

BIO \_\_\_\_\_  
NANONET

# NEWSLETTER

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December 2019

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### **Finally**

## Editorial – *contemporary issues from the network*

Dear Ladies and Gentlemen,

the end of the year is a perfect time to reflect; and we can conclude that the activity level of our members increases continuously and that the collaboration with the BNN-team is very successful. We are therefore expanding our team to continue and ensure the high level of quality in supporting our members. Motivated by a successful evaluation of the previous round of submissions, numerous first stage proposals for the last H2020-calls have been supported for the submissions to NMBP-calls recently. The topics addressed by our members cover areas like e.g. safe-by-design, standardisation, sustainability, bio-based nano-enabled materials, and applications in the nanomedical field. If you are interested in collaborations to such topics, do not hesitate to contact us and/or become a member of the Bio-NanoNet Association.

In addition to the preparation of proposals answering to the H2020-calls, BNN was involved in preparation work for Horizon Europe (H-EU), the next European Framework Program, which content will consider strategic documents from the communities in Europe. BNN contributed to the following activities:

- “European Research and Innovation Days” – end of September, the EC opened that forum for 3000+ people to contribute to the content of H-EU;
- “[NanoSafetyWeek](#)” – in October, the EU NanoSafetyCluster community (with numerous BioNanoNet-members involved!) met in Copenhagen and discussed (e.g. in the open forum) the future role of materials safety, specifically nano-related safety, in H-EU. The consultation is ongoing, will be completed mid of January 2020, and shall feed into the “strategic plan” which is under development by the European Commission.
- “[Sustainable Chemistry – Strategic Innovation and Research Agenda](#)”, published end of November during the [SusChem stakeholders event](#).

In addition to the contribution to strategic development in the European research ecosystem, BNN is implementing the BNN2020+ strategy with the goal to present it during our [BNN-Networking event on February 27<sup>th</sup>, 2020, in Graz](#); back-to-back with the [Rare Disease Day 2020-Event on February 28<sup>th</sup>, 2020, also in Graz](#) (more details coming soon) – please block your calendar for these events, would be great seeing you there!

The BNN team wishes you  
a Merry Christmas,  
relaxing holidays and a  
healthy, joyful and prosperous  
New Year!



*The office will be closed from  
23<sup>rd</sup> of December, 2019 until 6<sup>th</sup> of January, 2020!*

*from left to right:*

Johanna K. Scheper, Beatriz Alfaro Serrano, Susanne Resch, Andreas Falk, Christine Halbedel,  
Angelika Halbedl-Herrich, Simone Jagersbacher and Nikolaus Ladenhauf

Sincerely,

BioNanoNet-Team

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## Recent Scientific Publications of BioNanoNet Members

### Period 2019

#### CIBER-BBN

Castillo-Escario, Y., Ferrer-Lluis, I., Montserrat, J. M., Jané, R., (2019). Entropy analysis of acoustic signals recorded with a smartphone for detecting apneas and hypopneas: A comparison with a commercial system for home sleep apnea diagnosis. *IEEE Access* 7, 128224-128241 DOI: 10.1109/ACCESS.2019.2939749

Mireia Pesarrodonà, Toni Jauset, Zamira V. Díaz-Riascos, Alejandro Sánchez-Chardi, Marie-Eve Beaulieu, Joaquín Seras-Franzoso, Laura Sánchez-García, Ricardo Baltà-Foix, Sandra Mancilla, Yolanda Fernández, Úrsula Rinas, Simó Schwartz Jr, Laura Soucek, Antonio Villaverde, Ibane Abasolo, Esther Vázquez (2019). Targeting Antitumoral Proteins to Breast Cancer by Local Administration of Functional Inclusion Bodies. *Advanced Science*. <https://doi.org/10.1002/advs.201900849>

Falgàs, Pallarès, Unzueta, Céspedes, Arroyo-Solera, Moreno, Gallardo, Mangues, Sierra, Villaverde, Vázquez, Mangues (2019): A CXCR4-targeted nanocarrier achieves highly selective tumor uptake in diffuse large B-cell lymphoma mouse models. *Casanova. Haematologica*. <https://www.ncbi.nlm.nih.gov/pubmed/31248974>

Sandra Pusil, María Eugenia López, Pablo Cuesta, Ricardo Bruña, Ernesto Pereda y Fernando Maestú (2019): "Hypersynchronisation in mild cognitive impairment: the 'X' model". *Brain*. DOI: 10.1093/brain/awz320.

