the data driven workflow, and the MPC/DMC controllers for the NM production processes, using Matlab and other tools.

Thomas Chamberlain

(University of Leeds, UK)

- [LinkedIn](#) -

Self-Optimisation of Non-Toxic Spherical Silver Nanoparticles in Continuous Flow

Prof Thomas Chamberlain comes from Matlock, in Derbyshire, and completed an MSci in Chemistry at the University of Nottingham in 2005. He was then awarded a University Interdisciplinary award to study a PhD with Professors Andrei Khlobystov and Neil Champness in Chemistry and Peter Beton in the School of Physics working on the synthesis of novel functional fullerene molecules and the subsequent formation of fullerene/carbon nanotube peapod structures. He moved to the University of Leeds in 2015, where he is currently Professor of Digital and Materials Chemistry with an established independent research group within the Institute of Process Research and Development applying his understanding of nanomaterials to both fundamental and applied research challenges. His interests are focussed on the development of new and efficient approaches to making known and novel nanomaterials and improving chemical processes, principally multi-phase systems. To achieve this he utilises automated continuous flow and digital chemistry, combined with routine and novel, in- and off-line characterisation techniques. This enables the investigation of structure and formation mechanisms of materials, and evaluation of their functional electrical and catalytic properties using algorithm based self-optimisation and kinetic profiling.

The presentation will outline work undertaken in the SABYDOMA project, specifically cou-

pling of a continuous flow reactor and HISENTS biosensor platform enabling the synthesis of spherical silver nanoparticles (AgNPs) with minimal toxicity. The experimental chemical space was explored to determine the relationship between the synthesis conditions and the size of the spherical AgNPs using in-line UV-Vis spectroscopy (via MiE theory) and off-line TEM analysis.

This multi-functional platform has the ability to simultaneously explore the formation of metal-metal oxide nanoparticles and evaluate their toxicity, incorporating a safety-by-design approach into nanomaterial discovery and process design.

Thorsten Knoll

(Fraunhofer IBMT, Germany)

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Microfluidic platform concept for NP toxicity screening with cell lines

Thorsten Knoll received his German diploma degree in microsystems technology from the University of applied sciences, Kaiserslautern, in 2002. He joined Fraunhofer IBMT in 2002. From 2011 until 2020 he was group leader of the Microsensors and Microfluidics group in the department of Biomedical Microsystems. Since 2021 he is working as senior researcher in the Cell Models and Toxicology group. He is the author of more than 20 peer-reviewed publications. His research focuses on the design and fabrication of micro-electromechanical and microfluidic devices, on packaging and system integration of biochips and on the development of printing processes for biomedical applications.

The presentation deals with a microfluidic platform that utilises optical and electrochemical analysis to assess the effect of nanomaterials on single cells and on cell layers. Positioning of single cells or the cultivation of cells over several days to obtain dense layers can be performed in microfluidic modules with microfabricated porous membranes. The screening platform can be fluidically connected to other systems, which enables the direct transport of NP samples,

e.g. from the production line, to the screening platform.

15:30-16:00 | Coffee break

16:00-17:00 | Safe-by-Design case studies: Industrial success stories

Industrial success stories accomplished in the context of the NMBP-15-2019 projects will be briefly presented.

Additive manufacturing and specifically 3D-printing processes are known for their advantageous customization of final products. However, emissions during the 3D-printing process that use nano-enabled filaments, can impact inhalation exposure and may pose a concern. A fine tuning of process parameters (nozzle temperature, infill density) can serve as an effective SbD approach, without compromising the functionality of the final NEPs.

Apostolos Salmatonidis

(LEITAT Technological Center, Spain)

- [LinkedIn](#) -

Success and limitation in the implementation of SbD interventions on SAbYNA case studies for 3D Printing Products and Processes

Apostolos Salmatonidis works as a senior researcher at LEITAT. He is a materials engineer with a master in physics of materials and a PhD in analytical and environmental chemistry. His research focuses on the characterization of the emission sources related to nanoform releases and the assessment of their impact on inhalation exposure.

The “flash” presentation highlights and gives insights of the main interventions to make the 3D-printing process of NEP products safer via a combination of process parameter tuning and conventional measures.

Martí Busquets

(Applied NanoParticles SL (APPNPS), Spain)

- [LinkedIn](#) -

Real-life transfer of SSbD platform to industry: coupling Online screening and characterization to a continuous-flow AgNPs production line

Martí Busquets is an inorganic chemist who has been involved in Applied Nanoparticles SL since its foundation in 2013 as a spin-off of the Catalan Institute of Nanotechnology (ICN). During his five-year tenure as a PhD student within the Inorganic Nanoparticles Group, led by Prof. Víctor F. Puntes at ICN, he focused his research on the synthesis and characterization of metal and metal oxide nanoparticles, including their behaviour in biologically relevant environments. This expertise has been transferred to his role of Product Manager and Nanoparticles Engineer at Applied Nanoparticles SL on the production of high quality and highly concentrated inorganic nanoparticles colloids and nanoparticle-based products both for research and industrial uses, such as sensing, immunoassays, functional inks, and, more recently, chemically-labelled nanoplastics. Martí has actively participated in EU projects related to nanotoxicity, nanosafety, the environmental fate of nanomaterials, and the safety-by-design of nanoparticles, mainly leading Work Packages on the production and characterization of nanomaterials.

Focus on one of SAbYDOMA's 4 Industrial Cases: the production of silver nanoparticles (AgNPs) at Applied Nanoparticles SL. This Industrial Case serves as the project's spearhead, known as the 'Lead Demonstrator,' for technology development and implementation. It features a continuous-flow AgNPs production line coupled with various online screening modules. These modules include the characterization of physicochemical properties and potential toxicity assessment. The development status of these technologies and its successful transfer to Applied Nanoparticles Industrial Site will be presented, along with a comparison of the obtained AgNPs against the benchmark standard produced at Applied Nanoparticles.

