BNN

ISSUE 02/2023

QUARTERLY

Digital Magazine for Developments in Sustainable Technology

FOCUS TOPIC:

Leveraging new technologies for societal impact

INNOVATION IS THE KEY.
SUSTAINABILITY LEADS THE WAY.

Cover: Smart skin is a wafer-thin material that reacts simultaneously to force, moisture and temperature with extremely high spatial resolution and emits corresponding electronic signals.

WWW.BNN.AT

Editorial

UNDERSCORING THE SOCIETAL IMPACT FROM OUR NETWORK

The past few years of the global pandemic have highlighted the far-ranging effects of health crises. Besides statistics about COVID-related deaths and illness[1], resulting mental health issues and societal polarization[2] regarding issues such as vaccination and trust in science came to the fore. Furthermore, so-called secondary health impacts, such as lost income, food shortages and social isolation[3] affected myriad aspects of daily life. Both primary and secondary impacts were skewed in terms of income level, gender and race, among other factors, increasing inequality.

At BNN, we are humbled to maintain a network of companies and organizations that are using new technologies to solve health challenges as well as many others – while also positively impacting society.

Whether creating effective therapies for rare diseases, educating the general public about nanotoxicology, reducing raw material consumption, or employing people with disabilities for upcycling projects, our members are using their innovations to improve the lives of those around them – read on in our Focus Topic section “Leveraging New Technologies for Societal Impact” to find out how they carry out this meaningful work.

Creating societal impact starts by getting to know the community – and the past few months have brought a wealth of in-person and hybrid events where we connected with other players in the nano- and advanced materials communities, which you can read about under BNN News.

Don’t miss the opportunity to meet the BioNanoNet Association members and broader community at the BioNanoNet Annual Forum and Networking Event on 13 September 2023 in Vienna, Austria at TUtheSky with breathtaking views of Vienna’s city center. You can expect a day of enriching talks and stimulating networking opportunities.

Hope to see you in Vienna this fall!

Andreas Falk, CEO

1. https://covid19.who.int/
2. https://doi.org/10.1038/s41586-022-05607-y
3. doi: 10.3390/ijerph18020683

Table of contents

ISSUE 02/2023

BioNanoMed Conference 2023 Was a Success

The 11th International BioNanoMed Congress “Nanotechnology enables Personalized Medicine” was jointly organized by Tech-konnex - High-Tech Promotion, the University of Graz, Institute of Pharmaceutical Technology & Biopharmacy, and the Medical University Graz in cooperation with the Johannes Kepler University Linz from 12 - 14 April 2023 in Graz, Austria.

After taking a pandemic-related break, the BioNanoMed 2023 congress was again a remarkable success and has been established as an internationally recognized congress for the bio/nano/medicine-community. This year, BioNanoMed could attract about 130 participants from 22 different nations.

Recent advances in nanomedicine ranging from nanomaterials for biomedical applications & regenerative medicine, drug delivery & nanotherapy, nanotechnology for imaging, sensing & diagnostics, pharmaceutical nanotechnology & drug design as well as biophysical nanotechnology & single molecule technology aspects were presented.

The program of BioNanoMed 2023 with 48 presentations included outstanding keynote & invited talks! Posters presented by young researchers significantly contributed to the high scientific level of the meeting. MDPI and the Erwin Schrödinger Society of Nanosciences by sponsored 3 poster prizes.

The best speaker presentation was evaluated by the chairs of the Austrian technology platform NanoMedicine-Austria and awarded by its representatives Sebastian Schwaminger and Susanne Resch during the closing ceremony. Congratulations to Nina Kostevšek from the Jozef Stefan Institute (Ljubljana, Slovenia), who received the best oral presentation award for her talk "Magneto-Erythrocyte Membrane Vesicles as T2 MRI Contrast Agents" in the session "Nanotechnology for Imaging, Sensing and Diagnostics." NanoMedicine-Austria was very pleased to sponsor the Best Talk Award 2023 and thanks all speakers for their great presentations – the decision was difficult as the overall level of the talks was very high.

From the left: NanoMedicine-Austria chair Sebastian Schwaminger (Medical University of Graz), Nina Kostevšek (Jozef Stefan Institute) and NanoMedicine-Austria coordinator Susanne Resch (BNN)

Thanks to all excellent speakers and contributors, we enjoyed a highly interesting conference in Graz and are already looking forward to the next edition of the BioNanoMed conference.

For more pictures of the conference, visit https://bio-nanomed.at.

Our member NANOMOL won the BNN QUARTERLY raffle and received a ticket to the BioNanoMed 2023 conference

Many people subscribed to our BNN Quarterly by 12 December 2022 and entered into a free conference registration raffle at BioNanoMed or nanoSAFE in 2023. The winner was drawn at random and got to decide which conference to attend, paid for by BNN. We congratulate Lidia Ferrer of NANOMOL Technologies, who chose a ticket for the BioNanoMed conference 2023. Susanne Resch and Johanna K. Scheper were pleased to present the conference ticket and a nice Styrian goodie bag with traditional Styrian snacks.

From the left: Susanne Resch (BNN), Lidia Ferrer (NANOMOL TECHNOLOGIES) and Johanna K. Scheper (BNN)

From the left: Patrick Pammer (Competence Center CHASE GmbH), Andreas Falk (BNN), Bettina Mihalyi-Schneider (Technische Universität Wien), Josef Wünsch (BASF), Fabian Weinhandl (BDI – BioEnergy International GmbH) © CHASE

CHASE Expert Day in Cooperation with SusChem–AT

In April 2023, the third CHASE Expert Day took place, a series of events for technical exchange between CHASE partners. This time CHASE organized the event with SusChem-AT, the Austrian national technology platform in the field of sustainable chemistry.

Under the title “Transformation towards Sustainable Process Industries”, numerous guests from industry and science were invited to the Open Innovation Center (OIC) at the Johannes Kepler University Linz.

On Day 1 the event started with SusChem-AT contributions covering “Framework for Sustainable Process Industries”. We had the pleasure to listen to renowned speakers from the network. Keynote speaker Josef Wünsch, Chair of ETP-SusChem and Senior Vice President R&D Performance Materials at BASF, opened Session 1 with his talk on “Sustainable Raw Materials and Energy Supply”. Further interesting presentations were given by the leading team of SusChem-AT: Andreas Falk, Bettina Mihalyi-Schneider and Fabian Weinhandl. The following session covered the topic “New Technologies Enabling Sustainable Process Industries” wherein technology partners of CHASE contributed. Amongst the speakers were the CEO of NGE - Next Generation Elements Sven Wolf; Head of R&D at Neveon, Roland Krämer; a founder of Plasmion, Jan-Christoph Wolf; and business developer Paul Voithofer.

On Day 2 the stage was reserved for contributions of invited, associated and scientific partners. Prof. Kosek and Prof. Schleper started off lectures on the topic of “Scientific Perspectives on Sustainable Processing” followed by contributions of Mark Hlawitschka & Wolfgang Schöfberger. Thereafter we had presentations from Roman Kern (Know-Center), Martine Brandsma (NTCP), Christoph Burgstaller (TCKT) and Klaus Straka (LIT-Factory) on “Innovations in Sustainable Conversion Processes”. The last two sessions concluded the Expert Day with contributions on the latest research activities of CHASE held by CHASE employees and PhD students.

The CHASE Expert Day was a great opportunity for professionals and researchers to stay up-to-date on the latest activities in their field. The active involvement from all participants truly illustrated the spirit of collaboration required for creating a sustainable future across all industries.

CHASE is member of BioNanoNet association, and CEO Patrick Pammer is holding a SusChem-AT co-chair position. We invite you to join SusChem-AT as a partner and follow the technology platform on LinkedIn.

Participants of CHASE Expert Day & SusChem-AT Day © CHASE

Impressions from the 12th NanoSafety Training School on Safe and Sustainable by Design Approaches for Chemicals, Advanced Materials & Plastics

Nurturing International Collaboration to Advance Research for a More Sustainable Future

For yet another consecutive year, a vibrant community of young researchers and experts from various disciplines met in the historical center of Venice for the 12th Nanosafety Training School, held on 15-19 May 2023, to discuss the latest approaches and trends in the field of advanced (nano) materials.

In line with Europe's ambition towards Safe and Sustainable by Design (SSbD) this year’s school focused on SSbD approaches for chemicals, advanced materials & plastics.

Jointly organized by the Horizon2020 flagship projects SUNSHINE, DIAGONAL, HARMLESS, ASINA, SABYDOMA, SAbyNA, SbD4Nano, and the US-led INFRAMES initiative, this edition of the school brought in international perspectives on a number of topics, including:

- ✔ SSbD approaches for nanomaterials and advanced materials
- ✔ Environmental and health impacts of micro and nano plastics
- ✔ Physicochemical characterisation methods for advanced materials
- ✔ Methods to assess the release of advanced materials, their fate, biodistribution and exposure

- ✔ New approach methodologies (NAMs) for hazard assessment of advanced materials
- ✔ FAIR data management in nanoinformatics
- ✔ Computational modelling of properties and interactions
- ✔ Sustainability assessment methods (environmental, social and economic)
- ✔ Policy perspectives on risk governance of nanotechnologies
- ✔ Responsible Research and Innovation

With a global presence of more than 130 scientists from academia, research institutions, industry, governmental institutions, and NGOs including around 30 online participants spanning Europe, USA and Korea, this year's school hits the greatest attendance rate in our history.

Featuring interactive hands-on sessions, a number of keynote speeches and various networking opportunities, we were proud to host representatives from the JRC and the EC to comment on the Commission recommendation for safe-and-sustainable-by-design chemicals and materials.

"Nurturing international collaboration" was the mission of this years' school with the presence of the US-led INFRAMES (International Network for Researching, Advancing, and Assessing Materials for Environmental Sustainability) community at the event. Hosting their annual meeting in parallel and together with the school, we were able to provide an avenue to boost the US and EU networks addressing materials sustainability, foster knowledge exchange and discuss staff exchange opportunities.

INFRAMES Partners and School Participants

INFRAMES includes 18 US universities associated with the Center for the Environmental Implications of NanoTechnology (CEINT) and the Center for Sustainable Nanotechnology (CSN), along with networks representing over 100 participating EU and UK partners, the Kwame Nkrumah University of Science and Technology (KNUST) in Ghana, and researchers at six synchrotron X-ray facilities in four countries.

This year's main organizer was the SUNSHINE project, together with partners from SUNSHINE, DIAGONAL, HARMLESS, ASINA, SABYDOMA, SAbyNA, SbD4Nano and the INFRAMES initiative.

However, the school would not have been possible without further support and contributions from

- ✔ CHARISMA, AURORA, PLASTICHEAL, PlasticsFatE, IMPTOX, POLYRISK, NanoSolveIT, NanoInformaTIX, ACCORDs, BIO-SUSHY (all funded by the EU Horizon 2020 programme)
- ✔ CompSafeNano (Marie Skłodowska-Curie Actions)
- ✔ SUPREME, MACRAMÉ, REPOXYBLE (Horizon Europe)
- ✔ SmartCERIALS (funded by the Austrian Research Promotion Agency, FFG)
- ✔ CUSP Cluster
- ✔ EU NanoSafety Cluster
- ✔ Early Career Researchers Group

All presentation slides and materials are public and now available to download here.

These projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements n° 952924 (SUNSHINE), n° 862444 (ASINA), n° 952921 (CHARISMA), n° 953152 (DIAGONAL), n° 953183 (HARMLESS), n° 862296 (SABYDOMA), n° 862419 (SAbyNA), n° 862195 (SbD4Nano), n° 964827 (AURORA), n° 965367 (PLasticsFatE), n° 965196 (PLASTICHEAL), n° 964766 (POLYRISK), n° 965173 (IMPTOX), n° 814572 (NanoSolveIT), n° 101008099 (CompSafeNano), n° 814426 (NanoInformaTIX), n° 101058422 (SUPREME), n° 101092686 (MACRAMÉ), n° 101091891 (REPOXYBLE), n° 101091464 (Bio-SUSHY) and n° 890610 (non-EU, Austrian SmartCERIALS).

Where Milliliters met Nanometers: Pint of Science with BRAVE, JOANNEUM RESEARCH, BST and BNN

Pint of Science is an international science festival where researchers share their latest findings in neighborhood pubs in multiple cities. On 22 May 2023, BNN hosted the Pint of Science Austria session **"Invisible to the eye – New technologies under the magnifying glass"** in Graz at Bar8020.

The laid-back evening held in German included an introduction by Susanne Resch (BNN), followed by a talk by Christian Hill from BRAVE Analytics about their solution for particle analysis using light beams, which is being developed within NanoPAT.

Next, Richard Gruber from Bionic Surface Technologies followed up with a closer look at the small channels (riblets) that can affect fluid flow.

Finally, Martin Smolka from JOANNEUM RESEARCH explained how to make and use microscopic chip labs, mentioning their work in the NextGenMicrofluidics project.

At the end, Susanne Resch & Clemens Wolf tested the participants' knowledge with a pub quiz done via Mentimeter on their phones. Around 40 participants across all age ranges attended, enjoyed drinks and learned a lot. We look forward to #PintofScience24!