#### Department for Health Sciences and Biomedicine, Faculty of Health and Medicine, Danube University Krems

Fendl, B., Weiss, R., Eichhorn, T., Spittler, A., Fischer, M.B., Weber, V. (2019): Storage of human whole blood, but not isolated monocytes, preserves the distribution of monocyte subsets. *Biochem Biophys Res Commun*. pii: S0006-291X(19)31488-3. doi: 10.1016/j.bbrc.2019.07.120.

**Short summary:** We investigated the influence of different monocyte isolation protocols and storage on the relative abundance of monocyte subsets. Overnight incubation of isolated monocytes induced a change in the monocyte subset distribution towards CD14<sup>++</sup>CD16<sup>+</sup> intermediate monocytes, which were also the main binding partners of platelets and platelet-derived extracellular vesicles. Our data propose the involvement of platelet EVs in the induction of CD16 expression on monocytes.

Pilecky, M., Schildberger, A., Knabl, L., Orth-Höller, D., Weber, V. (2019): Influence of antibiotic treatment on the detection of *S. aureus* in whole blood following pathogen enrichment. *BMC Microbiol*, 19(1),180. doi: 10.1186/s12866-019-1559-7.

**Short summary:** The study aimed to investigate the influence of antibiotic pre-treatment on the recovery of pathogen DNA during pre-analytical pathogen enrichment by selective lysis and centrifugation.

gation. While antibiotic treatment did not negatively affect the recovery of pathogen DNA, cell wall active antibiotics even supported the release and detection of pathogen DNA.

Kardos, D., Marschall, B., Simon, M., Hornyák, I., Hinsenkamp, A., Kuten, O., Gyevnár, Z., Erdélyi, G., Bárdos, T., Paukovits, T.M., Magos, K., Béres, G., Szenthe, K., Bánáti, F., Szathmary, S., Nehrer, S., Lacza, Z. (2019): Investigation of Cytokine Changes in Osteoarthritic Knee Joint Tissues in Response to Hyperacute Serum Treatment. *Cells*, 8(8). pii: E824. doi: 10.3390/cells8080824.

Short summary: The recent study investigated how the cytokine milieu of osteoarthritic knee joint reacts to hyperacute serum treatment in vitro. The study revealed that hyperacute serum treatment induces cell proliferation of osteoarthritic joint tissues and affects the cytokine milieu towards a less inflamed state.

Stojanović, B., Bauer, C., Stotter, C., Klestil, T., Nehrer, S., Franek, F., Rodríguez Ripoll, M. (2019): Tribocorrosion of a CoCrMo alloy sliding against articular cartilage and the impact of metal ion release on chondrocytes. *Acta Biomater*, 94:597-609. doi: 10.1016/j.actbio.2019.06.015.

Short summary: The study showed the occurrence of biotribocorrosion during sliding between a CoCrMo alloy and bovine articular cartilage. Cobalt concentrations of up to 22 ppb were measured in electrolyte after the tribocorrosion experiment, along with the presence of Co and Cr compounds on the cartilage surface despite the very low coefficient of friction measured. Surface analyses of CoCrMo cylinders after the experiments confirmed changes in passive layer and presence of a tribofilm. The experiments on cell cultures using Co containing culture medium indicated that critical concentrations of Co ions led to chondrocyte morphology changes and their apoptosis.

Further publications:

<https://www.donau-uni.ac.at/en/university/faculties/health-medicine/departments/biomedical-research/publications.html>

<https://www.donau-uni.ac.at/en/university/faculties/health-medicine/departments/health-sciences-medicine-research/centers/regenerative-medicine/publications.html>

## Department of Water-Atmosphere-Environment, Institute of Waste Management, University of Natural Resources

Florian Part, Christoph Zaba, Oliver Bixner, Christian Zafiu, Sabine Lenz, Lukas Martetschläger, Stephan Hann, Marion Huber-Humer, and Eva-Kathrin Ehmoser, 2019. Mobility and fate of ligand stabilised semiconductor nanoparticles in landfill leachates. Currently under review in: *Journal of Hazardous Materials*.

A. Jandric, F. Part, N. Fink, V. Cocco, F. Mouillarda, M. Huber-Humer, S. Salhofer, and C. Zafiu, 2019.

Investigation of the heterogeneity of bromine in plastic components as an indicator for brominated flame retardants in waste electrical and electronic equipment with regard to recyclability. Currently under review in: *Journal of Hazardous Materials*.