Alex Grigoropoulos

(Creative Nano, Greece)

- [LinkedIn](#) -

Promoting photocatalytic activity of S-doped TiO₂ NPs by applying a SbD modification

Dr Alex Grigoropoulos is the R&D manager of Creative Nano, a greek SME focusing on the integration of nanotechnology in surface finishing. Over the last 20 years, he has published >25 papers in peer-review journals across various fields of inorganic and materials chemistry, such as organometallic chemistry, computational chemistry, crystalline porous materials, green chemistry, photocatalysis and nanocomposite coatings. He joined Creative Nano in 2021 and he is actively involved in various EC-funded projects related to the SSbD framework (DIAGONAL, SbD4Nano, SABYDOMA, MOZART, FreeME, REDONDO, SAFARI).

In the context of the SbD4Nano project, sulphur-doped TiO₂ NPs were modified with SiO₂, as a SbD strategy to reduce their cytotoxic and ecotoxic effect. Importantly, the SbD modification did not affect their overall activity in the photocatalytic degradation of indoor-air pollutants under visible light irradiation.

Julio Gomez

(AVANZARE, Spain)

- [LinkedIn](#) -

Implementation of SbD in the preparation of graphene and related materials and its composites

Dr Julio Gomez is the founder, CEO and President of the Board of directors of AVANZARE. AVANZARE is the largest EU company in graphene and other 2D materials and its composites and one of the largest in nanomaterials and nanocomposites sector and pioneer in the implementation of SbD & SSbD in the graphene industry from 2011. President of the Spanish Graphene Alliance, and former member of the Strategy Advanced Council of Graphene Flagship. He has received several awards including the Na-

tional Award Entrepreneur of the year 2008 in Spain by the ministry of industry. And awards in the USA and UK, among others. Member of the Executive board of the Chamber of Commerce from 2010 and from 2012 he is member of the Social Council of La Rioja University elected by the Regional Parliament. Inventor of several families of patents. Author of 67 papers and 7 books (H factor 30).

In the context of the SbD4Nano and previous projects, AVANZARE has implemented SbD and SSbD protocols for the preparation of Graphene and Related Materials (GRMs) and its composites. The functionality, performance and scale up of GRMs composites produced by SbD vs conventional ones has been compared.

Adriano Ferrara

(UNI, Italy)

- [LinkedIn](#) -

How standardization can boost R&I

Project Manager with more than five years of experience in managing projects funded by the European Commission through the Horizon2020 and Horizon Europe Framework Program in the field of research and innovation. Active participation in 11 Horizon research projects with coordination roles of specific Task and Work Packages on Standardization. Many years of experience in managing Working Groups and Technical Tables, based on consensus building and aimed at producing pre-standardization documents at national level (UNI/PdR) and at European level (CEN/WS) of voluntary application.

Standardisation and research work hand in hand. In this session, we will explore the relationship between these two worlds, highlighting their mutual benefits by bringing concrete examples from the ASINA project.

17:00-18:30 | Lessons learned and future impact of the developed methods and tools: Roundtable discussion

Central part of this discussion are the methods and tools that are available now to support the innovation process, beginning from the material selection, across processing steps and finally towards a product that can be successfully brought to the market. These methods and tools, developed by the NSC-community in the recent 15 years, are the basis for future assessments and the implementation of the SSbD framework. However, the full potential of these developments can only be achieved by harmonising and standardising the methods - a clear need for the future. Hence, the questions addressed during this round table will be about (i) what experiences could be made during the recent years of methods/tools development, (ii) which learnings could be drawn from that, (iii) what next steps need to be undertaken to maximise the impact, and (iv) what needs to be set in motion (e.g., initiatives, funding programs, infrastructure) to support this further development.

Moderator:

Andreas Falk
(BNN)

- [LinkedIn](#) -

NSC coordination team

Andreas Falk, MSc (male), is CEO of BioNanoNet Forschungsgesellschaft mbH (BNN), studied medical analytical technologies, and business administration (University of Graz); was/is part of >60 completed/ongoing national and European projects in the thematic fields of (nano-)medicine & nano-safety, innovation, & sustainable development. He is active within several national and international working groups: NanoSafety Cluster (NSC) coordination team member; European Technology Platform Sustainable Chemistry - SusChem (member of NTPs-leader board; coordinator of national technology platform SusChem-AT); coordinator of INISS-Nano (internat. network initiative on

Safety and Sustainability in Nanotechnologies); COST-Actions; national expert at OECD-WPMN; plenum member of ISO TC229 & CEN TC352; etc. In the field of nano-safety/nanotoxicology and industrial innovation support, he contributed >100 talks, >30 poster presentations on international scientific conferences, as well as >15 publications. He is involved in shaping the strategies towards implementation of the "Safe-and-Sustainable-by-Design"(SSbD)-concept within the European high-tech ecosystem, and developing the concept for global scientific collaboration.

Panellists:

Hubert Rauscher
(JRC, European Commission)

- [LinkedIn](#) -

EC representative JRC

PD Dr. Hubert Rauscher (PhD in Physics, lecturer in Physical Chemistry) is the "Advanced Materials Governance" team leader at the European Commission's (EC) Joint Research Centre (JRC) and project leader for safe and sustainable advanced materials. He started working at the JRC in 2005, supporting EU policies mainly on chemicals through regulatory research on nanomaterials and advanced materials. He co-developed the JRC framework for safe and sustainable by design (SSbD) chemicals and materials, which is the scientific basis of a EC Recommendation establishing a European assessment framework for SSbD. Hubert did postdoctoral research on physico-chemical properties of nanomaterials at the Universities of Wisconsin-Madison (USA) and Ulm (Germany). At the JRC he provides scientific support to implement EC strategies related to the European Green Deal for advanced materials. He has published more than 150 scientific papers and has been involved in several European research projects on the safety of nanomaterials and now also on safe and sustainable advanced materials (e.g. GRACIOUS, SUNSHINE). Hubert also leads the JRC's activities on the EC's nanomaterial definition and related guidance and works with international fora such as the OECD's Working

Party on Manufactured Nanomaterials, e.g. in the steering groups “Advanced Materials” and “Safe and Sustainable Innovation Approach”.