NanoHarmony

European Safety and Sustainability Assessment: Fit for the Future

In Brussels on 23 May, the NanoHarmony project brought together policymakers and regulators, industry and industry bodies, OECD representatives and national coordinators and representatives of standardization and metrology bodies from the EU and member states to discuss the way forward for a European Test Methods Strategy.

During the day, delegates learned about the need for a coherent European approach to support internationally accepted standardized test methods to ensure that the goals addressed in the European Green Deal and the Chemicals Strategy for Sustainability can be delivered whilst building trust in safe innovation and ensuring the competitiveness of European industry. The NanoHarmony project presented a coherent approach to achieving the needed test methods for ensuring that European regulations are fit for the future.

Delegates heard from both regulators like the European Chemicals Agency (ECHA) and industry about the need for a test methods strategy. The achievements made over the last few years as part of the Malta Initiative to provide new test methods for nanomaterials and the needs for the next generation of advanced materials as part of the Advanced Materials Initiative 2030 (AMI2030) were also presented.

Thomas Kuhlbusch, Federal Institute of Occupational Safety and Health (BAuA, Germany) and NanoHarmony Coordinator, said, "NanoHarmony has shown the rapid advances that can be made to ensure that effective test guidelines are in place for nanomaterials by bringing together all relevant stakeholders and how this approach can be used for tomorrow's advanced materials. Continued support through a coherent European Test Methods Strategy will help ensure that safe and sustainable material innovations can be brought to the market for the benefit of European citizens."

Andrej Kobe stated in the opening of the event "DG Environment welcomes the work and achievements of NanoHarmony. New and highly relevant test methods for regulations such as REACH were finalized and agreed. It is important that test methods for regulatory purposes are continuously updated and developed to support effective regulatory implementation. As demonstrated by NanoHarmony, scientific community is instrumental in that regard."

From left to right: Sabine Frey (BAG), Blanca Suarez (TEMASOL), Monique Groenewold (RIVM), Isabella De Angelis (ISS), Eric Bleeker (RIVM), and Andreas Falk (BNN)

Eric Bleeker, The National Institute for Public Health and the Environment (RIVM, Netherlands) and author of the NanoHarmony white paper presented during the meeting, explained, “The need for a better strategy to coordinate test method developments became more than evident during NanoHarmony. EU research funding has led to great advances in science. This includes contributions to new and needed test methods usable for regulatory testing. But there needs to be something in place to help these methods through the process to become harmonized OECD Test Guidelines!”

Philippe Jacques, Co-Chair of the AMI2030 Initiative, was enthusiastic: “It is great to see the progress that has been made in developing test methods for nanomaterials and we need this extended to other advanced materials. A formal strategy and structure to support the development of future test methods will help ensure that we can make similar advances for safe and sustainable innovations in advanced materials.”

Blanca Suarez, Regulatory Affairs Director at the Nanotechnology Industries Association emphasized, “Industry needs the certainty of acceptance that OECD Test Guidelines provide. They allow new innovations to reach the market safely and efficiently and help enable global trade. The NIA and its members would welcome the development of a coherent test methods strategy to cement the advances made during NanoHarmony and allow new test methods to be effectively advanced into new Test Guidelines and bring together all relevant stakeholders to ensure that this happens.”

Attendees at the **European Safety and Sustainability Assessment: Fit for the Fu–**

ture event heard from speakers about how industry, regulators, member states, NGOs and scientists contribute to and use OECD Test Guidelines and the need for a coherent European approach to ensure safe innovation and support European industry. As part of the larger Malta Initiative NanoHarmony has supported the development of a European Test Methods Strategy as a coordinated effort that will lead to better outcomes for European industry and citizens.

To help the development of future Test Guidelines, NanoHarmony is developing a white paper with recommendations for policymakers, an online tool to help future test method developers and training materials that can be used to help educate the next generation of scientists. Further details of these project outcomes will be published in September 2023.

Download the proposed European Test Methods Strategy.

Representatives of relevant EC-funded projects (e.g., HARMLESS, SABYDOMA, IRISS, PARC), NGOs, as well as key players such as the European Commission, OECD, ECHA, governmental institutes, and large industry, joined the meeting, shared their views, and dis-cussed potential recommendations that shall be included in the abovementioned white paper.

For further information, images of the event or to interview relevant NanoHarmony people, please contact the NanoHarmony Project Manager Seden Caglar (caglar.seden@baua.bund.de).

Andreas Falk (BNN) and Cris Rocca, representing NSC

Alexander Pogany (BMVIT & Chair of the Malta Initiative Board)

Wim De Coen (ECHA) during his presentation

These projects have received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreements n° 953183 (HARMLESS) and n° 862296 (SABYDOMA) and the European Union’s HORIZON EUROPE research and innovation programme under grant agreements n° 101058245 (IRISS) and n° 101057014 (PARC).

5th BioNanoNet Member Welcome Webinar

On 25 May 2023 we had the pleasure to host our fifth BioNanoNet Member Welcome Webinar. Two organizations that recently joined the BioNanoNet Association presented their organizations and expertise:

- ✔ Advanced Manufacturing Laboratory presented by Carlos Sánchez Somolinos
- ✔ Covirabio GmbH presented by Marko Poglitsch

Our Welcome Webinars give new members the opportunity to provide insights into their organizations, their latest research, developments, and collaborations within a particular field. Webinars like these are a great opportunity for professionals and researchers to stay up-to-date on the latest developments in their field and to connect with others who share similar interests. They provide a platform for knowledge sharing and collaboration, which can lead to new ideas and innovations.

You can download all presentations here. We also recorded the presentations of our new members. Enjoy watching the video!

22nd nanoNET–Austria Meeting & 1st NanoSyn4–Joint Meeting

The 22nd nanoNET-Austria Meeting took place on 31 May 2023 at the Technische Universität Wien and online. This event was supported by BioNanoNet Forschungsgesellschaft mbH with the NanoSyn4 project and was organized as the 1st NanoSyn4-Joint Meeting. This allowed us to reach an audience of the Austrian nano-community beyond the circle of members and interested parties of nanoNET-Austria.

We started with a block of presentations on the topic of sensors. As an introduction, nanomaterials for chemical sensors under the framework conditions of industrial sensor production were presented. Highly integrated photonic circuits for applications in the life sciences were shown from the perspective of applied research. The block was concluded with an insight into smart skin research for applications in robotics and prosthetics.

In the following lecture block we turned to the latest technologies for the fabrication of nanostructures in semiconductor technology and got an insight into the product portfolio of the EV Group. The presentation on the placement of individual semiconductor components with nanometer accuracy enables not least the highest integration densities sought in industrial manufacturing, which was demonstrated by BESI's systems.

A report on current topics and activities of the Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology (BMK) in the field of production technologies rounded off this block of lectures.

The final part was the report from the nanoNET-Austria network and the outlook on the planned events, especially the planned presentations at international fairs and delegation trips.

In detail the following invited talks were given in a hybrid format:

- Nanomaterials for Chemical Sensors; Dr. Stephan Steinhauer, Sensirion AG
- Photonic integrated circuit technology for sensory applications in health and life sciences; Dr. Rainer Hainberger, AIT Austrian Institute of Technology GmbH
- Smart Skin: Multi-Stimuli Responsiveness at High Resolution; Prof. Anna Maria Coclite, TU-Graz
- Nanoimprint Lithography – Manufacturing Next-Generation MEMS, Photonic and Life Science Devices; Dr. Bernd Dielacher, EV Group Europe & Asia/Pacific GmbH
- Pick-And-Place Equipment and Processes in the Nanometer Regime for Advanced Packaging; Dr. Birgit Brandstätter, BE Semiconductor Industries N.V.
- Overview of nano-activities from the point of view of the BMK; Mag. Alexander Pogany, Federal Ministry for Climate Action, Energy, Mobility, Innovation and Technology
- Report on the activities of nanoNET-Austria; Dr. Rudolf Heer, Silicon Austria Labs GmbH

A guided tour for the audience through the laboratories and the clean room at the Institute for Solid State Electronics was offered by our host.

The meeting was closed by Rudolf Heer after a Q&A session and a summary of the presented and discussed topics.

A live video stream was conducted of all presentations.

This event was funded by the BMK project NanoSyn4.

NanoSyn 4
FUNDED BY
Federal Ministry
Republic of Austria
Climate Action, Environment,
Energy, Mobility,
Innovation and Technology

→ TABLE OF CONTENTS

nanoSAFE 2023 and NanoSafety Cluster Joint Conference

From 5-9 June, the joint conference of nanoSAFE 2023 and NanoSafety Cluster took place in Grenoble (France). The eighth edition of the international conference on health and safety issues for the socially responsible use of nanomaterials, organized by CEA, brought together international experts on various topics with the main objective of sharing the latest research results on health, safety and also sustainability issues related to nanomaterials and beyond.

The week was full of interesting presentations on the following topics:

- Methods, tools and technologies for SSbD purposes
- Implementation of the SSbD concept in case studies
- Transferability and acceptance of the concept of SSbD
- Commonalities of the SSbD paradigm in innovation
- From nanomaterial risk assessment to risk governance, a journey through regulation and standardization
- Characterization of advanced materials, including nanomaterials
- Modeling, nanosafety digitization, and data management
- Pollution from micro- and nanoplastics
- NanoTech Talks: advancements in the nanotechnology industry.

Approximately 250 people from various organizations in the nanosafety community (academia, industry, and regulatory agencies) around the globe attended the event.

Special thanks to the speakers of the plenary talks: Monique Groenewold (RIVM) with her presentation on future-proof approaches to risk governance and lessons learned from nanotechnologies; Georgios Katalagarianakis (retired European Commissioner) who provided insights and recommendations for the transition from regulation to SbD to SSbD; Hubert Rauscher (EC-JRC) who explained the European Commission's SSbD framework for chemicals and materials; Lars Montelius (Lund University), co-author of the AMI 2030 (Advanced Materials Initiative), who explained how the initiative aims to pave the way for a unified European systemic change for people, planet and prosperity; and Elisabeth Heunisch (BAuA), who spoke about the OECD Test Guidelines (TG) for nanomaterials, their progress and future support for TG development through the Malta Initiative and the NanoHarmony project.

On Tuesday, 6 June, the EU NSC General Assembly took place in the afternoon. Apart from catching up on the activities of the last months and getting an insight into future plans, we inaugurated the new member of the NSC Coordination Team (Monique Groenewold, RIVM) and said goodbye to Flemming Cassee, whom we thanked for his great work in the last years as an important part of the coordination team. In addition, the community was also informed of some changes in the NSC Communications Team: The entire team expressed their sincere thanks to Lesley Tobin and Tassos Papadiamantis for their great work in the past, and the BNN team was recognized in a new role taking over the communications. To be part of the NSC community and keep up with the latest news, events and developments, please subscribe to our regular NSC Update.

On Wednesday, 7 June, the **SSbD Solutions Day** took place within the conference, in which the different EU-funded S(S)bD projects (SABYDOMA, SAbyNA, ASINA, SbD4Nano, DIAGONAL, HARMLESS, SUNSHINE, IRISS, PARC, etc.) presented their approaches and results. Two panel discussions were also organized with representative experts on the industrial perspective of SSbD and on collaboration and alignment on SSbD.

Other activities of the conference worth highlighting were:

- The 2nd SABYDOMA workshop on "Legal aspects of SSbD"
- The NSC Education, Training and Communication Working Group, chaired by Martin Himly (PLUS), organized 4 training sessions on the following topics as part of its main task of networking ongoing projects around nanomaterials, advanced materials, nanomedicine and microplastics:
  - FAIR data, by Nina Jeliazkova (Ideaconsult)
  - FAIR Data & Model provision, by Thomas Exner (Seven past Nine) and Martin Himly (Paris Lodron University Salzburg)
  - New methods on the way to regulatory acceptance, by colleagues from the NanoHarmony project
  - Stakeholder perspective on SSbD, by Claire Mays (Institut Symlog de France)

All in all, it was a great event with many interesting talks, networking opportunities and social activities. We would like to thank the CEA for hosting the event and for the excellent organization and smooth running of the event.

Impressions from the conference

The conference program can be viewed here. Videos and more pictures of the event are available here.

These projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements n° 953152 (DIAGONAL), n° 953183 (HARMLESS), n° 862296 (SABYDOMA) and n° 862195 (SbD4Nano) and the European Union's HORIZON EUROPE research and innovation programme under grant agreements n° 101058245 (IRISS) and n° 101057014 (PARC).

EURO NANO FORUM 2023

Euro Nano Forum – Nanotechnology and Advanced Materials for a Sustainable Europe

Every second year, Euro Nano Forum convenes industry leaders, academics, policy makers, and various stakeholders in an inclusive forum to explore advancements in nanotechnologies. This conference has established a strong reputation and attracts an interested audience. In 2023, the Euro Nano Forum took place in Lund (Sweden) from 11-13 June.

The Euro Nano Forum 2023 provided a platform to discuss important transformations related to the Green Deal, twin transition, and the resilience of our societies and economies, particularly in terms of Safe-and-Sustainable-by-Design (SSbD) approaches. These changes play a critical role in how European research programs can contribute to and enhance these transformations.

Advanced materials and nanotechnologies have been recognized as a pivotal Key Enabling Technology for the past five years. Rather than considering technologies in isolation as "key enablers", the focus has shifted to the global competition among industries driven by new technologies worldwide. Furthermore, emphasis has been placed on the value-added aspects of these technologies, enabling citizens to actively support their integration into daily life. Given this context, the discussions in plenary and parallel sessions during the conference aimed to prioritize the research and innovation goals for advanced materials and nanotechnologies. The parallel sessions were dedicated to addressing the associated challenges and fostering meaningful dialogue.