Schneider, F; Part, F; Gobel, C; Langen, N; Gerhards, C; Kraus, GF; Ritter, G  
A methodological approach for the on-site quantification of food losses in primary production: Austrian and German case studies using the example of potato harvest. *WASTE MANAGE*. 2019; 86: 106-113.

## HAHN SCHICKARD

Johannsen, B., Müller, L., Baumgartner, D., Karkossa, L., Früh, S.M., Bostanci, N., Karpíšek, M., Zengerle, R., Paust, N., Mitsakakis, K. (2019): Automated Pre-Analytic Processing of Whole Saliva Using Magnet-Beating for Point-of-Care Protein Biomarker Analysis. *Micromachines*, 10(12), 833. doi:10.3390/mi10120833.

Hays, J.P., Mitsakakis, K., Luz, S., van Belkum, A., Becker, K., van den Bruel, A., Harbarth, S., Rex, J.H., Simonsen, G.S., Werner, G., Di Gregori, V., Ludke, G., van Staa, T., Moran-Gilad, J., Bachmann, T.T., on behalf of the JPIAMR AMR-RDT consortium. (2019): The successful uptake and sustainability of rapid infectious disease and antimicrobial resistance point-of-care testing requires a complex 'mix-and-match' implementation package. *European Journal of Clinical Microbiology & Infectious Diseases*, 38(6), 1015-1022. doi: 10.1007/s10096-019-03492-4.

van Belkum, A., Bachmann, T.T., Ludke, G., Lisby, J.G., Kahlmeter, G., Mohess, A., Becker, K., Hays, J.P., Woodford, N., Mitsakakis, K., Moran-Gilad, J., Vila, J., Peter, H., Rex, J.H., Dunne, W.M., & the JPIAMR AMR-RDT Working Group on Antimicrobial Resistance and Rapid Diagnostic Testing. (2019): Developmental roadmap for antimicrobial susceptibility testing systems. *Nature Reviews Microbiology*, 17(1), 51-62. doi: 10.1038/s41579-018-0098-9.

## Institute of Technology Assessment (ITA), Austrian Academy of Sciences (ÖAW)

Greßler, S., Prenner, S., Kurz, A., Resch S., Pavlicek, A., Part, F. (2019): Polymer-Nanokomposite: Additive, Eigenschaften, Anwendungen, Umweltaspekte No. 052 – November 2019. Wien: Institut für Technikfolgen-Abschätzung (ITA).

Pavlicek, A., Rose, G., & Gázsó, A. (2019): Nano-registries: Country-specific Solutions for Nano-regulation No. 051en – June 2019. Wien: Institut für Technikfolgen-Abschätzung (ITA). <https://doi.org/10.1553/ita-nt-051en>

Rose, G., Pavlicek, A., & Gázsó, A. (2019): Safe-by-Design – The Early Integration of Safety Aspects in Innovation Processes. NanoTrust dossier No. 050en – May 2019. Wien: Institut für Technikfolgen-Abschätzung (ITA). <https://doi.org/10.1553/ita-nt-050en>  
<http://epub.oew.ac.at/ita/nanotrust-dossiers/dossier050en.pdf>

## Institute of Tendon & Bone Regeneration, Paracelsus Medical University

Costea, L., Meszaros, A., Bauer, H., Bauer, H. C., Traweger, A., Wilhelm, I., . . . Krizbai, I. A. (2019). The Blood-Brain Barrier and Its Intercellular Junctions in Age-Related Brain Disorders. *Int J Mol Sci*, 20(21). doi: 10.3390/ijms20215472

Gehwolf, R., Schwemberger, B., Jessen, M., Korntner, S., Wagner, A., Lehner, C., . . . Traweger, A. (2019). Global Responses of Il-1beta-Primed 3D Tendon Constructs to Treatment with Pulsed Electromagnetic Fields. *Cells*, 8(5). doi: 10.3390/cells8050399



Gehwolf, R., Spitzer, G., Wagner, A., Lehner, C., Weissenbacher, N., Tempfer, H., & Traweger, A. (2019). 3D-Embedded Cell Cultures to Study Tendon Biology. *Methods in molecular biology*, 2045, 155-165. doi: 10.1007/7651\_2019\_208