As panellist in the roundtable Hubert can bring to the discussion his expertise based on 15 years of work on the safety of nanomaterials, his insights into the EC/JRC SSbD framework and experiences with its application and implementation. He can also offer considerations on how to make the transition from “safe by design” to “safe and sustainable by design” for advanced materials, including nanomaterials.

Massimo Perucca

(Project-Hub360, Italy)

- [LinkedIn](#) -

Representing ASINA project

Dr Perucca, MD Physics, PhD in FluidDynamics, starting from fundamental research in fusion plasmas at MIT, Boston-MA, he devoted his efforts to the industrial applications of plasma technologies and nanotechnologies, targeting safe and sustainable-by-design (SSbD) solutions. With almost 25 years experience in modelling, Life Cycle Assessment (LCA) and Life Cycle Costing Dr. Perucca is involved in the investigation of circular models for bio-based and nano-composite materials. In 2005 he founded the company Project HUB 360. Currently maintaining the role of co-owner he manages the team of Project HUB 360 developing custom tools for sustainability assessment, algorithms for artificial intelligence and support tools for multi-criteria decision based on quantitative models. Since 2010 he is technical director of the Italian magazine “Trattamenti e Finiture”. He actively contributed to more than 20 European large research projects and several national and transnational projects; he counts several scientific and technical publications in plasma technology, nano-composite coatings, environmental and economic sustainability.

Massimo will bring his expertise in implementing the SSbD methodology in real-world industrial case studies to the panel. This expertise comes from his involvement in H2020 projects such as

ASINA and the recently funded Horizon Europe project INTEGRANO, where consolidated SSbD strategies are applied across various nanomanufacturing sectors. Massimo will also share insights gained from collaborating with sister’s projects and co-chairing NSC Working Group focused on Safe and Sustainable by Design (SSbD), Innovation, and Regulation.

Carlos Fito

(ITENE, Spain)

- [LinkedIn](#) -

Project coordinator SbD4Nano

Carlos Fito López is a full-time researcher since 2006 at the Packaging, Transport and Logistic research center (ITENE), located in Valencia (Paterna), Spain. Carlos Fito is currently the area manager of safety and environmental monitoring technologies group at ITENE. His main lines of research in ITENE are human toxicology and workplace exposure to particles in the nanometer range. Since 2010, he has been involved in European projects focused on the evaluation of the potential risk posed by nanomaterials, coordinating the FP7 projects NanoSafePack and NanoMICEX, and the H2020 project SbD4Nano, which is focussed on the concept of safety and sustainability by design. Moreover, Carlos Fito has been coordinator of 3 LIFE projects focused on nanosafety, including LIFE REACHnano, LIFE NanoRISK, LIFE Nano-MONITOR. Since July 2018, Carlos Fito is also the scientific coordinator and project manager of the start up company Controlnano Technologies focused on the development of nanoparticle monitoring devices.

Carlos will bring to the panel his expertise in the implementation of the SSbD concept in cases studies, lessons from case studies conducted under H2020 projects such as SbD4nano and SUNSHINE, as well as information gathered from the recently created technological platform SENTIATECH, a spanish platform focussed on safe and sustainability, air quality, nanosafety and emerging risks.

Andrew Nelson

(University of Leeds, UK)

- [LinkedIn](#) -

Project coordinator SABYDOMA

Prof Andrew Nelson is currently professor of nanotoxicology in the School of Chemistry, University of Leeds. Andrew was awarded a degree in Chemistry/Zoology. from University of London in 1971. He obtained a PhD in analytical geochemistry at the Naval College, Greenwich, 1975 and went on to Post-Doc work in University of Edinburgh in research on oceanic particulate matter. He worked in the Water Industry as Analytical Chemist and finally secured a research position in Marine Lab in Plymouth, UK as an Electroanalytical Chemist. In Plymouth he pioneered the membrane-based biosensor technology and moved to University of Leeds in 2001. Here he has further developed this technology which has formed the core of three consecutive EU framework programmes which he has co-ordinated. He is currently working as a partner on the Bio-SUSHY programme where he is using his technology to screen novel PFAS free coatings and their component compounds and formulations. Andrew's core discipline is Electrochemistry and his current interest is the interaction of molecules and materials with biomembrane-like layers and its biological relevance.

Andrew will bring to the panel his expertise in screening technology and its role in the SSBD concept. He can also talk on the wider application of SSBD to advanced materials technology which has been developed during both his SABYDOMA programme and through his chairmanship of WG:E and discussions with the sister projects in NMBP which have been highlighted at this meeting.

Socorro Vázquez Campos

(LEITAT Technological Center, Spain)

- [LinkedIn](#) -

Project coordinator SAbyNA

Dr Socorro Vázquez Campos is the Area Manager of the Human & Environmental Health & Safety (HEHS) group in the Circular Economy Department at LEITAT Technological Centre in Barcelona, Spain. Holding a PhD in Chemistry from the University of Santiago de Compostela (Spain) and Carlsberg research centre (Denmark); broadening her expertise (from chemicals to materials and its implications in medicine/biology) with Postdoctoral positions in several international and multidisciplinary research groups (University of Santiago de Compostela (Spain); University of Twente (The Netherlands); Institut Català de Nanotecnologia (Spain)). In the last 15 years, her research activity is focused at assessing the potential impact of chemicals/ materials/ products/ processes on human health and the environment, along the product's life cycle. Supporting industry in their innovation processes ensuring that their products and processes along the value chain are Safe and Sustainable by Design (SSbD). She has coordinated and participated in numerous European and national projects in materials safety, SbD and SSbD (SURPASS, SAbyNA, ASINA, GRACIOUS, GUIDEnano, NANOFASE...), leading to numerous papers, contributions to several book chapters, conference proceedings, and presentations in international conferences and workshops.

Soco will bring to the panel her expertise on safety assessment methodologies and tools, and its potential applicability/ adaptability towards the implementation of the SSbD concept in industrial innovation strategies. She can also provide some lessons learnt in SAbyNA as well as share the experiences of working in a collaborative way with "sister" projects and similar initiatives for many years in the NSC chairing different working groups.