Session topics:

- ✔ Green Energy – European sustainable energy harvesting, storage, and use
- ✔ Nanomedicine – Nanomaterials to achieve innovation in healthcare
- ✔ Semiconductors and new materials for future chips
- ✔ Safe and Sustainable by Design & Environmental Nanosafety
- ✔ European Flagships for an innovative Europe
- ✔ Quantum Technologies – Europe's major role
- ✔ Advanced Materials and Manufacturing for a sustainable and resilient Europe
- ✔ European Infrastructures – From fundamental science to industrial applications

The NMBP-15 projects ASINA, SABYDOMA, SAbyNA and SbD4Nano and the NMBP-16 projects DIAGONAL, HARMLESS and SUNSHINE jointly organized a booth to raise awareness and create interest for Safe-by-Design (SbD) by explaining the concept, its impacts on society and bringing it closer to the community. All NMBP-15/16 projects showed their synergies and commonalities through several joint posters and roll-ups that were presented at the booth.

The Hi-Accuracy project was also involved in the poster session. It presented to interested visitors the project's goal of developing the next generation of large-area, flexible Organic Large Area Electronics (OLAE) structures such as organic Thin Film Transistors (OTFTs) and Electroluminescent Quantum Dot Light Emitting Diode (EL-QD-LED) displays in µm size that can be printed onto flexible substrates.

The Euro Nano Forum conference also served as a platform for addressing the pressing challenges in advanced material manufacturing. Among the participants, the NextGen-Microfluidics project was present as an Open Innovation Test Bed. The project and the founded association Microfluidics Innovation Hub brought two posters and demonstrators, effectively showcasing the integration of fundamental scientific discoveries into practical industrial applications. Their presence at the conference highlighted the immense potential of leveraging cutting-edge microfluidic technologies to revolutionize the future of lab-on-foil manufacturing.

As part of the scientific session on SSbD at the forum's first day, Andreas Falk from BNN and Stefan Spirk from Ecolyte presented their work in the SAF€RA project SABATLE. The presentation entitled "SSbD assessment framework application to development of an ecofriendly electrolyte for redox flow batteries" showed that the safety and sustainabi-

lity concept created in 2020 by BNN for the SABATLE-project is a relevant case to move forward with the EC JRC framework on SSbD. It clearly demonstrated that the methodology aids in the selection and manufacturing of safe and also sustainable materials, fostering innovation. The presentation led to further discussions with representatives of the European Commission, various projects and initiatives such as IRISS and SusChem, and stakeholders from academia and industry.

These projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements n° 862444 (ASINA), n° 953152 (DIAGONAL), n° 953183 (HARMLESS), n° 862410 (HI-Accuracy), n°862092 (NextGenMicrofluidics), n° 862296 (SABYDOMA), n° 862419 (SAbyNA), n° 862195 (SbD4Nano) and n° 952924 (SUNSHINE) and the European Union's HORIZON EUROPE research and innovation programme under grant agreement n° 101058245 (IRISS). NanoSyn4 is funded by the Federal Ministry of Republic of Austria, Climate Action, Environment, Energy, Mobility, Innovation and Technology. SAF€RA ERA-NET received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement n° 291812. The SABATLE project is funded within the SAF€RA framework.

→ TABLE OF CONTENTS

EU–Asia Dialogue on NanoSafety

On 21 June 2023 the 6th EU-Asia Dialogue on NanoSafety took place in Berlin, Germany.

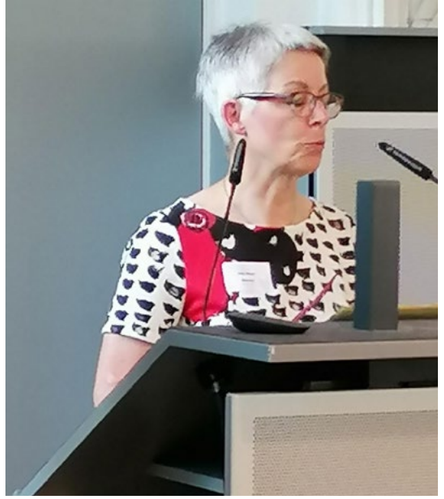
The "International Network Initiative on Safe and Sustainable Nanotechnology" (INISS-Nano) as an internationalization initiative of the EU NanoSafetyCluster and the Asia Nano Forum, but open to participants around the world, co-organized this annual globally open communication event. Core topic of the 6th Dialogue was "The role of characterization and how it is addressed in INISS-Nano". The location was inspired by the content: one of the leading metrology institutes, the Physikalisch-Technische Bundesanstalt (PTB) in Berlin. The German Ministry of Environment (BMUV), specifically Anke Jesse and her team, hosted the event as local organizer, back-to-back with their international conference. A big THANK YOU to PTB and BMUV for your support!

The program included presentations from Asian and European experts, spanning collaboration success stories, insights into the characterization competences in Europe and Asia, the envisaged next steps towards improved knowledge/data exchange, quality data, to global collaboration opportunities from Asia via Europe to the US.

Furthermore, in the breakout groups the session chairs and rapporteurs did a great job moderating their respective group to discuss the progress of the actions planned in the respective INISS-Nano pillar. Actions have been reviewed, modified and prioritized, new ideas generated and ways forward discussed in four groups.

Once more, we like to thank the speakers, the breakout group chairs and rapporteurs, the host organizations and all participants for making the event a success. We hope to see each other at the 7th EU-Asia Dialogue on NanoSafety in Asia in 2024.

Download the agenda and the presentations and find some impressions on the next page.



Above, right: Anita Breyer, Director-General of Chemical Safety, Emission Control and Transport at the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

Above: Wannee Chinsirikul, President of Asia Nano Forum (ANF) 2022-2023, Executive Director of National Nanotechnology Center, Thailand

BioNanoNet Gold Member Webinar on "Leveraging New Technologies for Societal Impact"

On 27 June 2023 our BioNanoNet Gold Member Webinar took place for the third time with interesting presentations on our focus topic "Leveraging new technologies for societal impact":

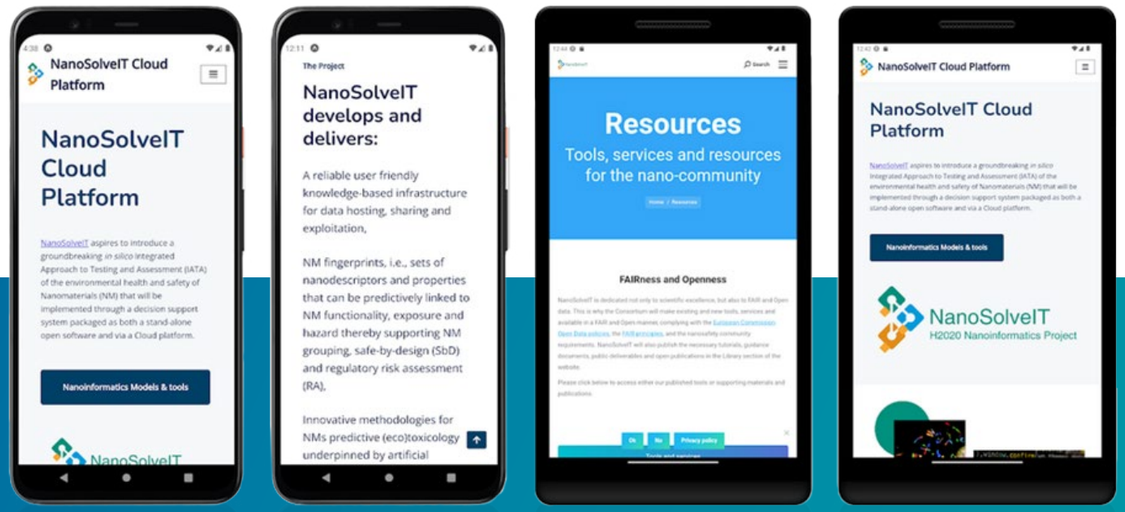
- ✔ New Technologies in Dementia Therapy by Marisa Koini, Scientist, Medical University of Graz, Department of Neurology, Division of Neurogeriatrics
- ✔ Buying the Pig in Poke? Barriers to Consumer Acceptance of Nontransparent Technologies by Andreas Strebinger, Professor of Marketing & Business Analytics, University of Graz
- ✔ Leveraging Innovation through Life-Cycle Thinking by Sara Carniello, Scientist, JOANNEUM RESEARCH Forschungsbmh, LIFE
- ✔ High-Resolution 3D Printing - Enabling Innovations in Biomedical Sector and Beyond by Aleksandr Ovsianikov, Founder & Chief Scientific Officer, UpNano GmbH and Head of Research Group 3D Printing and Biofabrication, Technische Universität Wien

To download the presentations, visit our website. The recordings will be available soon on our YouTube channel.

FOCUS TOPIC
OF THIS ISSUE:

Leveraging New Technologies for Societal Impact

CONTRIBUTION FROM NOVAMECHANICS



NanoSolveIT

www.nanosolveit.eu

NanoSolveIT Cloud Platform's Mobile Application Revolutionizes Access to Nano–material Research & Safety Information

The NanoSolveIT Cloud Platform's mobile application revolutionizes access to nanomaterial research and safety information. Available on Android devices (with an iPhone version in development), the app brings sophisticated in silico testing and assessment methodologies right to your fingertips. Its user-friendly design and innovative features make it an invaluable tool for anyone interested in the field of nanotechnology, from students and educators to industry professionals and the curious public. The application's unique offering of nanomaterial fingerprints, predictive (eco)toxicology methodologies, and integration with current research frameworks make it a comprehensive resource for understanding and managing the properties and potential impacts of nanomaterials. Plus, its cloud-based nature ensures that users can access this wealth of information anytime, anywhere. This mobile app truly exemplifies the power of technology in making complex scientific knowledge accessible, fostering safe and sustainable nanomaterials design practices, and promoting educational engagement.

The NanoSolveIT Cloud Platform's mobile application serves as a bridge, connecting non-specialist groups (the general public, schools, policy makers) with the fascinating world of nanotechnology. With its user-friendly interface and cloud-based accessibility, it presents the complex science of nanomaterials in easily comprehensible terms, right on their mobile devices. This allows individuals, regardless of their background, to learn about, and explore, nanotechnology at their own pace and whenever is convenient for them. For schools, it presents an opportunity to enrich science education by giving students a hands-on tool for learning about nanomaterials, their properties, and their safety implications. Teachers can incorporate the mobile app into their lessons, making science learning more interactive and engaging. Moreover, the app's focus on nanomaterials safety – through features such as nanomaterial fingerprints and predictive (eco)toxicology methodologies – can help to educate users about responsible and safe practices in nanotechnology. The NanoSolveIT mobile application democratizes access to scientific knowledge, making it an effective tool for societal impact.

Download the app here.

Contact

Antreas Afantitis, NovaMechanics Ltd
Cheminformatics & Nanoinformatics Excellence
NanoSolveIT Project Coordinator
afantitis@novamechanics.com
www.novamechanics.com

Iseult Lynch, School of Geography, Earth and Environmental Sciences,
University of Birmingham
NanoSolveIT Project Deputy Coordinator
i.lynch@bham.ac.uk
www.birmingham.ac.uk

Community Benefit of SABYDOMA's SbD Technology

The idea for the SABYDOMA project was first conceived over forty years ago in the context of water quality regulations. At the time there were intense discussions over whether, in the process of cleaning up rivers, discharges of noxious materials should be banned completely or whether the rivers should be continually monitored for these compounds. In the latter case if the levels exceeded a "safe" concentration, a negative feedback should be fed back to the discharge source to decrease the output of these materials. This policy in environmental management was termed "Environmental quality control". In this context, applied to Environmental Health, this policy of "feedback loop control" has a very general application; we therefore configured SABYDOMA around this idea and applied it to the Safety-by-Design topic. This was especially pertinent to our technology since we had been developing online rapid production and screening techniques at the time of planning SABYDOMA.

The essence of SABYDOMA is to directly couple online screening of nanomaterial with an online production procedure. If the nanomaterial's toxicity goes above a recommended "safe" level, the screen signal "tells" the nano production line to moderate the nanomaterial characteristics that render it biologically-active such as particle size or surface coating. **Figure 1** below shows how the various devices are put together to configure this platform technology. In principle: nanomaterial is synthesized though an online procedure shown at the top of the diagram. A sample line is taken from the output and passed through a screen generating a ToxScore which moderates the synthesis design. There are many advantages of this approach. A direct coupling of screen to the production line removes the time interval between production and testing which leads to a deterioration in the nanomaterial and unrepresentative results. The platform is itself rapid and ensures the supply of high-quality screened nanomaterial.