Lehner, C., Spitzer, G., Gehwolf, R., Wagner, A., Weissenbacher, N., Deininger, C., . . . Traweger, A. (2019). Tenophages: a novel macrophage-like tendon cell population expressing CX3CL1 and CX3CR1. *Dis Model Mech*. doi: 10.1242/dmm.041384

Plachel, F., Heuberger, P., Gehwolf, R., Frank, J., Tempfer, H., Lehner, C., . . . Traweger, A. (2019). MicroRNA Profiling Reveals Distinct Signatures in Degenerative Rotator Cuff Pathologies. *Journal of orthopaedic research: official publication of the Orthopaedic Research Society*. doi: 10.1002/jor.24473

Plachel, F., Korn, G., Traweger, A., Ortmaier, R., Resch, H., & Moroder, P. (2019). Long-term results after arthroscopic treatment of symptomatic Ellman grade 2 PASTA lesions. *J Shoulder Elbow Surg*, 28(7), 1356-1362. doi: 10.1016/j.jse.2018.12.002

Plachel, F., Moroder, P., Gehwolf, R., Tempfer, H., Wagner, A., Auffarth, A., . . . Traweger, A. (2019). Risk Factors for Rotator Cuff Disease: An Experimental Study on Intact Human Subscapularis Tendons. *Journal of orthopaedic research: official publication of the Orthopaedic Research Society*. doi: 10.1002/jor.24385

Plachel, F., Traweger, A., Vasvary, I., Schanda, J. E., Resch, H., & Moroder, P. (2019). Long-term results after arthroscopic transosseous rotator cuff repair. *J Shoulder Elbow Surg*, 28(4), 706-714. doi: 10.1016/j.jse.2018.09.003

Rivera, F. J., de la Fuente, A. G., Zhao, C., Silva, M. E., Gonzalez, G. A., Wodnar, R., . . . Aigner, L. (2019). Aging restricts the ability of mesenchymal stem cells to promote the generation of oligodendrocytes during remyelination. *Glia*, 67(8), 1510-1525. doi: 10.1002/glia.23624

## JOANNEUM RESEARCH

Altendorfer-Kroath, T., Schimek, D., Eberl, A., Rauter, G., Ratzer, M., Raml, R., Sinner, F. M., & Birngruber, T. (2019). Comparison of cerebral Open Flow Microperfusion and Microdialysis when sampling small lipophilic and small hydrophilic substances. *Journal of Neuroscience Methods*, 311, 394–401. <https://doi.org/10.1016/j.jneumeth.2018.09.024>

Altendorfer-Kroath, T., Schwingenschuh, S., Schondorff-Kruse, P., Heschel, M., Sinner, F., & Birngruber, T. (2019). Insulin distribution in human adipose tissue via a novel insulin infusion catheter. *Diabetes Technology & Therapeutics*, dia.2019.0195. <https://doi.org/10.1089/dia.2019.0195>

Carmona-Gutierrez, D., Zimmermann, A., Kainz, K., Pietrocola, F., Chen, G., Maglioni, S., Schiavi, A., Nah, J., Mertel, S., Beuschel, C. B., Castoldi, F., Sica, V., Trausinger, G., Raml, R., Sommer, C., Schroeder, S., Hofer, S. J., Bauer, M. A., Pendl, T., Tadic, J., Dambrueck, C., Hu, Z., Ruckstuhl, C., Eisenberg, T., Durand, S., Bossut, N., Aprahamian, F., Abdellatif, M., Sedej, S., Enot, D. P., Wolinski, H., Dengjel, J., Kepp, O., Magness, C., Sinner, F. M., Pieber, T. R., Sadoshima, J., Ventura, N., Sigrist, S. J., Kroemer, G., & Madeo, F. (2019). The flavonoid 4,4'-dimethoxychalcone promotes autophagy-dependent

longevity across species. *Nature Communications*, 10(1), 651.  
<https://doi.org/10.1038/s41467-019-08555-w>

de Mattos, I. B., Holzer, J. C. J., Tuca, A.-C., Groeber-Becker, F., Funk, M., Popp, D., Mautner, S., Birngruber, T., & Kamolz, L.-P. (2019). Uptake of PHMB in a bacterial nanocellulose-based wound dressing: A feasible clinical procedure. *Burns*, 45(4), 898–904.