Anke Jesse

(Head of division C II 6 - Nanoscale Advanced Materials, OECD Chemicals Policy, Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV); & Chair of Malta Initiative, Germany)

Chair of Malta initiative

Dr Anke Jesse (lawyer) is Head of division “NanoscaleAdvancedMaterials,OECDChemicals Policy” at the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection in Berlin since December 2008. Prior to this activity, Dr Anke Jesse was

- Head of Division “Cabinet and Parliament” at the Federal Ministry for the Environment, Berlin (2008-2005),
- Head of the Representation of North Rhine-Westphalia to the Federation, Berlin (2005-2003)
- Head of Minister’s Office at the Finance Ministry of North Rhine-Westphalia, Düsseldorf (2003-2001)
- Research assistant of the SPD parliamentary group in the state parliament, Düsseldorf (2001-1998)
- Department head in Detmold district government, (Ministry for the Interior of North Rhine-Westphalia), Düsseldorf (1998-1994)
- Head of legal department of the re-established Erfurt University (Ministry for Science and Art, Free State of Thuringia), Erfurt (1994)
- Graduation: Law, University of Bielefeld (1993)

Dr Anke Jesse will participate as head of the Malta Initiative – a voluntary network, which aims to

- Steer attention towards priorities for the validation of test methods and development of OECD Test Guidelines
- Support international exchange and cooperation
- Bring together different stakeholders in a constructive dialogue
- Strengthen trust in enforceable legislation and safe innovation

Victor Puentes

(Applied Nanoparticles SL (APPNPS), Vall d’Hebron Institut de Recerca (VHIR), Catalan Institute of Nanoscience and Nanotechnology (ICN2), Spain)

Industry representative

Prof. Dr. Victor Puentes is ICREA Research Professor and Group Leader at the Catalan Institute of Nanoscience and Nanotechnology (ICN2) (2005), with joint appointments in Vall d’Hebron Institute de Recerca (VHIR) (2015). He received his Ph.D. degree in Physics from the University of Barcelona in 1998 and his M.S. degree in chemical engineering from University Louis Pasteur (Strasbourg) in 1994. Between 2000 and 2004 he held a postdoc position as postdoctoral researcher at the University of California–Berkeley (UCB) and the Lawrence Berkeley National Laboratory (LBNL).

As a synthetic chemist I have been trained and sensibilized towards the production and product societal and ecological impacts when involving artificial nanomaterials.

18:30-Open-end | Networking Dinner

Day 2

6th March 2024

Translation & implementation of SSbD:
Towards an innovation-driven SSbD ecosystem

WATCH
RECORDINGS
FROM DAY 2



Day 2: Wednesday, March 06th

09:00-09:30 | Setting the scene:
Translation and valorisation of SSbD

The SSbD framework provides a rational and integrative assessment procedure that for the first time integrates safety, environmental and socio-economic sustainability dimensions.

The framework provides a holistic approach to support the design, development, production and use of chemicals and materials that provide a desirable function or service while being safe and sustainable throughout the entire life cycle. The framework is scientific and technical basis of a Commission Recommendation published in December 2022 for the establishment of the SSbD framework in R&I activities that envisages a 2 year testing period to test and provide feedback after which the framework will be reviewed in order to enhance its relevance, reliability and operability.

As the outcome of the first testing phase and the stakeholder workshop organised to present the first results, the JRC is developing methodological guidance, which will contribute to the revision.

Evangelos (Vangelis) Daskalopoulos
(Policy Officer at DG RTD, European Commission)

- [LinkedIn](#) -

Safe and Sustainable by Design chemicals and materials: state of play

Advanced Materials for Industrial Leadership

Vangelis studied pharmacy and following a year of working as a hospital pharmacist in the UK, decided to return to his native Greece to conduct a PhD Thesis on pharmacology. After acquiring his doctorate, he continued working in basic pharmacology and physiology as a post-doctoral fellow in the Netherlands and Belgium. After a total of 15 years of engagement on basic research he was intrigued to learn more about the roles the European Commission plays in making sense of knowledge in order to inform policy making in Europe. To this end, he joined the Joint Research Centre (JRC) in Ispra and worked for 2 years at the EURL ECVAM, supporting activities towards the promotion of New Approach Methodologies (NAMs) in research. Since January 2023, Vangelis has contributed to the implementation of the European research and innovation (R&I) policy that is related to chemicals and materials. His work as a Policy Officer in DG RTD in Brussels is mainly focused on the 'safe and sustainable by design' framework and towards the preparation of the forthcoming Communication 'Advanced Materials for Industrial Leadership'.

The 1st presentation will provide an overview of the state-of-play of the SSbD framework, the policy background and current activities (incl. R&I opportunities via EU-funded programmes).

The 2nd presentation will provide an overview of the forthcoming 'Advanced Materials for Industrial Leadership' Communication', expected to be adopted in Q1 2024.

Irantzu Garmendia

(Project Officer - EC JRC (ISPRA), European Commission)

- [LinkedIn](#) -

SSbD Framework: JRC perspective on the actual SSbD developments

MSc Irantzu Garmendia Aguirre is project officer at the European Commission's (EC) Joint Research Centre (JRC). She is an Organic Chemist by training with postgraduates on REACH management, Chemical Process Engineering and Sustainable Development and, Toxicology. She is also certified as Occupational Health and Safety advisor. She has dedicated more than 15 years of her professional career to the field of product stewardship and regulatory affairs. At the JRC, she is the SSbD project responsible in the Technologies for Health Unit.