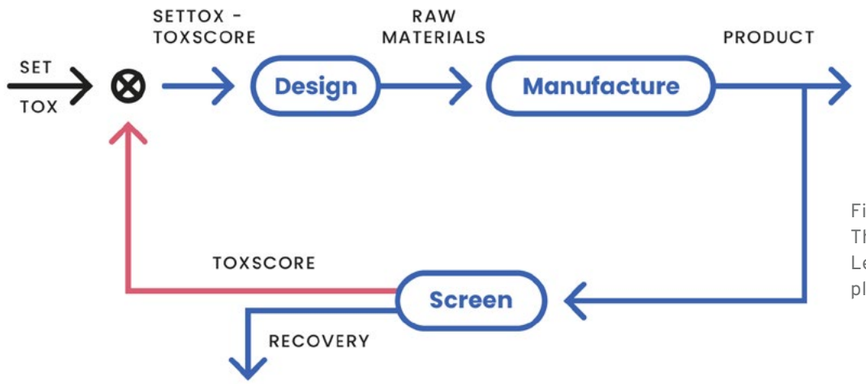


Figure 1:
The SABYDOMA Lead demonstrator platform

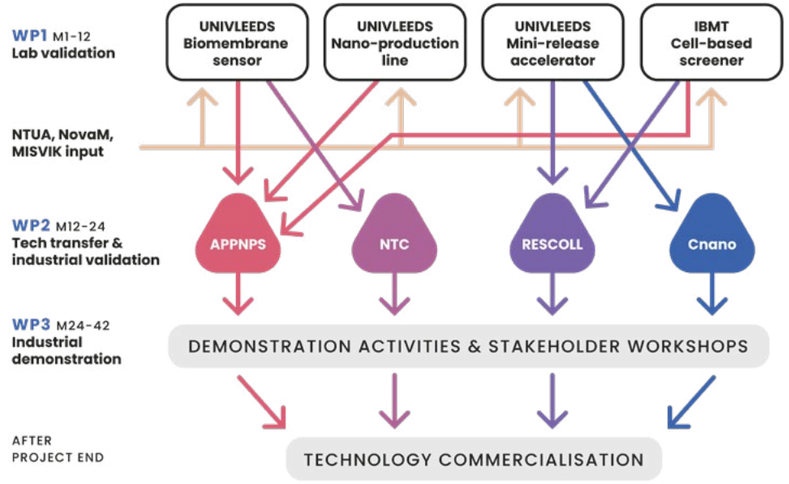


Figure 2: The SABYDOMA exploitation strategy

A further advantage of this technology is that manual handling is taken to a minimum, which decreases input of error and lessens the hazard to workers. In all aspects this technology, above all others, deals with the Safety-by-Design issue with a platform built with Sustainability in mind. An additional aspect of SABYDOMA which highlights the unique SABYDOMA approach is the fact that the total implementation of SABYDOMA passes through four independent companies located in four separate countries. This is summarized in **Figure 2**.

Now in its third year, SABYDOMA is achieving all its objectives: the Lead Demonstrator and Biomembrane screen (see **Figure 3**) have been transferred to APPNPS (Barcelona, Spain) to be coupled up in two weeks' time, the mini-release accelerator has been transferred to Cnano (Athens, Greece) and RESCOLL (Bordeaux, France), and the cell-based screener is due to be coupled to the nano-production line on the Fraunhofer site in September/October. In the final nine months of the project, the respective technologies will be refined and demonstrated on their industrial sites to enable them to be used for the ultimate benefit to the community.

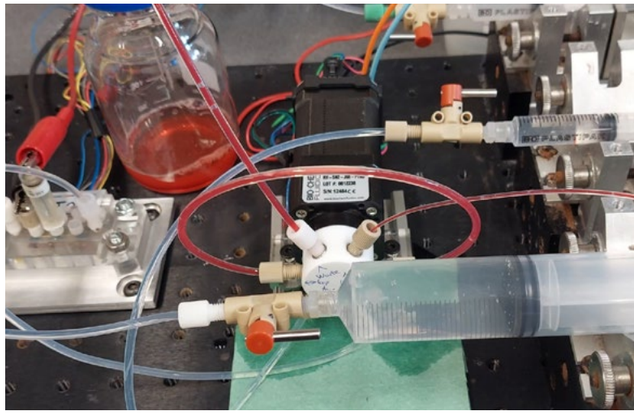


Figure 3: Photo showing the core of SABYDOMA: The coupling of the recently validated1 Biomembrane sensor to the nano-production line: left, sensor flow cell; middle, coupling unit; right, syringe pumps

Publication: Kohl, Yvonne, et al. "Rapid identification of in vitro cell toxicity using an electrochemical membrane screening platform." Bioelectrochemistry (2023): 108467.

Contact

Andrew Nelson, University of Leeds
Coordinator of SABYDOMA project
info@sabydoma.eu
www.sabydoma.eu

CONTRIBUTION FROM RECENDT

Societal Impact – Delivered by Interregional–Network Boosting Production Efficiency

RECENDT has recently started a new project in a consortium for Austria and Bavaria, striving to support companies (especially SMEs) to apply state-of-the-art technologies to optimize their production processes.

The topic is as simple as it is complex: There are a multitude of technologies that can be used to better monitor and (based on this) control and optimize a wide range of manufacturing processes. But especially small companies, which do not have specialized R&D departments, find it difficult to keep track of new developments. Many already struggle to identify and use available standard technologies to solve upcoming problems – or simply to harvest low-hanging fruit.

This is where SINOPES ("Strengthening interregional networks for the optimization of production efficiency by implementing sensor technologies") comes in.

This project is going to collect all information on technologies, services and providers of inline capable sensing- and testing technologies (including NDT – non-destructive testing) and process analytical technologies (PAT).

SINOPES

Interreg Bayern-Österreich

Kofinanziert von der Europäischen Union

This market survey will later serve as a tool to support the companies in the identification of potentially helpful solutions out there in the market.

It will provide a market-overview, a handbook, trainings, network events and consultancy.

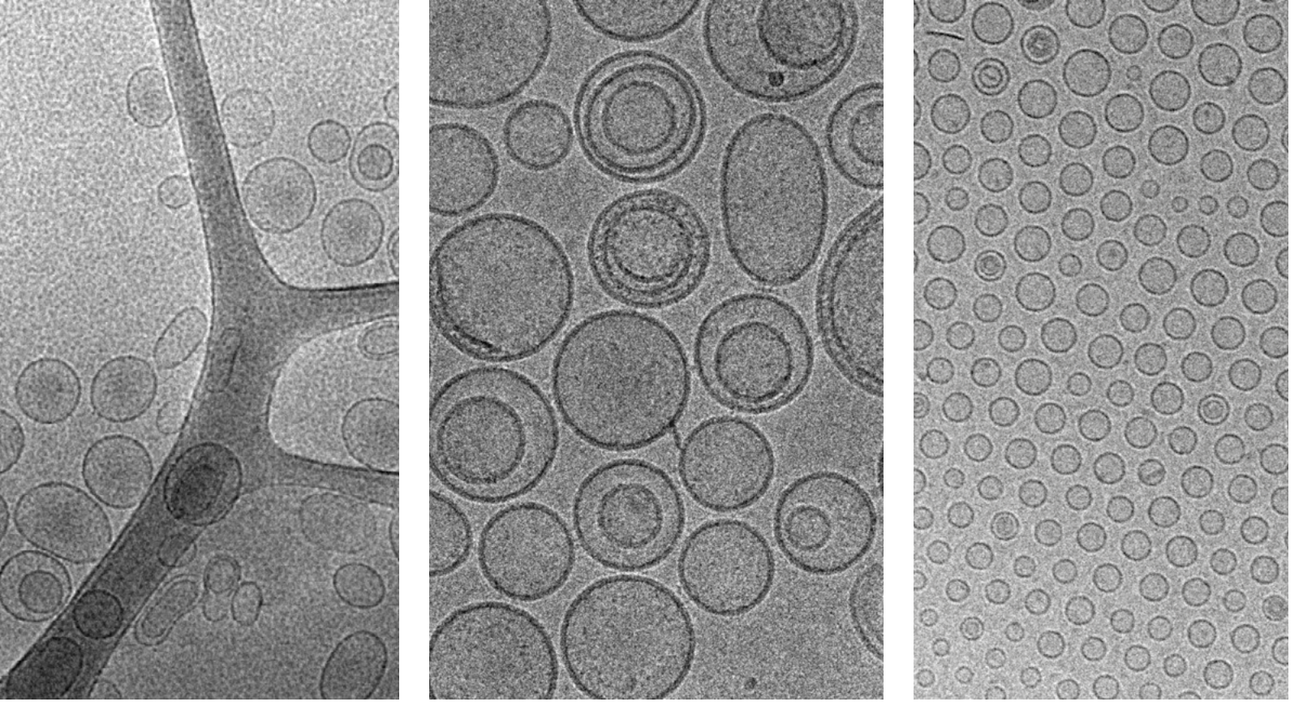
For extended support for the companies, the consortium partners will be available: RECENDT, the Austrian Research Center for Non-Destructive Testing and the Bavarian technology providers from University of Passau / FORWISS and Fraunhofer EZRT (Development Center for X-Ray technologies). The network-partners in Austria (Business Upper Austria with their well-established thematic industry clusters) and the Strategic Partnership for Sensor Technologies (Sensorik Bayern) are very well known to the companies in the target regions in Austria and Bavaria and can provide excellent service to inform and support all companies there.

So much about technology – but where is the societal impact? There are many aspects: The funding program INTERREG always aims to bring people closer together across borders. We make latest technological advancements available to all companies, crossing the border where needed. Applying those technologies helps companies to optimize their production processes – gaining benefits in efficiency, output and quality. Beyond the economic benefits (ensuring competitiveness and protecting jobs), this also leads to a reduction of raw-material consumption and energy demand. In many cases, dangerous or at least tedious work can be avoided by automatic inspection. Improvement of yield means to avoid scrap and to serve customers with top quality products. Top quality products generate satisfied and loyal customers and reduce waste. Many different aspects of societal impact – choose your favorite! If you want to help us supporting companies to get there, please become part of our LinkedIn-group and make your offerings available in our market survey.

SINOPES Kick-Off at RECENDT in Linz, 8 February 2023

Contact

Robert Holzer
RECENDT – Research Center for Non-Destructive Testing GmbH
robert.holzer@recendt.at
www.recendt.at



PHOENIX–OITB Scales Up New Treatment for a Rare Disease: the Fabry Disease Demo Case

There are more than 7,000 rare diseases[1], affecting life for 300 million people around the globe.[2] Of these, only about 5% have treatments. Investing in treatments for rare diseases can have a significant impact on societal well-being.

In PHOENIX-OITB Demo Case 4, Nanomol Technologies, ICMAB-CSIC, Leanbio and Grace Bio join efforts to advance the development of peptide targeted nanoliposomes for Fabry rare disease treatment. The entrapment of α-galactosidase (GLA) enzyme in these patented nanocarriers aims to improve the current enzymatic replacement therapy of Fabry disease, consisting in the intravenous administration of exogenous GLA to patients. These targeted nanovesicles are produced by DELOS technology, a robust & green nanoformulation platform owned by Nanomol Technologies. This novel nanomedicine, designated an Orphan Drug by the EMA, has been developed under Smart4Fabry EU-project. Within PHOENIX, it will be scaled-up and manufactured under GMP to enable its clinical testing.

For Rare Diseases Day 2023, we sat down with some of the team to discuss their endeavors.

What made you want to take on Fabry disease?

Fabry disease is the second-most prevalent lysosomal storage disorder (LSD). LSDs comprise a group of related conditions characterized by inappropriate lipid storage in lysosomes, due to specific enzyme deficiencies. Individually, LSDs are considered rare diseases, because their individual incidence is very low (less than 1 in 100,000 live births). However, as a disease group, the cumulative incidence of LSDs has been estimated at 1:7000–8000, representing a serious global health problem. Thanks to a research project funded by TV3 Marathon Foundation in 2009 called Nanofabry and led by Vall d'Hebron Research Institute, with the participation of ICMAB-CSIC team and other two Spanish teams from Autonomous University of Barcelona and Barcelona Science Park (all of them members of CIBER-BBN network), we had the great opportunity to start investigating new therapies for the treatment of Fabry disease. This was the starting point that was followed by other two Spanish projects – Lipocell and Terarmet – and by the European project Smart4Fabry (in which Nanomol Technologies and Leanbio were also involved), which allowed us to develop a novel, patent-protected, and potentially more effective therapy, based on nanoliposomes and named nanoGLA, up to an advanced stage of preclinical development. Currently, in the frame of the PHOENIX-OITB project, we intend to transfer this novel therapy from the lab bench to clinical trials.

The new nanomedicine is more effective and has a better biodistribution than the current treatments.

Your project Smart4Fabry ended in 2021. What is the status of the nanomedicine for Fabry disease treatment at the moment?

This new nanomedicine under development achieved the Orphan Drug Designation by the European Commission in January 2021 for the treatment of Fabry disease; that was an important milestone achieved in the frame of the Smart4Fabry project under the coordination of ICMAB-CSIC team, also belonging to the CIBER-BBN network. The new nanomedicine is more effective and has a better biodistribution than the current treatments, based on enzyme replacement therapy. The formulation is based on nanoliposomes that protect the enzyme and achieve a better cell internalization, which means that this will further offer a significant benefit for the patients (reduction of the doses needed, the total treatment cost, and improvement of the life-quality of patients).

In Smart4Fabry we successfully achieved the preclinical regulatory stage with an optimized candidate. Now in PHOENIX we are more focused on the CMC to achieve a GMP-compliant production, but also complementing in vivo assays in the preclinical setting.