### Know-Center GmbH

M. Lovrić, J. M. Molero, R. Kern (2019): PySpark and RDKit: Moving towards Big Data in Cheminformatics, *Mol. Inf.* 2019, 38, 1800082. DOI: <https://doi.org/10.1002/minf.201800082>

### NovaMechanics & National Technical University of Athens

Varsou, D. D., Afantitis, A., Melagraki, G., & Sarimveis, H. (2019). Read-across predictions of nanoparticle hazard endpoints: a mathematical optimisation approach. *Nanoscale Advances*. DOI: [10.1039/C9NA00242A](https://doi.org/10.1039/C9NA00242A)

### Luxembourg Institute of Science and Technology

Chary, A., Serchi, T., Moschini, E., Hennen, J., Cambier, S., Ezendam, J., Blömeke, B., Gutleb, A.C. 2019. An improved in vitro coculture system for the detection of respiratory sensitizers. *ALTEX* 36, 403-418. doi:10.14573/altex.1901241

Duroudiera, N., Cardoso, C., Mehennaoui, K., Mikolaczyk, M., Schäfer, J., Gutleb, A.C., Giamberini, L., Bebianno, M.J., Bilbao E., Cajaravillea M.P. 2019. Changes in protein expression in mussels *Mytilus galloprovincialis* dietarily exposed to PVP/PEI coated silver nanoparticles at different seasons. *Aquat. Toxicol.* 210, 56-68. doi:10.1016/j.aquatox.2019.01.010

Fadoju, O., Ogunsuyi, O., Akanni, O., Alabi, O., Alimba, C., Adaramoye, O., Cambier, S., Eswara, S., Gutleb, A.C., Bakare, A. 2019. Evaluation of cytogenotoxicity and oxidative stress parameters in male Swiss mice co-exposed to titanium dioxide and zinc oxide nanoparticles. *Environ. Toxicol. Pharm.* 70, in press. doi:10/1016/j.etap.2019.103204.

Fizeşan, I., Cambier, S., Moschini, E., Chary, A., Nelissen, I., Ziebel, J., Audinot, J.-N., Wirtz, T., Kruszewski, M., Kiss, B., Pop, A., Serchi, T., Loghin, F., Gutleb, A.C. 2019. In vitro exposure of a 3D-tetraculture representative for the alveolar barrier at the air-liquid interface to silver particles and nanowires. *Part. Fibre Toxicol.*, 16:14. doi:10.1186/s12989-019-0297-1

Marescotti, D., Serchi, T., Luettich, K., Xiang, Y., Moschini, E., Talikka, M., Martin, F., Baumer, K., Dulize, R., Peric, D., Bornard, D., Guedj, E., Sewer, A., Cambier, S., Contal, S., Chary, A., Gutleb, A.C., Frentzel, S., Ivanov, N.V., Peitsch, M.C., Hoeng, J. 2019. Added value of complexity: How complex should an in vitro model be? The experience on a 3D alveolar model. *ALTEX* 36, 388-402. doi:10.14573/altex.1811221

Ogunsuyi O.I., Fadoju, O.M., Akanni, O.O., Alabi, O.A., Alimba, C.G., Cambier, S., Eswara, S., Gutleb, A.C., Adaramoye, O.A., Bakare A.A. 2019. Genetic and systemic toxicity induced by silver and copper oxide nanoparticles, and their mixture in the fish *Clarias gariepinus* (Burchell, 1822). *Environ. Sci. Poll. Res.* in press. doi: 10.1007/s11356-019-05958-6.

### Unit of Process Control & Informatics at National Technical University of Athens

Kalogeropoulos, I., & Sarimveis, H. (2020, 01). Predictive control algorithms for congestion management in electric power distribution grids. *Applied Mathematical Modelling*, 77, 635-651. doi:10.1016/j.apm.2019.07.034

Tsiros, P., Bois, F. Y., Dokoumetzidis, A., Tsiliki, G., & Sarimveis, H. (2019, 04). Population pharmacokinetic reanalysis of a Diazepam PBPK model: A comparison of Stan and GNU MCSim. *Journal of Pharmacokinetics and Pharmacodynamics*, 46(2), 173-192. doi:10.1007/s10928-019-09630-x

Varsou, D., Afantitis, A., Melagraki, G., & Sarimveis, H. (2019). Read-across predictions of nanoparticle hazard endpoints: A mathematical optimisation approach. *Nanoscale Advances*, 1(9), 3485-3498. doi:10.1039/c9na00242a

Alexandridis, A., Stogiannos, M., Papaioannou, N., Zois, E., & Sarimveis, H. (2018, 01). An Inverse Neural Controller Based on the Applicability Domain of RBF Network Models. *Sensors*, 18(2), 315. doi:10.3390/s18010315