The presentation will provide an overview of the ongoing activities in the testing of the SSbD implementation covering:

- The JRC experience with the case studies
- EC Recommendation 1st testing phase feedback + 4th stakeholder workshop
- SSbD Bootcamp
- Methodological guidance

09:30-10:45 | SSbD approaches for advanced multi-component nanomaterials

There are too many nanomaterials and nanoforms to assess the hazard of each on a case by case basis, especially if that assessment is needed for SSbD purposes at early phases of innovation, when knowledge is scarce and probability of eventual commercialisation is low. The GRACIOUS project developed a framework to support the grouping of similar nanoforms and

developed Integrated Approaches to Testing and Assessment (IATAs) to guide users to identify the most relevant information needed. The SUNSHINE, HARMLESS and DIAGONAL projects have extended this Framework to support the grouping of multicomponent nanomaterials, taking into account their enhanced properties and the potential for different components to interact and modify toxicity. Assessment of similarity, but also rankings, contribute to the comparison of innovative against conventional materials in the Safe and Sustainable by Design (SSbD) context. The present talks demonstrate the conceptual approaches and the application to a case of quantum dots for the intended functionality as a colour converter and to a case of automotive exhaust catalysts enabled by perovskite-oxides.

Vicki Stone

(Heriot Watt University, UK)

- [LinkedIn](#) -

Developing grouping of multi-component nanomaterials to facilitate Sbd

Vicki Stone is Professor of Toxicology at Heriot-Watt University and a member of the UK REACH Independent Scientific Expert Pool (RISEP). She was recognised by Clarivate Analytics as one of the top 1% of researchers for the most cited publications in Pharmacology and Toxicology (2015-2019) and she held the Royal Society of Chemistry Toxicology Award (2015-16). Vicki's research focuses on the toxicology of materials, particles and nanomaterials. She has developed new approach methodologies (NAMs) such as in vitro models and a Framework to support grouping and read-across of nanomaterials (www.h2020gracious.eu). Vicki is now leading an OECD working group to update guidance on the grouping and read-across of nanomaterials and she is a partner in [SUNSHINE](#) (developing safe(r)-by-design strategies for multicomponent nanomaterials).

There are too many nanomaterials and nanoforms to assess the hazard of each on a case by case basis. Furthermore, it is difficult to predict their hazard due to interesting properties

developed at the nanoscale. The GRACIOUS project developed a framework to support the grouping of similar nanoforms, so that data could be shared (read-across) between group members. The GRACIOUS project developed Integrated Approaches to Testing and Assessment (IATAs) to guide users to identify the most relevant information needed to assess similarity to justify grouping and read-across. The SUNSHINE, HARMLESS and DIAGONAL projects have extended this Framework to support the grouping of multicomponent nanomaterials, taking into account their enhanced properties and the potential for different components to interact and modify toxicity. This framework has been structured to aid users to prioritise the testing to support decision making related to safety at different technology readiness levels for multicomponent nanomaterials.

Wendel Wohlleben

(BASF, Germany)

- [LinkedIn](#) -

Similarity of multicomponent nanomaterials in a SSbD context: The cases of quantum dots in TV screens and of perovskites in automotive catalysts

Wendel Wohlleben is Senior Principal Scientist at BASF in the Dept. of Analytical and Material Science, and has a second affiliation to the Dept. of Experimental Toxicology and Ecology. Wendel studied physics in Heidelberg, Paris and Munich, worked as postdoc in Physical Chemistry in Marburg, and was visiting scientist at the Weizmann Institute and at the Harvard School of Public Health. Wendel's research covers both the development of advanced materials and the assessment of safe uses, and specifically in the HARMLESS project Wendel leads the work on case studies and on concepts of analogy.

Concepts of similarity, such as grouping, categorization, and read-across, enable a fast comparative screening of hazard, as introduced by Vick Stone. Assessment of similarity, but also rankings, contribute to the comparison of innovative against conventional materials in the Safe and Sustainable by Design (SSbD)

context. The present talk demonstrates multi-dimensional similarity assessment on two cases of multicomponent nanomaterials (MCNM):

- First, on quantum dots (QDs) of different compositions and core-shell structures. The SUNSHINE, HARMLESS and DIAGONAL projects have compared and ranked the case study materials amongst themselves and against well-known benchmark materials to calibrate the data matrix to the biologically relevant range. The similarity of fluorescence spectra was assessed as a measure of the QD performance for the intended functionality as a colour converter.
- Second, on automotive exhaust catalysts enabled by perovskite-oxides. The HARMLESS project amended the above screenings, comparisons and rankings by an additional consideration of transformation products. The bio-transform and induce multi-component clearance and hazard in excellent agreement of screening methods and in-vivo confirmation. In this case, the trade-offs between in-chemico, in-vitro and performance screenings (high-throughput) identify a preferred SSbD version.

10:45-11:15 | Coffee break

11:15-12:45 | SSbD decision support system & industrial implementation

In this session the industrial implementation of the SSbD approaches that are developed in the NMBP-16 projects SUNSHINE, HARMLESS and DIAGONAL will be presented. Next to their SSbD approach, each of the projects will elaborate on the industrial implementation using the Safe and Sustainable by Design e-infrastructure developed within SUNSHINE, the Decision Support System developed within HARMLESS and the application of the SSbD approach to a case studies within DIAGONAL.

Lisa Pizzol

(Green Decision, Italy)

- [LinkedIn](#) -

SUNSHINE SSbD approach and e-infrastructure

Lisa Pizzol, PhD in environmental science from the University Ca' Foscari of Venice, is a senior scientist and consultant specialising in risk assessment, management, and sustainability evaluation of chemical substances and nano(bio)materials used in industrial products and medical devices. With expertise in the application of multi-criteria decision analysis methodologies in the environmental sector, she has also played a key role in developing software-based decision support systems for environmental issues. Presently, her focus lies in conducting sustainability assessments for products, processes, services, and organisations through the implementation of life cycle assessment (LCA), life cycle costing (LCC), and social life cycle assessment (s-LCA). Lisa has actively participated in and contributed to various EU and national projects, including SUNSHINE, SAFE-n-MEDTECH, REFINE, BIORIMA, caLIBRAtE, GLOCOM, SYRIADE, TIMBRE, SUN, FOKS, and DESYRE. Beyond her research roles, she serves as President and CEO of GreenDecision.