In PHOENIX–OITB, you are intending to scale up and manufacture this nanomedicine under GMP (good manufacturing practice) so that it can undergo clinical testing. Can you tell us about that process?

It's been an exciting journey from the lab to the pilot scale following the Good Manufacturing Practices. The drug product is produced using DELOS technology, a robust and green method developed by ICMAB-CSIC researchers and scaled-up and exploited by partner Nanomol Technologies, which uses compressed CO_2 as a co-solvent and delivers a high batch-to-batch consistency. A significant milestone was the design and building of a GMP-compliant DELOS pilot equipment by Nanomol Technologies' engineers! This equipment will enable manufacturing of GMP batches of this nanomedicine and many others to come.

We first looked for pharma-grade starting materials, and already transferred the synthesis of the peptide targeting unit to a qualified supplier. The scaling-up of the process will be carried out at Nanomol Technologies during the following months, and then the process will be transferred to MyBiotech clean room facilities for the clinical test materials production. MyBiotech is also developing the final lyophilized form.

Partner Leanbio is in charge of the drug substance development, the GLA enzyme.

Fast forward a few years. How will those with Fabry disease be interacting with your product? What will be the benefit to the patient?

Patients, health systems, and clinicians will benefit from the advantages of this novel treatment. The solution we offer will impact society, improving patients' quality of life and reducing premature deaths. Additionally, the improved biodistribution and higher efficacy of the treatment will mean that a lower amount of drug substance (the GLA enzyme) will be required to obtain the same or better therapeutic effect. The optimized production, with a strict control of costs, will lead to a cheaper treatment, having a direct incidence on the sustainability of public health systems.

This is a critical issue when dealing with rare diseases, as treatments usually involve high costs, which in some cases compromise their reimbursement by the public health system. The transfer of this nanomedicine to the market will enable a more effective version of enzyme replacement therapy based on nanotechnology, giving innovative treatment opportunities for an orphan condition, with the subsequent enhance of both patient quality of life and life expectancy.

Follow our progress by subscribing to the PHOENIX-OITB newsletter!

1. https://www.fda.gov/patients/rare-diseases-fda

2. Nguengang Wakap, S., Lambert, D.M., Olry, A. et al. Estimating cumulative point prevalence of rare diseases: analysis of the Orphanet database. Eur J Hum Genet 28, 165–173 (2020). https://doi.org/10.1038/s41431-019-0508-0

Presentation of the CSR Certificate 2022 from left to right: Robert Müllneritsch (Infineon Austria Central Works Council and AfB Expert Advisory Board), Fabio Papini (AfB Branch Manager Klagenfurt), Oliver Heinrich (CFO Infineon Austria), Walter Nirschl (Global Head of Infineon IT-Workplace Services) © Infineon Austria

CONTRIBUTION FROM INFINEON

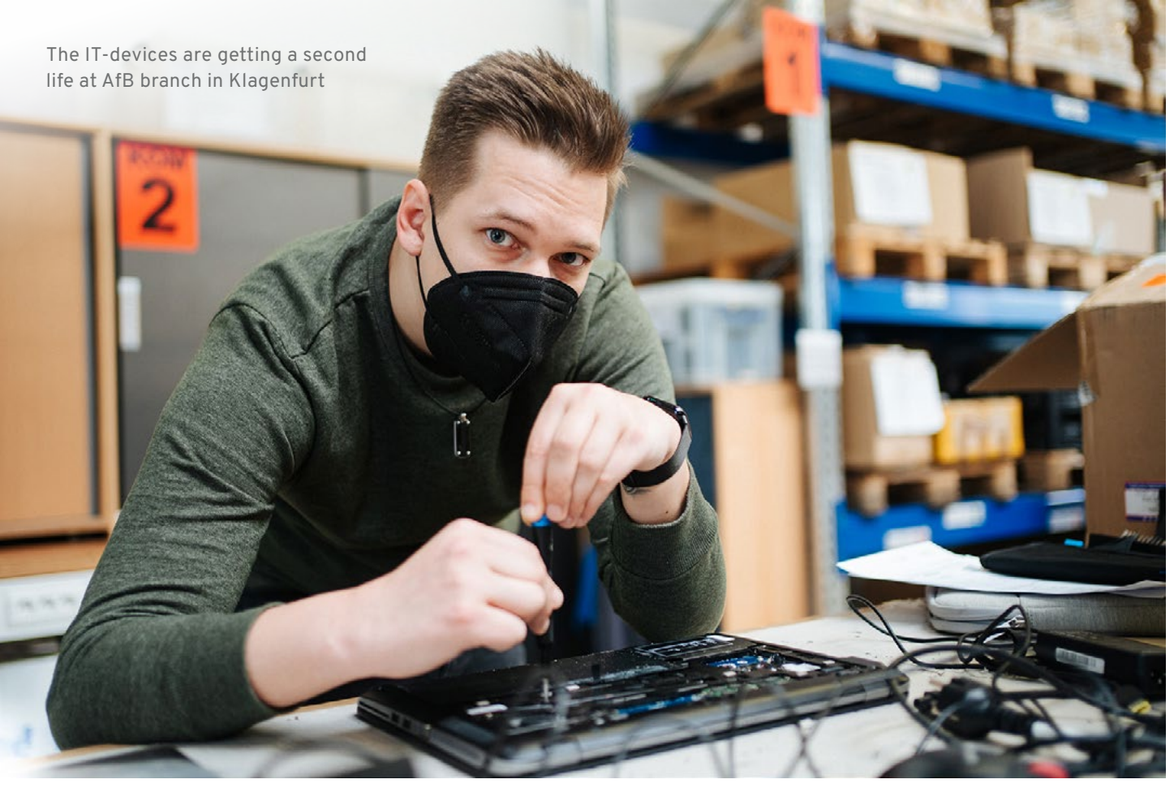
Infineon–Green–IT: Contribution to the Circular Economy and to an Inclusive Society

Infineon Austria promotes both jobs for people with disabilities and the recycling of IT equipment through its cooperation with AfB Social & Green-IT. In 2022, 463 tonnes of CO_2 were saved, resources were conserved and three jobs with inclusion were secured.

With the certificate, the non-profit AfB "Arbeit für Menschen mit Behinderung" GmbH (Work for People with Disabilities) annually honors Infineon Technologies Austria AG for its socially and ecologically responsible actions. Infineon's used IT equipment is given a second life through certified recycling. The balance sheet for 2022 is impressive.

Around 463 tonnes CO_2 saved with 3,629 IT devices

In 2022, Infineon provided a total of 3,629 discarded IT devices such as laptops, PCs, monitors, printers and mobile devices. More than 81 percent were recycled and marketed by the AfB Social & Green IT staff in a tested and safe process.



The IT-devices are getting a second life at AfB branch in Klagenfurt

By reusing Infineon IT equipment, around 462,750 kilograms less CO_2 was emitted compared to new production. This is roughly equivalent to 210 air journeys from Vienna to New York and back. In addition, more than 170,000 kilograms of raw materials (metals or iron) were saved, around 1.8 million kilowatt hours less energy was used and 3.4 million liters less water was consumed.[1]

Oliver Heinrich, CFO of Infineon Technologies Austria AG: "These figures show that we can really make a difference through our responsible approach to IT. It is a sustainable contribution to climate protection and through our cooperation with AfB we actively promote value-creating jobs for people with disabilities in the region. I am particularly pleased about that."

Last year, Infineon was able to secure three jobs for people with disabilities at the Klagenfurt site through the IT cooperation. The trained AfB employees ensure high-quality refurbishment of the IT equipment and resale in the company's own salesroom.

Fabio Papini, AfB Branch Manager Klagenfurt: "We are a non-profit IT and recognized inclusion company. By partnering with companies, we conserve valuable resources and create jobs for people with disabilities that are subject to social insurance contributions. Many thanks to Infineon for the proven and good cooperation."

About AfB "Arbeit für Menschen mit Behinderung" gemeinnützige GmbH

AfB "Arbeit für Menschen mit Behinderung" GmbH is Europe's largest non-profit IT company that takes over, refurbishes and resells used IT from companies. The inclusive company employs around 600 people, 45 percent of whom are people with disabilities, in five countries: Germany, Austria, France, Switzerland and Slovakia. The AfB location in Klagenfurt employs 16 people with disabilities. www.afbshop.at

About Infineon Austria

Infineon Technologies Austria AG is a group subsidiary of Infineon Technologies AG, a world-leading provider of semiconductor solutions that make life easier, safer and greener. Microelectronics from Infineon reduce the energy consumption of consumer electronics, domestic appliances and industrial facilities. They make a major contribution to the convenience, security and sustainability of vehicles, and enable secure transactions in the Internet of Things.

Infineon Austria pools competencies for research and development, production as well as global business responsibility. The head office is in Villach, with further branches in Graz, Klagenfurt, Linz and Vienna. With 5,461 employees from 79 countries (including 2,390 in research and development), in the financial year 2022 (ending in September) the company achieved a turnover of € 5.2 billion. With a research expenditure of 585 million euros, Infineon Austria is one of the strongest research companies in Austria.

Contact

Birgit Rader-Brunner
Infineon Technologies AG
Villach, Austria
birgit.rader-brunner@infineon.com
www.infineon.com

1. The figures are calculated in comparison to the new production of the same number of appliances and are determined for the AfB on the basis of a study by the Technical University of Berlin and the non-profit climate protection organisation myclimate.

The recycled devices are sold at fair conditions in the AfB IT-shops www.afbshop.at © Infineon Austria

Together with Martin Pfeiffer and Andrej Ribar, Bernd Nidetzky succeded in the biocatalysis of pseudouridine
© Lunghammer - TU Graz

CONTRIBUTION FROM GRAZ UNIVERSITY OF TECHNOLOGY

TU Graz Researchers Produce Pseudo–uridine by Means of Biocatalytic Synthesis

The new and patented method for the production of the important mRNA vaccine component pseudouridine is more efficient, sustainable and cost-effective than the previously used chemical synthesis.

Researchers from the Institute of Biotechnology and Biochemical Engineering at TU Graz and the Austrian Centre of Industrial Biotechnology (acib) have developed a novel method for the production of central components of mRNA vaccines and applied for a patent. In an article published in the prestigious journal Nature Communications, Martin Pfeiffer, Andrej Ribar and Bernd Nidetzky explain how they produced the essential vaccine ingredient pseudouridine by means of biocatalytic synthesis and thus created an alternative to the previous method of chemical synthesis.

One process step is sufficient

This alternative offers some decisive advantages. The chemical syntheses of pseudouridine not only involve toxic reagents and rare raw materials, but are also very energy- and time-consuming due to the necessary four to eight process steps, partly involving cooling to minus 20 degrees. Biocatalysis, on the other hand, requires only one process step, with four parallel reactions performed in an enzymatic cascade transformation at room temperature. The required enzymes can be produced quite easily with E. coli bacteria. In addition, only four enzymes are needed as catalysts (uridine phosphorylase, phosphopentose mutase, pseudouridine monophosphate glycosidase and phosphatase). The biocatalysis enables clean production of pseudouridine because almost no waste accumulates in the transformation; the only waste is phosphate, but this is recycled again during the catalysis process.

Another important advantage is efficiency. Since, in short, the chemical production of pseudouridine converts the naturally occurring uridine, which is less efficient for vaccines, there is no 100 per cent yield during the conversion process. Due to the small number of process steps, biocatalytic synthesis achieves a yield of 92 to 95 per cent, compared to just 40 to 50 per cent for the chemical processes published so far.

Inspiration from nature

The researchers based the development of this new process on one of their earlier studies in which they discovered that the YeiN enzyme is a biocatalyst for the production of C-nucleosides. Since pseudouridine is the C-nucleoside of the RNA building block uridine, they had the idea of taking uridine, which can be produced in large quantities by means of bacterial fermentations, as a raw material and re-establishing the bond between its basic building blocks. The inspiration for this came from nature.

Unlike pseudouridine, uridine has an N-glycosidic bond, which is cleaved into ribose-1-phosphate (sugar) and uracil during natural degradation in cells by means of the enzyme uridine phosphorylase. Then the enzyme phosphopentose mutase comes into play, which converts the ribose-1-phosphate to ribose-5-phosphate. This is followed by the application of the YeiN enzyme, which is used to link the ribose-5-phosphate and the uracil to pseudouridine-5-phosphate. Phosphatase is used to split off the phosphate from the pseudouridine and the goal is reached. Since pseudouridine is much less water-soluble than uridine, it simply crystallises in the course of the reaction and can therefore be easily obtained by filtering the reaction supernatant.