Sopasakis, P., Sarimveis, H., Macheras, P., & Dokoumetzidis, A. (2017, 10). Fractional calculus in pharmacokinetics. *Journal of Pharmacokinetics and Pharmacodynamics*, 45(1), 107-125. doi:10.1007/s10928-017-9547-8

Puzyn, T., Jeliaskova, N., Sarimveis, H., Robinson, R. L., Lobaskin, V., Rallo, R., Fernández, A. (2018, 02). Perspectives from the NanoSafety Modelling Cluster on the validation criteria for (Q)SAR models used in nanotechnology. *Food and Chemical Toxicology*, 112, 478-494. doi:10.1016/j.fct.2017.09.037

## Period 2018

### BioNanoNet

Schimpel, C., Resch, S., Flament, G., Carlander, D., Vaquero, C., Bustero, I., & Falk, A. (2018). A methodology on how to create a real-life relevant risk profile for a given nano-material. *Journal of Chemical Health and Safety*, 25(1), 12-23. DOI: [10.1016/j.jchas.2017.06.002](https://doi.org/10.1016/j.jchas.2017.06.002)

### CIBER-BBN

Masvidal-Codina E., Illa X., Dasilva M., Bonaccini Calia A., Dragojević T., Vidal-Rosas E., Prats-Alfonso E., Martínez-Aguilar J., De la Cruz JM., Garcia-Cortadella R., Godignon P., Rius G., Camassa A., Del Corro E., Bousquets J., Hébert C., Durduran T., Villa R., Sanchez-Vives MV., Garrido JA., and Guimerà-Brunet A. (2019): High-resolution mapping of infraslow cortical brain activity enabled by graphene microtransistors. *Nature Materials* 18, 280–288. <https://doi.org/10.1038/s41563-018-0249-4>

Dey P., Fabri-Faja N., Calvo-Lozano., Terborg R., Belushkin A., Yesilkoy F., Fábrega A., Ruiz-Rodriguez JC., Ferrer R., González-López JJ., Estévez MC., Altug H., Pruneri V., and Lechuga LM. (2019): Label-free Bacteria Quantification in Blood Plasma by a Bioprinted Microarray Based Interferometric Point-of-Care Device. *ACS Sens.*, 4 (1), 52–60. from <https://pubs.acs.org/doi/10.1021/acssensors.8b00789>

Di Dominico A., Carola G., Calatayud C., Pons-Espinal M., Muñoz JP., Richaud-Patin Y., Fernandez-Carasa I., Gut M., Faella A., Parameswaran J., Soriano J., Ferrer I., Tolosa E., Zorzano A., Cuervo AM., Raya A., Cosiglio A. (2019): Patient-Specific iPSC-Derived Astrocytes Contribute to Non-Cell-Autonomous Neurodegeneration in Parkinson's Disease. *Stem Cell Reports*. 12 (2), 213-229. <https://doi.org/10.1016/j.stemcr.2018.12.011>

### Department of Water-Atmosphere-Environment, Institute of Waste Management, University of Natural Resources

Greßler, S.; Part, F.; Gzásó, A.; Nanotechnological Applications for Food Contact Materials (NanoTrust-Dossier 049en). *ITA Nanotrust Dossiers*, ISSN 1998-7293, 2018. [doi: 10.1553/ita-nt-049en](https://doi.org/10.1553/ita-nt-049en)

Part, F., Zaba, C., Bixner, O., Grünwald, T.A., Michor, H., Küpcü, S., Debreczeny, M., De Vito Francesco, E., Lassenberger, A., Schrittwieser, S., Hann, S., Lichtenegger, H., Ehmoser, E.-K., 2018. Doping Method Determines Para- or Superparamagnetic Properties of Photostable and Surface-Modifiable Quantum Dots for Multimodal Bioimaging. *Chemistry of Materials* 30, 4233-4241, [10.1021/acs.chemmater.8b00431](https://doi.org/10.1021/acs.chemmater.8b00431).

Part, F., Berge, N., Baran, P., Stringfellow, A., Sun, W., Bartelt-Hunt, S., Mitrano, D., Li, L., Hennebert, P., Quicker, P., Bolyard, S.C., Huber-Humer, M., 2018a. A review of the fate of

engineered nanomaterials in municipal solid waste streams. *Waste Management* 75, 427-449, <https://doi.org/10.1016/j.wasman.2018.02.012>.