Dr Pizzol will introduce the SUNSHINE tiered SSbD approach developed for advanced nanomaterials and its implementation within the Safe and Sustainable by Design (SSIA) e-infrastructure designed to facilitate the development of safer and more sustainable advanced (multicomponent) nanomaterials (MCNMs) by industry, especially SMEs. The SUNSHINE tiered SSbD approach is composed of two tiers, each applied along the entire lifecycle of the chemicals/materials/products, which address different stages of the innovation process and are characterised by different levels of complexity and specificity of the applied assessment methods.

Blanca Suarez Merino

(TEMAS Solutions GmbH (TEMASOL), Switzerland)

- [LinkedIn](#) -

HARMLESS SSbD Framework, tools and Design Principles

Dr Suarez Merino (DPhil Oxford Biochemistry) is the Cofounder of TEMAS Solutions GmbH and Regulatory Affairs Director at the Nanotechnology Industries Association. Dr Suarez-Merino is Vice Chair of the BIAC Nanotechnology Committee at the OECD contributing to several groups under the OECD WPMN including the Steering Group on Advanced Materials and the Safe Innovation Approach. She also contributes to the Nanomaterial Expert Group under ECHA and the EFSA's Stakeholder Discussion Group on Emerging Risks (StadDG-ER). She is also a National Expert under the Nanotechnologies Standardisation Group (SNV) and routinely contributes to work under CEN/TC 352 Nanotechnologies, leading the SSbD standard. Dr Suarez-Merino is also a member of the Swiss National Platform on the safe handling of synthetic nanomaterials and co-authored the update of the Precautionary Matrix for Nanomaterials, and contributed to different testing guidelines for safety assessment of nanomaterials, the latest one being the adaptation of OECD TG 442D. She has been very active in European Projects focusing on Regulatory research and nanomaterials for several years.

Dr Suarez Merino will introduce the HARMLESS SSbD Framework which includes recommended tools and Design principles to assist industry in the implementation of SSbD strategies

Susan Dekkers

(TNO, The Netherlands)

- [LinkedIn](#) -

HARMLESS Decision Support System (DSS) for Safe and Sustainable by Design (SSbD)

Susan Dekkers is a senior scientist at the department of Risk Analysis for Products in Development at TNO in the Netherlands. Her

main expertise is in hazard prediction, human health risk assessment and safe and sustainable by design approaches of chemical substances and advanced (nano)materials. She is involved in various projects on the development and application of innovative methods (such as in vitro high throughput screening, omics, adverse outcome pathway concepts and other new approach methodologies) in safe and sustainable by design approaches and toxicological risk assessment.

Dr Dekkers will introduce the HARMLESS Decision Support System which provides innovators with design and assessment advice on the safety and sustainability of their material in the various stages of the innovation process.

Carlos Rumbo

(University of Burgos (UBU), Spain)

Metallic HARNs for printed electronics: Ag nanowires

Carlos Rumbo obtained his PhD in Health Sciences from the University of A Coruña, (Spain). During this period, he was member of the Department of Microbiology at the Biomedical Research Institute of A Coruña (INIBIC), and his research was focused on the study of different fields on the biology of the nosocomial pathogen *Acinetobacter baumannii*, including mechanisms of multidrug resistance, role of outer membrane vesicles as transformation vectors and virulence. As postdoctoral researcher, he was involved in different projects carried out at INIBIC related to the development of new approaches to prevent and treat nosocomial pathogen infections. In 2016 he joined the Bioorganic group in the Chemistry department of the University of Burgos, where he participated in a regional project developing different research activities related with toxicology and microbiology, as well as collaborating with ICCRAM. In 2018 he joined the ICCRAM. As senior researcher in this institution, he was mainly involved leading different tasks related with toxicology and microbiology in several European Projects, as well as being the toxicology lab manager. In October 2022 he became the head of the to-

xicology group of ICCRAM. Currently he is one of the coordinators of the DIAGONAL project (NMBP-16).

Dr Rumbo will introduce one of the case studies analysed in the DIAGONAL project (Ag nanowires), including the different activities performed in the project on the safety and sustainability of these materials, and the recommendations provided.

12:45-14:15 | Lunch

14:15-15:45 | Knowledge sharing within the SSbD community
- An interactive PARC and IRISS session

This session will focus on information transfer for implementation of the SSbD concept at different stages of innovation. The work on SSbD in PARC and the link between IRISS and PARC will be presented in order to explore novel ways of collaboration.

Emma Strömberg

(Swedish Environmental Research Institute (IVL), Sweden)

- [LinkedIn](#) -

Knowledge sharing within the SSbD community
- An interactive PARC - IRISS session

Emma Strömberg is an Associate professor in polymeric materials and she works as a senior researcher at IVL Swedish Environmental Research Institute. The work is focused on solutions for waste management, design for recycling, circular economy, chemicals in products and waste, standardisation and design for safe- and sustainable materials. She is currently involved in EU projects on development of novel materials (BioPlastics Europe, TORNADO, CheMatSustain) and is coordinating an EU-funded project IRISS - The International ecosystem for accelerating the transition to Safe-and-Sustainable-by-design materials, products and processes.

Denis Sarigiannis

(Aristotle University of Thessaloniki (AUTH), Greece)

- [LinkedIn](#) -

Denis Sarigiannis is Director and Chairman of the Board of the National Hellenic Research Foundation. He is also Professor of Environmental Engineering and Director of the General Chemical Technology Laboratory of the Department of Chemical Engineering and of the research center on the Exposome and Health at the Center for Interdisciplinary Research and Innovation of Aristotle University of Thessaloniki in Greece. Moreover, he is Professor of Environmental Health Engineering at the Institute for Advanced Study (IUSS) in Pavia, Italy, Director of the Research Center on Complex Risk and Data Analysis and member of the coordination team of the nation-wide PhD program on Sustainable Development and Climate at the Institute for Advanced Study (IUSS) of Pavia in Italy and visiting Professor at the University of Paris. He has been working on the safe by design paradigm in complex energy and chemical processing systems for over 30 years and he is currently leading the work on SSbD in the EU partnership on the assessment of the risk of chemicals (PARC).