Production soon on a larger scale

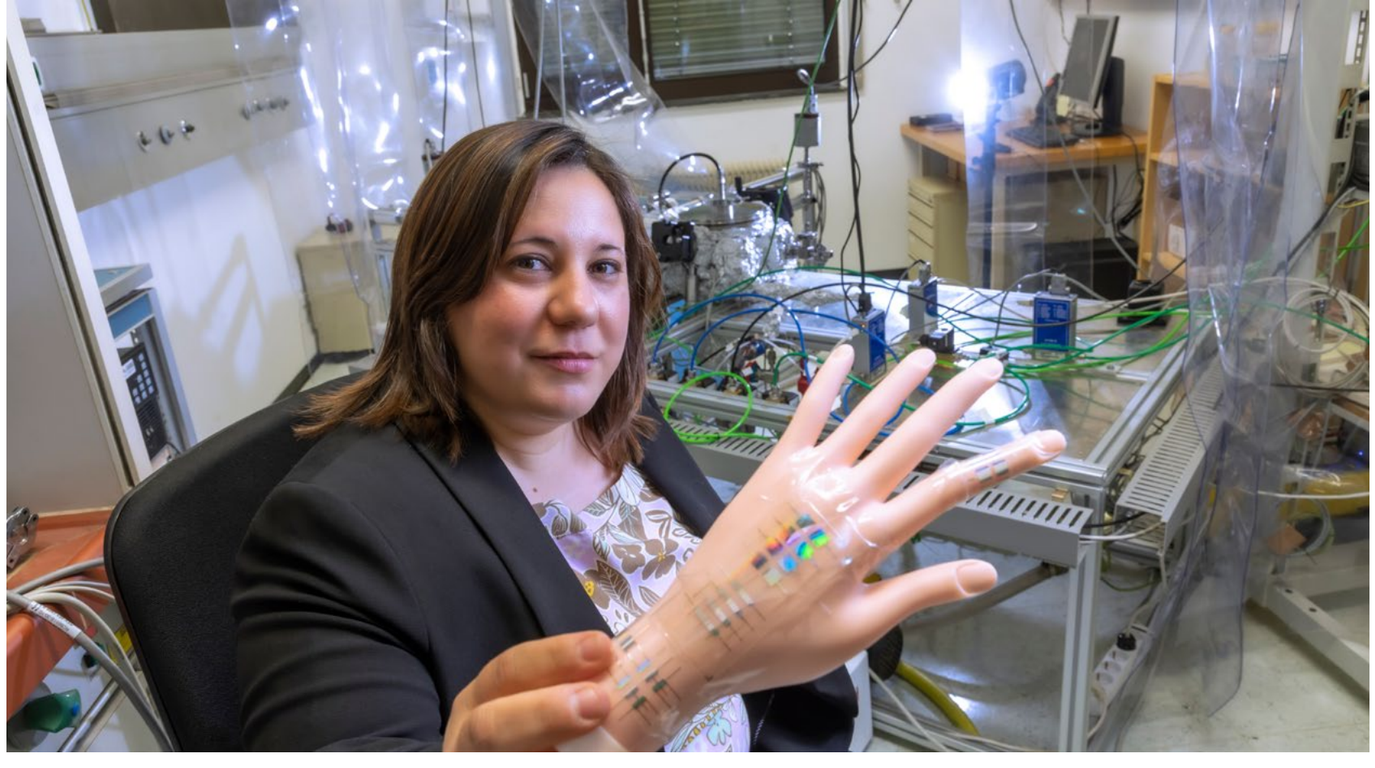
“Our work shows that biocatalysis is a potent alternative to the chemical synthesis of C-nucleosides such as pseudouridine,” explains Bernd Nidetzky, head of the Institute of Biotechnology and Biochemical Engineering at TU Graz. “We hope to implement the production on a larger scale soon and thus make pseudouridine available sustainably and cheaply in larger quantities. This could possibly also make the production of mRNA vaccines cheaper in the medium term, as potential partners from industry could implement our application quite promptly.”

Contact

TU Graz | Institute of Biotechnology and Biochemical Engineering

Bernd Nidetzky
bernd.nidetzky@tugraz.at

Martin Pfeiffer
martin.pfeiffer@tugraz.at



Anna Maria Coclite is the first researcher ever to win an ERC Proof of Concept grant at TU Graz.
© Lunghammer - TU Graz

CONTRIBUTION FROM GRAZ UNIVERSITY OF TECHNOLOGY

Smart Artificial Skin in Application Check Stage: TU Graz Researcher Wins ERC Proof of Concept Grant

The smart skin developed by Anna Coclite has many potential applications. With an ERC Proof of Concept Grant, the researcher is exploring its practical applications.

Just a few months ago, Anna Maria Coclite and her team from the Institute of Solid State Physics at Graz University of Technology (TU Graz) presented the results of their research as part of Coclite's ERC Starting Grant project "SmartCore". They had succeeded in developing the three-in-one "smart skin" hybrid material, which closely resembles human skin by simultaneously sensing pressure, moisture and temperature and converting them into electronic signals. With 2,000 individual sensors per square millimetre, the hybrid material is more sensitive than a human fingertip and, at 0.006 millimetres thick, many times thinner than human skin. By reacting to the three aforementioned human sensory impressions, the smart skin surpasses all electronic skin materials on the market to date which only react to pressure and temperature.

On the way to commercialisation

European Research Council (ERC) Proof of Concept (PoC) Grants support researchers who have already secured an ERC grant and who now want to test their research results for marketable innovation potential. Starting from the existing prototype of the smart skin, the scientist wants to use the PoC funding to develop the wireless connection of the electronic skin to a real-time monitoring system. This is to transmit important data on temperature, humidity and pressure via Bluetooth to a smartphone app that can be used to display the recorded sensory impressions. This represents a central further development of the currently still unwieldy wired electrical readout of the data and is an important step towards making the smart skin advantages presentable to potential customers. Industrial partners, including robot manufacturers, prosthetics companies and medical device producers, are to be involved in the further development of the smart skin at an early stage so that their requirements can be taken into account accordingly.

"We can take an important step towards a market launch of the smart skin with this EU funding. It will be exciting to see how the results of our basic research can find concrete application in monitoring, in the health sector or in robotics," says Anna Maria Coclite, who is delighted about the PoC grant.

Potential areas of application for the smart skin

There are many commercial applications for the multisensory hybrid material developed at TU Graz and the market is very big worldwide. According to the World Health Organisation (WHO), around 200,000 people are severely burned every year and suffer a complete loss of sensation due to the death of the skin receptors. Smart skin could act as a "plaster" to help burn victims regain their sensations. It could also revolutionise the manufacture of intelligent prostheses. Modern prostheses reproduce movements and are – if possible – connected to the nerve endings so that patients can control and move the robotic limb using their brain. Smart skin could cover the prostheses and collect sensory information.

According to a WHO estimate, around 30 million people worldwide need a prosthesis. In general, broad application possibilities are opening up in the medical device sector. Used as a sensor with smart watches, the novel multisensory hybrid material collects precise information about the health status of patients. In this way, skin moisture, pH value and temperature could be continuously monitored. It is a very big market, with about 216 million people wearing a smart watch in 2022.

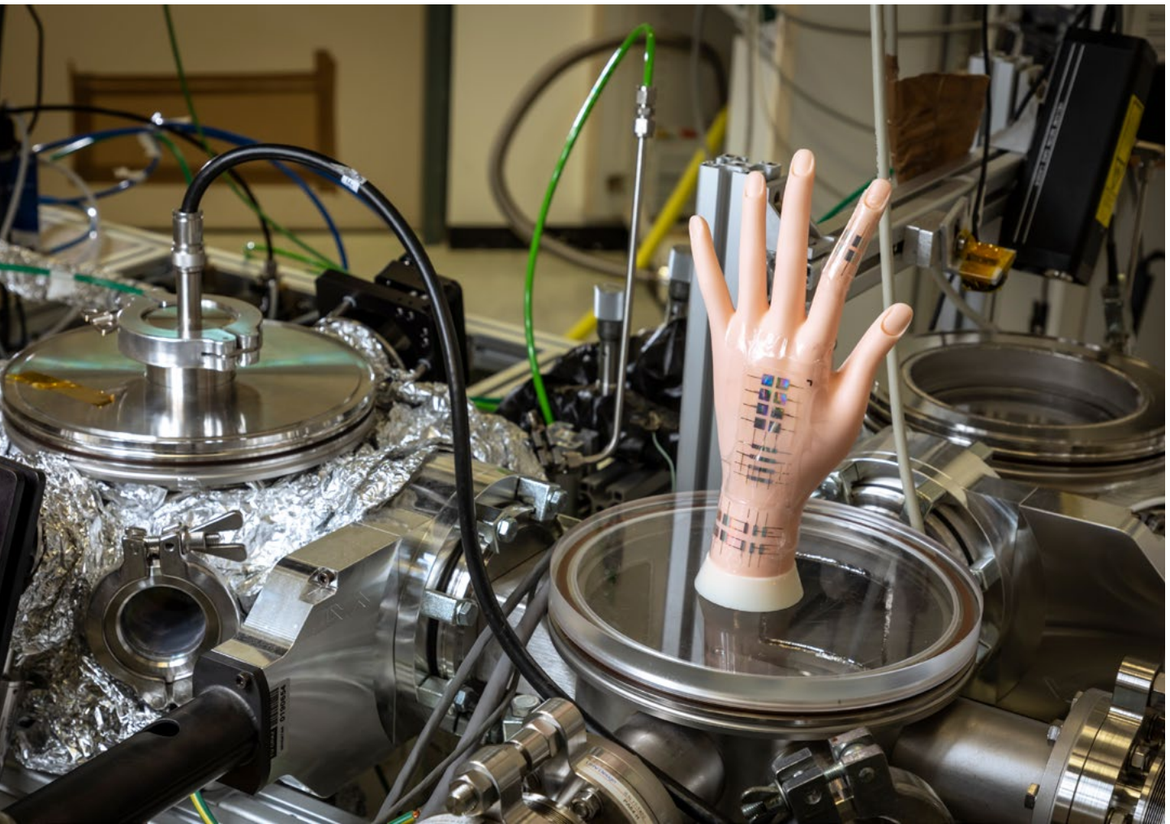
First Proof of Concept Grant for TU Graz

While Anna Maria Coclite was the first woman to receive an ERC grant at TU Graz in 2016, she is now the first researcher ever at TU Graz to win an ERC Proof of Concept grant. PoC grants from the European Research Council are endowed with 150,000 euros for a maximum of 18 months. The research company Joanneum Research, which holds the patent for smart skin together with TU Graz, remains an important research partner in the proof of concept project.

Contact

Anna Maria Coclite
TU Graz | Institute of Solid State Physics
anna.coclite@tugraz.at

Smart skin is a wafer-thin material that reacts simultaneously to force, moisture and temperature with extremely high spatial resolution and emits corresponding electronic signals. © Lunghammer - TU Graz



Member Updates

MEMBER INTERVIEW

Advanced Manufacturing Laboratory with Carlos Sànchez Somolinos

The Advanced Manufacturing Laboratory (AML) is part of the Institute of Nanoscience and Materials of Aragón (INMA), a Joint Research Unit of the Spanish National Council of Research (CSIC), and the University of Zaragoza (UNIZAR) in Spain. The AML is focused on the development of functional polymeric materials and their microstructuring in the search of functional systems of interest in areas such as photonics, biomedicine and soft robotics. We have recently developed the 4D printing of liquid crystal elastomers, intelligent materials that respond mechanically to an external stimulus such as temperature or light. This technique introduces intelligent character to 3D printed structures, digitally programming material response to stimuli through additive manufacturing. Related to this achievement, AML coordinates the PRIME FET-OPEN H2020 project (ID: 829010), dedicated to the development of active microfluidic devices; and the MSCA Network STORM-BOTS (ID.: 956150) on soft robotics based on liquid crystal elastomers.

BNN: Why did you decide to become a BioNanoNet Association member, and what do you expect from the membership?

Five years ago, we got in touch for first time with BNN to form a consortium for a European project proposal. This was very successful, already in the first attempt, and we started to work together with BNN in PRIME (grant agreement no 829010), a project funded by the European Union's Horizon 2020 Research & Innovation Programme, on active microfluidic devices. For AML, coordinator of this project, BNN has been a very reliable project partner so we look forward to future joint projects. We would also like to become a key partner in the BioNanoNet Association in the topic functional polymeric materials. We would like to see our developed smart materials and our soft robotic functions being used in relevant real-life applications, and the Association with its members is a great community that could help us to achieve this goal.

Sustainability is a core value of BNN. What strategies have you implemented to improve your organization's sustainability?

At our lab we are becoming more and more concerned about sustainability in our research. To implement it, we try to minimize the amount of used chemicals and solvents, trying to choose non-toxic and environmentally friendly alternatives whenever it is possible. Especially when having applications in mind, we strive for sustainable material choices considering their life cycle.

Our Focus Topic of this issue is "Leveraging new technologies for societal impact". Does your organization address this topic?

At our group, we aim to generate new fundamental knowledge on materials and their processing technologies, but we do not do this research without considering that the potential application of our systems should always have a positive impact on our society. Leveraging new technologies for societal impact is in our DNA.

What led you to your profession?

I was determined to study Mathematics at the University, but a very motivating high school physics teacher, Carlos Gracia, led me to study physics. Later, I got more and more attracted to research in Condensed Matter Physics. I started my PhD in polymers, "by accident", as nobody in my department had done it before and my PhD supervisor, Rafael Alcalá, proposed this topic to me. With his wise guidance and humanity, we successfully set up a new research line in our department that has grown over time. Overall, curiosity, the joy of learning new things, perseverance, and the satisfaction of generating new knowledge that can be useful to society have driven me to

push my research ahead throughout my scientific career, and I hope there are a lot of good things awaiting us in the future.

What does your typical workday look like?

Currently I spend lot of time managing projects and people, so there are many meetings. Although it is enjoyable and rewarding, I would like to spend more time in the lab. I deeply enjoy facing the experiments, from the conceptualization, the idea, the spark, to the setup, the experiment itself, many times leading to a failure…that leads you to the next, improved, attempt. This process is a challenge that I very much enjoy, rethinking a solution to finally succeed once on a while (or not). I like to solve problems.