Gressler, S., Part, F., Gázsó, A., Huber-Humer, M., 2018. Nanotechnological Applications for Food Contact Materials (NanoTrust Dossier No. 049en - July 2018, *ITA Nanotruster Dossiers*. Eigenverlag/Self, Wien.

Suzuki, S., Part, F., Matsufuji, Y., Huber-Humer, M., 2018. Modeling the fate and end-of-life phase of engineered nanomaterials in the Japanese construction sector. *Waste Management* 72, 389-398, <https://doi.org/10.1016/j.wasman.2017.11.037>.

## HAHN SCHICKARD

Mitsakakis, K.\*/D'Acremont\*, V., Hin, S., von Stetten, F., Zengerle, R. (2018): Diagnostic tools for tackling febrile illness and enhancing patient management. *Microelectronic Engineering*, 201, 26-59. doi: 10.1016/j.mee.2018.10.001.

\*Equally contributing first authors

Mitsakakis, K., Kaman, W.E., Elshout, G., Specht, M., Hays, J.P. (2018): Challenges in identifying antibiotic resistance targets for point-of-care diagnostics in general practice. *Future Microbiology*, 13(10), 1157-1164. doi: 10.2217/fmb-2018-0084.

Hin, S., Loskyll, M., Klein, V., Keller, M., Strohmeier, O., von Stetten, F., Zengerle, R., Mitsakakis, K. (2018): Membrane-based sample inlet for centrifugal microfluidic cartridges. *Microelectronic Engineering*, 187, 78-83. doi: 10.1016/j.mee.2017.12.006.

Mitsakakis, K., Hin, S., Muller, P., Wipf, N., Thomsen, E., Coleman, M., Zengerle, R., Vontas, J., Mavridis, K. (2018): Converging Human and Malaria Vector Diagnostics with Data Management towards an Integrated Holistic One Health Approach. *International Journal of Environmental Research and Public Health*, 15(2), 259. doi: 10.3390/ijerph15020259.

Hin, S., Paust, N., Keller, M., Rombach, M., Strohmeier, O., Zengerle, R., Mitsakakis, K. (2018): Temperature change rate actuated bubble mixing for homogeneous rehydration of dry pre-stored reagents in centrifugal microfluidics. *Lab Chip*, 18(2), 362-370. doi: 10.1039/c7lc01249g.

## Institute of Biophysics, Medical University of Graz

Lehofer, B., Golub, M., Kornmueller, K., Kriechbaum, M., Martinez, N., Nagy, G., Kohlbrecher, J., Amenitsch, H., Peters, J. and Prassl, R. (2018): High Hydrostatic Pressure Induces a Lipid Phase Transition and Molecular Rearrangements in Low-Density Lipoprotein Nanoparticles. *Particle & particle systems characterisation: measurement and description of particle properties and behavior in powders and other disperse systems*. 35

Matuszak, J., Dorfler, P., Lyer, S., Unterweger, H., Juenet, M., Chauvierre, C., Alaarg, A., Franke, D., Almer, G., Texier, I., Metselaar, J. M., Prassl, R., Alexiou, C., Mangge, H., Letourneur, D. and Cicha, I. (2018): Comparative analysis of nanosystems' effects on human endothelial and monocytic cell functions. *Nanotoxicology*, 1-18

Leithner, K., Triebel, A., Trotschmuller, M., Hinteregger, B., Leko, P., Wieser, B. I., Grasmann, G., Bertsch, A. L., Zullig, T., Stacher, E., Valli, A., Prassl, R., Olschewski, A., Harris, A. L., Kofeler, H. C., Olschewski, H. and Hrzenjak, A. (2018): The glycerol backbone of phospholipids derives from noncarbohydrate precursors in starved lung cancer cells. *Proc Natl Acad Sci U S A*. **115**, 6225-6230

Kornmueller, K., Lehofer, B., Leitinger, G., Amenitsch, H. and Prassl, R. (2018): Peptide self-assembly into lamellar phases and the formation of lipid-peptide nanostructures. *Nano research*. **11**, 913-928

Teubl, B. J., Stojkovic, B., Docter, D., Pritz, E., Leitinger, G., Poberaj, I., Prassl, R., Stauber, R. H., Frohlich, E., Khinast, J. G. and Roblegg, E. (2018): The effect of saliva on the fate of nanoparticles. *Clinical oral investigations*. **22**, 929-940