Doris Völker

(UBA, German Environment Agency, Germany)

- [LinkedIn](#) -

Doris Völker is working as a biologist at the German Environment Agency in the division on chemical safety. Her main focus is on the environmental risk assessment of nanomaterials and the needs for adaptation of methods and instruments to provide reliable data to comply with regulatory information requirements. Recently, this work has been expanded to also cover challenges in safety assessment of advanced materials. In EU Partnership PARC, she is involved in the development of a knowledge sharing platform on SSbD.

Anne Chloé Devic

(SSbD Consulting Europe SL, Spain)

- [LinkedIn](#) -

Anne Chloé Devic has a Master's degree in Chemistry and Chemical engineering with a specialisation in Polymers from the Ecole Nationale Supérieure de Chimie in Montpellier, France. After being Senior Innovation Manager in the European Chemical Industry Council (Cefic) in Brussels between 2020 and 2022, she is now CEO of the newly formed SSbD consulting Europe SL company (safe and sustainable by design). Apart from her past industrial experience successively in ICI, Huntsman and Repsol in various R&D manager positions, she has been responsible for innovation policies and funding opportunities in Cefic, and also representing the area of advanced materials and coordinating 17 SusChem's National Technology Platforms for the European platform.

15:45-16:15 | **Coffee break**

16:15-17:45 | **Roundtable discussion:
Creating long-term impact for society
considering multistakeholder needs**

Many different stakeholders have interest in development and implementation of SSbD: consumers, industry, public authorities and academia. Understanding multi-stakeholder needs in the early stage helps to address them timely and systematically. How can we create an innovation-driven ecosystem for SSbD that takes into account different needs of stakeholders in a pro-active and participative way? In this round table stakeholders from different perspectives will discuss HOW to support the implementation of SSbD, WHICH adoptions of methods/tools are needed to maximise long-term impact, and WHAT regulatory and/or policy aspects shall be addressed/sponsored by future initiatives.

The goal of the Roundtable is:

- To identify key aspects that are addressed by the presented initiatives and their relevance

for different stakeholder-groups.

- To address specific needs in terms of making the available knowledge accessible and/or applicable and/or translate the developments from R&D towards implementation e.g., regulatory, policy, industry, etc.
- To discuss the requested resources and opportunities to maximise the long-term impact of the developed assets.

Moderator:

Monique Groenewold

(RIVM)

- [LinkedIn](#) -

NSC coordination team

Monique Groenewold, is senior policy advisor at the Dutch institute for Public Health and Environment (RIVM). After her study of toxicology she held various positions in the international research and policy field of safety of chemicals including senior project manager, product manager, team manager and policy officer in both private and (semi)-public organisations. She coordinated the EC research project Gov4Nano 'Risk Governance - meeting the needs for Nanotechnology' (2019-2023). She is Head of Knowledge and Information Centre on Risks of Nano & Advanced materials (since 2011), chair of the OECD Working Party on Manufactured Nanomaterials (since 2022), head of the Dutch Delegation of OECD WPMN, board member of the Malta Initiative and one of the initiators of Early4AdMa 'Earlyawareness and actions system for Advanced Materials'.

Panellists:

Evangelos (Vangelis) Daskalopoulos

(Policy Officer at DG RTD, European Commission)

- [LinkedIn](#) -

EC representative DG-RTD

Vangelis studied pharmacy and following a year of working as a hospital pharmacist in the UK, decided to return to his native Greece to conduct

a PhD Thesis on pharmacology. After acquiring his doctorate, he continued working in basic pharmacology and physiology as a post-doctoral fellow in the Netherlands and Belgium. After a total of 15 years of engagement on basic research he was intrigued to learn more about the roles the European Commission plays in making sense of knowledge in order to inform policy making in Europe. To this end, he joined the Joint Research Centre (JRC) in Ispra and worked for 2 years at the EURL ECVAM, supporting activities towards the promotion of New Approach Methodologies (NAMs) in research. Since January 2023, Vangelis contributes to the implementation of the European research and innovation (R&I) policy that is related to chemicals and materials. His work as a Policy Officer in DG RTD in Brussels is mainly focused on the 'safe and sustainable by design' framework and towards the preparation of the forthcoming Communication 'Advanced Materials for Industrial Leadership'.

Vangelis will bring in the panel discussion the European Commission's perspective and his insights into the current state-of-play of the SSbD framework.

Danail Hristozov

(University Ca' Foscari of Venice, Italy)

- [LinkedIn](#) -

SUNSHINE Project coordinator

Dr Danail Hristozov is the founder and Scientific Director of EMERGELtd in Bulgaria and co-founder and Head of Research of Greendecision Srl, a spin-off company of University Ca' Foscari of Venice in Italy. Danail has participated in more than 20 European FP7, H2020 and HE projects where he has performed integrative research across the areas of risk governance and sustainability of chemicals, (advanced) nanomaterials and biomaterials used in consumer products and medical applications. He has coordinated the large EU FP7, H2020 and HE projects SUN, SUNSHINE and SUNRISE, which have pioneered the state-of-the-art frameworks and tools for Safe & Sustainable by Design advanced (nano)materials. Danail has been a senior scientist at the Department of Environmental Science, Informatics

and Statistics of University Ca' Foscari of Venice and a researcher at Venice Research Consortium and Veneto Nanotech. In his early years, Danail was employed as a research fellow at the Chair of Industrial Sustainability of the Brandenburg University of Technology in Germany.

Dr Hristozov will provide the perspective of the SUNSHINE project on the paradigm shift towards prevention-based risk governance via application of the SSbD approach to emerging chemicals and advanced materials.