What's the best aspect of your job?

Although I must admit sometimes it can be exhausting, research is a continuous intellectual challenge. You always have to be creative and search and re-search for solutions to solve problems in the best way. I also very much enjoy interacting with people that are passionate about the things they do. The atmosphere in research is lively and motivating.

What would you advise a young person considering working in your field?

I try to advise early-stage researchers to seek out high-quality research, look for good mentors, be humble and learn from every single detail, technical or not, around you.

I deeply enjoy facing the experiments, from the conceptualization, the idea, the spark, to the setup, the experiment itself.

Who are people in your field that inspire you?

Prof. Dirk J. Broer has been, and continues to be, the most inspiring person in my field for me. I had the honor and privilege of working under his guidance for almost three years during my postdoctoral period in Eindhoven, the Netherlands. I am lucky to have him as a long-term collaborator since that time. Prof. Broer excels in his research but even more remarkable is his personality. Due to all this, Prof. Broer has been a decisive source of inspiration along my entire career and a role model.

5–second answers

What was your dream job when you were a kid?

Something like engineer, architect, inventor… I liked to design and attempt to build different things with my hands, like airplanes or submarines (even if they never worked).

If you could study anything (new) right now, what would it be?

I have always loved the formal beauty of mathematics, but I like hands-on things too so I would like to go for Advanced Robotics.

Office, home office or hybrid?

Hybrid: sometimes you need isolation to focus on something but contact with people is always enriching and can change everything.

Which book have you most enjoyed reading lately?

Sapiens by Yuval Noah Harari

If you could make any activity an Olympic discipline, in which would you win a medal?

Loving my kids. Gold medal winner, no doubt. Although shared with my wife.

What is your motto?

I have several I like but I will choose one, from Henry Ford, related to the importance of perseverance and the opportunity of failure in Science. Something I try to instill in my students: "Failure is only the opportunity to begin again, this time more intelligently."

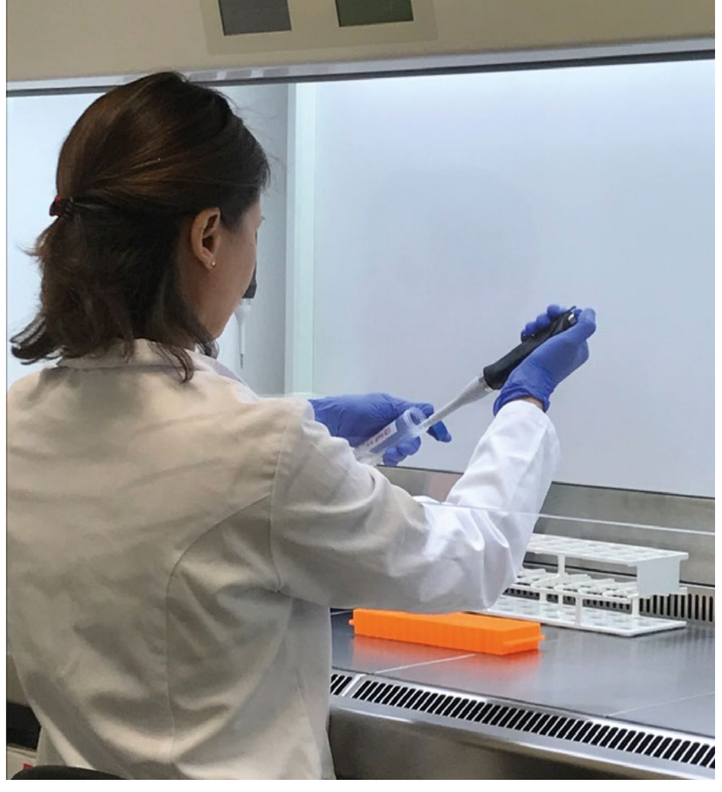
Contact

Carlos Sánchez Somolinos
Advanced Manufacturing Laboratory (AML)
carlos.s@csic.es
aml.csic.es

→ TABLE OF CONTENTS

MEMBER INTERVIEW

COVIRABIO with Bernhard Klemen



Covirabio GmbH is an Austrian start-up with the vision to enable pathogen detection and immune monitoring at the Point-of-Care/ Point-of-Need. Based on the Covirabio technology platform VERB (Virus Entry Receptor Binding), a portfolio of test systems for the detection of SARS-CoV-2 infections and the immune response to an infection and/or vaccination is currently being developed. For the use at the Point-of-Care or Point-of-Need, the assays are integrated into microfluidic systems. The technology platform is now also expanded to bacterial pathogens and other viruses.

The core team of Covirabio GmbH consists of experts in the fields of diagnostics, microbiology, immunology and biochemistry as well as successful bio-entrepreneurs who cover the commercial and operational side. Dr. Bernhard Klemen is the CEO of Covirabio and has more than 10 years' experience in investment banking. As an entrepreneurial investor he co-founded 6 companies and is now continuously working to grow Covirabio.

BNN: Why did you decide to become a BioNanoNet Association member, and what do you expect from the membership?

To realize Covirabio's vision of near-patient infection diagnosis and immune monitoring, the integration of bioassays in microfluidic systems is crucial. As a young company in Austria, the integration into the network for the exchange of technologies and expertise is very valuable. Among others, the "Advanced Microfluidics Initiative" and its networking, rapid prototyping and biochip production possibilities are very relevant for Covirabio. In addition, we welcome the opportunity to learn more about the technological aspects of diagnostic test development and exchange ideas within the BioNanoNet network.

Sustainability is a core value of BNN. What strategies have you implemented to improve your organization's sustainability?

As a visionary company, Covirabio has integrated sustainability in its strategy to stay relevant in the future. We have already implemented sustainable aspects when carrying out daily operations such as a mindful use of materials and avoidance of waste. Orders are bundled as far as possible to avoid unnecessary transport and packing material and employees reach the company by public transport or by bike. As Point-of-Care tests have a huge need and potential for sustainable materials we are keen to learn and benefit from the respective developments and activities of the BioNanoNet network.

Our Focus Topic of this issue is "Leveraging new technologies for societal impact". Does your organization address this topic?

The impact of fast, precise, and accessible infectious disease diagnosis on health and socioeconomic aspects has been demonstrated by the Coronavirus pandemic. New technologies and innovative diagnostic tests, such as those developed by Covirabio, will have a huge impact on a society that is dealing with the aftermath of a pandemic and must be prepared for emerging ones.

What led you to your profession?

As a software developer with degrees in law, economics and business administration and more than 10 years of experience at US investment banks, I turned into a serial entrepreneur comparably late in my career. The focus on tech and more and more diagnostics and techbio is driven by my conviction that I can have impact in these areas of innovation as well as the respective growth potential in the next decades.

What does your typical workday look like?

I get up early, travel a lot, work remotely to the extent possible, but appreciate the value of in-person interactions even more since COVID-19.

What's the best aspect of your job?

Being shareholder as well as managing director/ co-founder gives me a degree of freedom that maximizes my impact on the business.

What would you advise a young person considering working in your field?

Be curious, never shy away from hard work, see challenges as opportunities and ask yourself whether diagnostics/ biotech/ techbio is a field you believe will be a relative outperformer versus other industries.

Who are people in your field that inspire you?

There is not one individual that inspires me, it is rather anyone who consistently builds conviction and acts accordingly and makes good decisions more than 50% of the time.

5-second answers

What was your dream job when you were a kid?

Astronaut

If you could study anything (new) right now, what would it be?

Molecular biology, genetics

Office, home office or hybrid?

Hybrid

Which book have you most enjoyed reading lately?

The Lean Startup

If you could make any activity an Olympic discipline, in which would you win a medal?

5000m

What is your motto?

Find in every challenge an opportunity

Contact

Bernhard Klemen
Covirabio GmbH
bernhard.klemen@covirabio.com
www.covirabio.net

→ TABLE OF CONTENTS

Manfred Baumgartner and Kurt Ternegg
© Tom Kubin

BDI–BIOENERGY

Change of Management at Styrian Industrial Plant Manufacturer BDI–BioEnergy International GmbH

BDI-BioEnergy International GmbH is pleased to announce that Mr Manfred Baumgartner has been appointed second CEO as of 15 May 2023.

Manfred Baumgartner, who has been working at BDI since 1996, has long-term experience, comprehensive technical knowledge and is well connected internationally. Thanks to his curious nature, he will manage the company together with Kurt Ternegg and accelerate the technological and economic progress.

Read the whole article here.

HAHN–SCHICKARD & INFINEON

Research for the "Digital Ear" of the Future: EU Project "Listen2Future" Started at Infineon

Led by Infineon Austria, the European research project "Listen2Future" started with 27 partners from 7 countries to develop the smallest microphone and ultrasound sensors for examinations in industry and medicine. Precise mini hearing aids, fast infection controls for infants or wearable ultrasound patches will become possible.

Medical care, healthy aging, energy security and product quality are fundamental issues for our society. As sensory organs of technology, tiny sensors such as microphones and ultrasonic sensors play an important role in this. As a "digital ear", they record acoustic signals and allow rapid investigations. The research of "Listen2Future" will significantly improve the performance of existing systems and also produce completely new solutions that benefit society, people and health.

Read the whole article here.

HAHN–SCHICKARD

Mapping the Customer's Entire Value Chain

Medical start-ups usually face two major challenges: product development as such and the transfer of small series to efficient large-scale production. Cost- and time-intensive conversions can be the result if the requirements of series production are not taken into account right from the start.

Hahn-Schickard and Rodinger Kunststoff-Technik GmbH (RKT) experienced this in several customer projects and took this as an opportunity to bundle their competences in the future. With a cooperation, the research and development service provider and the plastics specialist want to facilitate the transfer of ideas from product development to large-scale production for medical start-ups. The cooperation focuses on test carrier systems and in-vitro diagnostics.

Read the whole article here.

INFINEON

Infineon Builds New, Sustainable Logistics Building at the Villach Site

Infineon Austria started construction of a new logistics building at the Villach site in March. The new building will bundle the logistics areas and office space currently spread across the site in one location. Around 15 million euros will be invested. Completion of the building is scheduled for the end of October 2023, with commissioning starting in January 2024. Particular attention was paid to sustainable solutions in construction and use for the building.

Read the whole article here.

Project Presentations & Updates

HARMLESS Workshop on "Safe–and–Sustainable by Design for SMEs: Advanced Materials in Product Development"

On 25th May 2023, the H2020 project HARMLESS organised a virtual workshop on "Safe-and-Sustainable by Design (SSbD) for SMEs: Advanced Materials in Product Development" with the main aim to present to the audience the HARMLESS SSbD framework and the corresponding Decision Support System (DSS), which provides information and guidance on both safety and sustainability aspects of Advanced Materials to support SMEs in all stages of product development. Advanced Materials can include single- and multicomponent nanomaterials as well as other materials with enhanced properties as compared to conventionally used materials.

After a short overview of the HARMLESS project by the coordinator Dr Otmar Schmid (Helmholtz Munich), Dr Michael Persson (Chalmers Industriteknik) guided the participants on the integration of HARMLESS Safe-by-Design (SbD) principles during the earliest stages of product development. Dr Blanca Suarez (Temas Solutions) presented the EU-CSS-aligned HARMLESS SSbD framework and Dr Susan Dekkers (TNO) provided insight into how to implement SSbD principles at all stages

of product development using the HARMLESS Decision Support System. Often consideration of SSbD aspects in product development is hampered by the scarcity of SSbD relevant data on Advanced Materials. Dr Nina Jeliazkova (IDEAconsult) presented easy steps towards leveraging Artificial Intelligence (AI) for filling these data gaps for arbitrary materials and integrating them in the HARMLESS SSbD/DSS e-infrastructure.

After a brief summary of the workshop, Otmar Schmid highlighted some benefits for SMEs applying the HARMLESS approach to SSbD product development.

The workshop ended with a Q&A session in which participants were able to discuss with the experts their impressions, thoughts, and concerns.

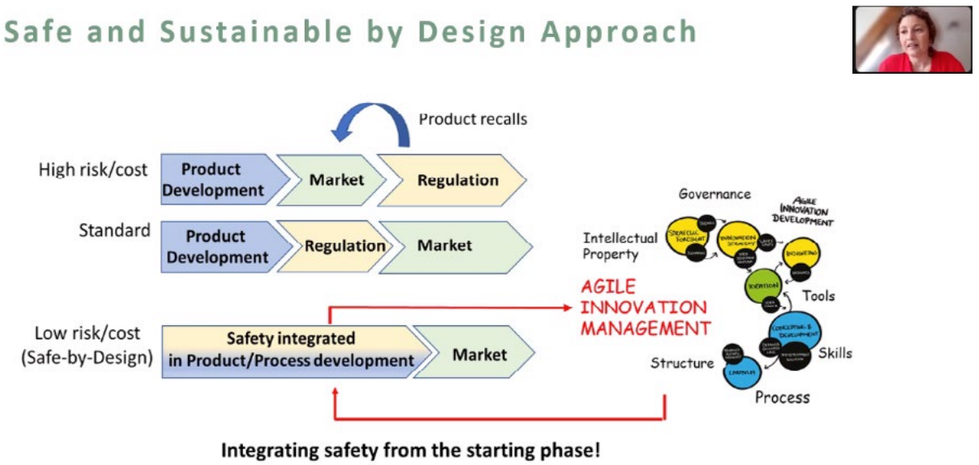
More than 40 people from all over Europe (e.g. Spain, Germany, and Greece), Türkiye and Australia attended this workshop and they represented a wide range of stakeholder groups from the scientific community (53%) to SMEs (29%) and SSbD consultants (5%) to regulators (1%) and non-governmental organisations (NGOs, 1%) (see graphics below for more details).

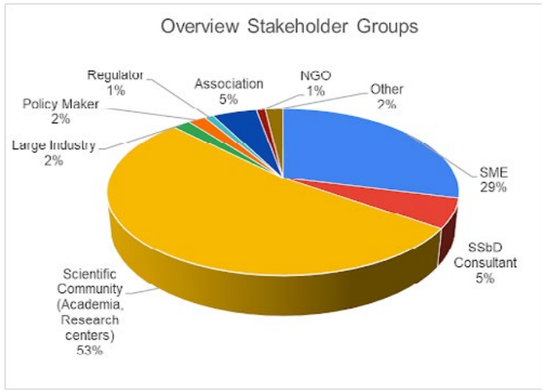
Selected highlights from the workshop:

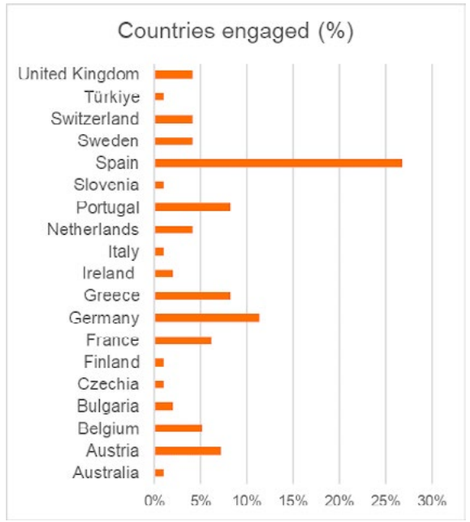
1. From the business perspective, the HARMLESS approach to SSbD can be seen as a value proposition on several levels.

- ✔ Avoidance of potentially hazardous materials and adoption of the most sustainable use of resources is reducing societal risks and industry cost on several levels as it protects the health of employees and consumers, protects the environment and enhances consumer acceptance at the marketplace.
- ✔ Consideration of SSbD during the earliest (ideation) stage of product development may save money by either not investing in a product, that may not be considered

Slide presented by Blanca Suarez Merino during the workshop







safe, or by SSbD-redesigning the product during the early stages of product development, which is less expensive than doing so later.

- ✔ Following an evidence-based approach to SSbD may be advantageous for regulatory acceptance of products containing advanced materials.

2. It was discussed that the HARMLESS SSbD/DSS e-infrastructure is likely too complex to be handled by SMEs themselves, but potentially useful with the help of SSbD consultants.
3. It is important for consultants to understand when and how to use the HARMLESS approach to SSbD to provide SMEs with the best possible value for their specific needs.
4. Hence, attendees asked for further demonstration of the HARMLESS approach to SSbD targeted to interested consultants (and SMEs) by providing examples on how to use the DDS in the context of real-world industry case studies.

The HARMLESS coordinator, Otmar Schmid, invited SMEs, consultancies and other interested attendees to contact HARMLESS for further inquiries and potential collaborations. Active involvement of SMEs with real-world case studies is essential for optimised tailoring of the HARMLESS SSbD approach to the specific needs of SMEs. If you have any questions about our work, new ideas to contribute or you want to explore and provide feedback on the HARMLESS SSbD/DSS, we would love to hear about it. Do not hesitate to contact us via email or directly via our project website.

All workshop materials (presentations, recording and agenda) are available here (DOI: 10.5281/zenodo.7974563).

HARMLESS project has received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement n° 953183.

SABYDOMA's 2nd Legal Workshop on S[S]bD

On 5 June 2023, the EU H2020 project SABYDOMA organised its 2nd Legal Workshop on Safe-by-Design (SbD), on the first day of the nanoSAFE2023 conference in Grenoble, France.

While the by-design paradigm now seems to be integrated into regulatory policies, legal challenges have yet to be addressed. This workshop is the first to focus on potential liability issues (Asia/EU/US) and the global regulatory dimension of the by-design approach. With expert lawyers and scientists from different regions of the world among the speakers, the workshop covered the legal aspects of the SSbD approach in the nanotechnology sector, expanding out to "by-design" approaches relevant in other technological industries.

The main objective of the workshop was to have a better understanding of the potential legal consequences of the adoption of the SSbD recommendation by the European Commission on 8 December 2022 and, in particular, whether it could prompt a change in the liability regimes which are currently centred on the manufacturers' liability and not on the "designers" of technologies.

Around 50 participants from all over the world (one-third in person and two-thirds on online); with a majority of female participants, from a wide range of stakeholders (scientists, industry, consultants, market researchers, NGO representatives, regulators, policy makers/ advisors, lawyers, etc.), joined the workshop (See Figures 1 and 2).

After a warm welcome to the workshop by the moderator Mr Anthony Bochon, from Gil Robles – San Bartolome & Partners (Brussels), SABYDOMA's coordinator, Prof. Andrew Nelson, from the University of Leeds, and Ignasi Gispert Pi, from APPNPS (Spain), presented SABYDOMA's key findings towards a better understanding of the SSbD paradigm. Hubert Rauscher, representing the European Commission JRC, then talked about the recommendation of the EC on SSbD. Dr Muhammad Nizam Awang (Universiti Sains Islam), Paul V. Majkowski (New York and New Jersey bars) and Anthony Bochon followed with talks about the Asian, American and EU perspectives on liability and the by-design paradigm. Our last speaker, Leonie Reins (Erasmus University Rotterdam), gave an insight of the SSbD concept as a regulatory approach.

The workshop ended with a very interactive Round Table discussion where our four panellists (Andrew Nelson, Ignasi Gispert, Dalila Antunes (from Factor Social), and Hubert Rauscher) were interviewed by the moderator Anthony Bochon.

This second legal workshop highlighted that the SSbD recommendation was not meant to cause any change in liability regimes and that it remains until now a voluntary scheme. Whether it could influence the interpretation of the current legal regimes remains uncertain and the future legislation on product safety (already adopted) and product liability (currently under adoption) will have to be carefully watched.

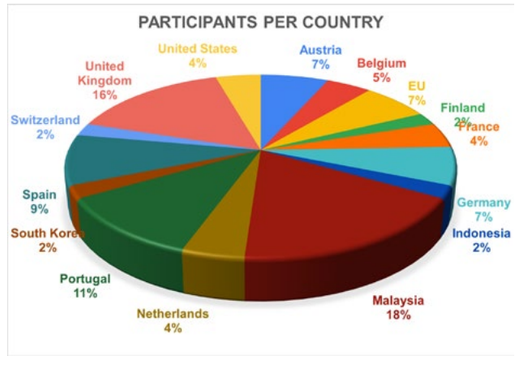
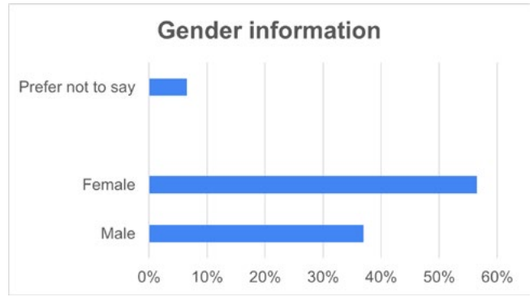


Figure 1. Workshop Global Outreach - Participants per Country.



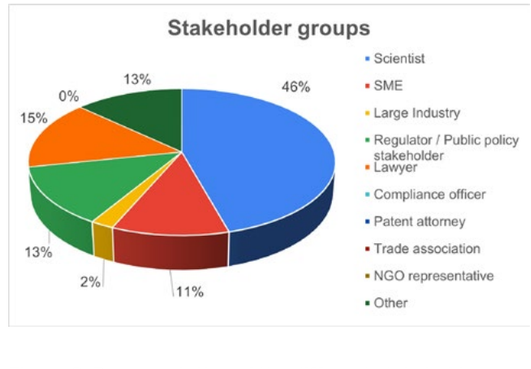


Figure 2. Representation of the different stakeholder groups among the workshop participants.

You can find the presentations here, available under the Creative Commons Attribution 4.0 International Licence (CC BY 4.0) (DOI: 10.5281/zenodo.8072145), and the recording of the workshop in SABYDOMA's YouTube Channel: SABYDOMA's 2nd Legal Workshop on S(S)bD Part 1 & Part 2. The agenda can be found here.

SABYDOMA project has received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement n° 862296.

NMBP–16 Ambassadors Meet in Grenoble to Align Activities

On 8 June 2023, representatives from the six Task Forces gathered once more to delve into the scientific advancements achieved within the three NMBP-16 sister projects, DIAGONAL, HARMLESS, and SUNSHINE. Their primary objective was to assess the current state of inter-project collaboration and foster mutual understanding. Given that many of the partners were already attending the nanoSAFE 2023 & NanoSafety Cluster joint conference, the meeting conveniently took place in Grenoble, France the same week.

The organization of the meeting fell under the responsibility of Beatriz Alfaro and Susanne Resch (BNN), with Susanne Resch serving as the moderator. This collaborative assembly presented an exceptional opportunity for the participants to share comprehensive updates regarding the progress made in each Task Force (Stakeholder Engagement, Grouping and read-across (Hypotheses and IATA editing/development), Database Task Force, Risk Management (incl. Exposure Assessment & Risk Assessment tools), MCNMs (Meaning of MCNM, case study comparison and sector-specific transparency) and Hazard Assessment). By doing so, they aimed to foster a deeper understanding of the advancements achieved and identify potential areas of synergy.

Moreover, the meeting served as a platform to facilitate discussions on joint activities that could be undertaken collectively by the three projects in order to amplify the impact of their individual contributions. Through these deliberations, the representatives were able to establish a clearer roadmap and outline the upcoming milestones and endeavours to be pursued in the following months.

Overall, the meeting in Grenoble proved to be a valuable occasion for cross-project exchange and evaluation. It allowed the representatives to stay abreast of scientific progress, enhance inter-project cooperation, and establish a strategic framework for future interactions. Such gatherings play a vital role in fostering collaboration and propelling scientific endeavours forward within the NMBP-16 sister projects.

These projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements n° 953152 (DIAGONAL), and n° 953183 (HARMLESS).

NanoPAT Newsletter Released

The NanoPAT project has published its sixth newsletter with the latest highlights, introducing the partners, sharing news, informing you about project developments and telling you where you can meet the NanoPAT team!

Download Newsletter

This project has received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement n° 862583.

Outlook

BNN EVENTS & EVENTS SUPPORTED BY BNN

BioNanoNet Annual Forum & BNN Networking Session 2023

13 September 2023 | Vienna, Austria

More information coming soon!

BNN Days 2024

4 – 8 March 2024 | Vienna, Austria

More information coming soon!

Microfluidics in their PRIME: Integrated Chips, Active Valves, Smart Sensors, and What Comes Next

14 September 2023, 9:30-14:00 (incl. lunch) | Vienna, Austria (TUtheSky, Getreidemarkt 9)

Microfluidic devices manipulate tiny amounts of fluid, enabling cost-effective, fast, accurate and high-throughput analytical assays. Progress in microfluidics has huge impact in environmental pollution monitoring, biohazard detection and biomedicine, contributing to the development of new tools for drug screening, biological studies, point-of-care diagnostics and personalized medicine.

Despite this huge potential, microfluidics market growth is heavily constrained by the complexity and high prices of the required large-scale off-chip equipment and its operational cost.

PRIME, an EU-funded H2020 project with beneficiaries BNN and BioNanoNet member Advanced Manufacturing Laboratories (CSIC), among others, has used additive manufacturing technologies to integrate smart valves in a microfluidic chip. PRIME is also producing new ultrasensitive and selective sensors embedded in the chip and readable with light. The final device is to be remotely addressed and read using simple photonic elements that can be integrated in compact, portable and cheap operation&read devices.

The BioNanoNet community is warmly welcome to join the PRIME consortium and others from the field of microfluidics to learn more about this technology for their final dissemination event with a fantastic view over Vienna, Austria on Thursday, 14 September 2023.

More information

Finally

We hope you enjoyed reading the BNN QUARTERLY! Please don't hesitate to contact us if you have any suggestions or feedback.

Our next BNN QUARTERLY will be published in September 2023 and will focus on the topic **Biofunctionalization**. BioNanoNet members are welcome to send their contributions regarding this focus topic as well as articles about their scientific research until 18 September 2023! Articles on other topics can be published anytime on the BNN website.

Contact
info@bnn.at

The BNN team from left to right: Barbara, Andreas, Simone, Angelika, Caitlin, Johanna, Christine, Christina, Beatriz, Clemens and Susanne

Impressum:

Owner and publisher:
BioNanoNet Forschungsgesellschaft mbH
Kaiser-Josef-Platz 9, 8010 Graz, Austria
UID: ATU 63046279, FN 285326 y

Graphic Design & Layout: Barbara Ebner

Connect with us!

→ TABLE OF CONTENTS