Carlos Rumbo

(University of Burgos (UBU), Spain)

DIAGONAL Project coordinator

Carlos Rumbo obtained his PhD in Health Sciences from the University of A Coruña, (Spain). During this period, he was member of the Department of Microbiology at the Biomedical Research Institute of A Coruña (INIBIC), and his research was focused on the study of different fields on the biology of the nosocomial pathogen *Acinetobacter baumannii*, including mechanisms of multidrug resistance, role of outer membrane vesicles as transformation vectors and virulence. As post-doctoral researcher, he was involved in different projects carried out at INIBIC related to the development of new approaches to prevent and treat nosocomial pathogen infections. In 2016 he joined the Bioorganic group in the Chemistry department of the University of Burgos, where he participated in a regional project developing different research activities related with toxicology and microbiology, as well as collaborating with ICCRAM. In 2018 he joined the ICCRAM. As senior researcher in this institution, he was mainly involved leading different tasks related with toxicology and microbiology in several European Projects, as well as being the toxicology lab manager. In October 2022 he became the head of the toxicology group of ICCRAM. Currently he is one of the coordinators of the DIAGONAL project (NMBP-16).

Dr Rumbo will be representing the project

DIAGONAL, providing the perspective gained through the evaluation of 7 industrial scenarios across different positions in the value chain. This project actively contributes to provide insights on the industry and technology developers' needs regarding SSbD of MCNMs and HARNs.

Otmar Schmid

(Helmholtz Zentrum München (HMGU), Germany)

- [LinkedIn](#) -

HARMLESS Project coordinator

Otmar Schmid is head of the Pulmonary Aerosol Delivery Group at the Comprehensive Pneumology Center and Helmholtz Center Munich (Germany). He received his Ph.D. in physics from the Missouri University of Science and Technology and he held postdoctoral positions at Denver University (USA) and the Max-Planck Institute of Chemistry in Mainz (Germany). He is an aerosol physicist with 20 years of experience in the field of inhalation (nano-)toxicology and pulmonary drug testing. He has developed commercially available technologies for aerosol delivery and dosimetry for in vitro and in vivo models of the lung and he worked on in vitro / in vivo extrapolation of toxicological and therapeutic effects of inhaled substances. He has participated in several EU-funded nanosafety projects and he is currently co-coordinator of the HARMLESS (NMBP-16) project, which works towards integration of safe and sustainable by design strategies for advanced materials into the multi-stage process of commercial product development.

Representation of the activities of the HARMLESS project related to creating long-term impact of their project on SSbD of Advanced Materials.

Emma Strömberg

(Swedish Environmental Research Institute (IVL), Sweden)

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IRISS Project coordinator

Emma Strömberg is an Associate professor in polymeric materials and she works as a senior researcher at IVL Swedish Environmental Research Institute. The work is focused on solutions for waste management, design for recycling, circular economy, chemicals in products and waste, standardisation and design for safe- and sustainable materials. She is currently involved in EU projects on development of novel materials (BioPlastics Europe, TORNADO, CheMatSustain) and is coordinating an EU-funded project IRISS - The International ecosystem for accelerating the transition to Safe-and-Sustainable-by-design materials, products and processes.

Emma Stromberg represents the IRISS project, providing insights on research and knowledge needs, and challenges and possibilities in implementation of the SSbD concept identified by the 7 value chains represented in the project.

Denis Sarigiannis

(Aristotle University of Thessaloniki (AUTH), Greece)

- [LinkedIn](#) -

Representative of PARC Project

Denis Sarigiannis is Director and Chairman of the Board of the National Hellenic Research Foundation. He is also Professor of Environmental Engineering and Director of the General Chemical Technology Laboratory of the Department of Chemical Engineering and of the research center on the Exposome and Health at the Center for Interdisciplinary Research and Innovation of Aristotle University of Thessaloniki in Greece. Moreover, he is Professor of Environmental Health Engineering at the Institute for Advanced Study (IUSS) in Pavia, Italy, Director of the Research Center on Complex Risk and Data Analysis and member of the coordination team of the nation-wide PhD program on Sustainable Development and

Climate at the Institute for Advanced Study (IUSS) of Pavia in Italy and visiting Professor at the University of Paris. He has been working on the safe by design paradigm in complex energy and chemical processing systems for over 30 years and he is currently leading the work on SSbD in the EU partnership on the assessment of the risk of chemicals (PARC).

Denis Sarigiannis will present the work of PARC on SSbD covering all aspects from strategic interactions with policy makers and stakeholders, development of the SSbD toolbox, testing it and improving it through case studies and providing training and capacity building.

Mar Gonzalez

(Organisation for Economic Co-operation and Development (OECD), France)

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OECD representative

Mar Gonzalez joined the Organisation for Economic Co-operation and Development (OECD) in 2004. Over the years, she has had several responsibilities addressing the safety/risk assessment and international harmonisation in the regulation of chemicals and products of modern biotechnology. As such, she has been involved in various technical programmes covering biosafety, the safety of novel foods and feeds, chemical accidents prevention, preparedness and response, nanomaterials, advanced materials, and test guidelines. Mar was involved in the establishment of the Working Party on Manufactured Nanomaterials in 2006. Since then, Mar has been coordinating the implementation of its programme of work, which includes the development of tools to enhance regulatory preparedness on emerging issues such as those related to NM and Advanced Materials. As a consequence, Mar has contributed to the evolution of the nanosafety programme which now includes work on the Safe(r) and Sustainable Innovation Approach (SSIA) which aims to support SSbD implementation. Mar has a BA in Physical Anthropology, a Master degree in Biotechnology and Ethics from the University of Sheffield, UK and a UN Diploma on Biosafety.

Mar will provide the perspective of the OECD regarding the risk governance of NM and AdMa and the role that SSIA can offer in facilitating SSbD Implementation.

Thomas Jakl

(Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK), Austria)

Austrian Ministry representative

- PhD, MSc Plant Physiology, Earth Sciences
- AT - Fed. Ministry for Environment - Deputy Director General
- PARC – Horizon Europe Partnership Risk Assessment of Chemicals - Chair of Governing board
- European Chemicals Agency (ECHA) – Member of Management board (2007-2016; Chair from 2008 to 2012)
- Austrian Federal Agency for Site Remediation – Chair of Supervisory board
- Austrian Federal Environment Agency – Member, Supervisory Board
- International Sustainable Chemistry Collaborative Centre, Member, Advisory Council
- Global Green Chemistry Initiative, Member, Advisory Board

Thomas Jakl will shed light on the potential for governments to strengthen the SSbD concept as well as to its integration into political/regulatory instruments.