Juch, H., Nikitina, L., Reimann, S., Gauster, M., Dohr, G., Obermayer-Pietsch, B., Hoch, D., Kornmueller, K. and Haag, R. (2018): Dendritic polyglycerol nanoparticles show charge dependent bio-distribution in early human placental explants and reduce hCG secretion. *Nanotoxicology*. **12**, 90-103

## JOANNEUM RESEARCH

Duta-Mare, M., Sachdev, V., Leopold, C., Kolb, D., Vujic, N., Korbelius, M., Hofer, D. C., Xia, W., Huber, K., Auer, M., Gottschalk, B., Magnes, C., Graier, W. F., Prokesch, A., Radovic, B., Bogner-Strauss, J. G., & Kratky, D. (2018). Lysosomal acid lipase regulates fatty acid channeling in brown adipose tissue to maintain thermogenesis. *Biochimica et Biophysica Acta - Molecular and Cell Biology of Lipids*, 1863(4), 467–478. <https://doi.org/10.1016/j.bbalip.2018.01.011>

Faustmann, G., Meinitzer, A., Magnes, C., Tiran, B., Obermayer-Pietsch, B., Gruber, H.-J., Ribalta, J., Rock, E., Roob, J. M., & Winklhofer-Roob, B. M. (2018). Progesterone-associated arginine decline at luteal phase of menstrual cycle and associations with related amino acids and nuclear factor kB activation. *PLOS ONE*, 13(7), e0200489. <https://doi.org/10.1371/journal.pone.0200489>

Holzer, J. C. J., Birngruber, T., Mautner, S., Graff, A., & Kamolz, L.-P. (2019). Topical application of haemoglobin: a safety study. *Journal of Wound Care*, 28(3), 148–153.

Huber, K., Hofer, D. C., Trefely, S., Pelzmann, H. J., Madreiter-Sokolowski, C., Duta-Mare, M., Schlager, S., Trausinger, G., Stryeck, S., Graier, W. F., Kolb, D., Magnes, C., Snyder, N. W., Prokesch, A., Kratky, D., Madl, T., Wellen, K. E., & Bogner-Strauss, J. G. (2018). N-acetylaspartate pathway is nutrient responsive and coordinates lipid and energy metabolism in brown adipocytes. *Biochimica et Biophysica Acta (BBA) - Molecular Cell Research*, 1866, 337–348. <https://doi.org/10.1016/j.bbamcr.2018.08.017>

Hummer, J., Altendorfer-Kroath, T., & Birngruber, T. (2019). Cerebral Open Flow Microperfusion to Monitor Drug Transport Across the Blood-Brain Barrier. *Current Protocols in Pharmacology*, e60.



Kiefel, K., Donsa, K., Tiefenbacher, P., Mischak, R., Brunner, G., Sendlhofer, G., & Pieber, T. R. (2018). Feasibility and design of an electronic surgical safety checklist in a teaching hospital: A user-based approach. *EHealth Congress*. Vienna. <https://doi.org/10.3233/978-1-61499-858-7-270>

Kleinert, M., Kotzbeck, P., Altendorfer-Kroath, T., Birngruber, T., Tschöp, M. H., & Clemmensen, C. (2018). Time-resolved hypothalamic open flow micro-perfusion reveals normal leptin transport across the blood–brain barrier in leptin resistant mice. *Molecular Metabolism*, 13, 77–82. <https://doi.org/10.1016/j.molmet.2018.04.008>

Holweg, G., & Deutschmann, B. (2018). Intelligent NFC potassium measurement strip with hemolysis check in capillary blood. *E & i Elektrotechnik Und Informationstechnik*, 135(1), 83–88.

Meyer, M., Donsa, K., Truskaller, T., & Frohner, M. (2018). Development of a Protocol for Automated Glucose Measurement Transmission Used in Clinical Decision Support Systems Based on the Continua Design Guidelines. *Studies in Health Technology and Informatics*, 248, 132–139. <https://doi.org/10.3233/978-1-61499-858-7-132>

Moser, O., Münzker, J., Korsatko, S., Pachler, C., Smolle, K., Toller, W., Augustin, T., Plank, J., Pieber, T. R., Mader, J. K., & others. (2018). A prolonged run-in period of standard subcutaneous microdialysis ameliorates quality of interstitial glucose signal in patients after major cardiac surgery. *Scientific Reports*, 8(1), 1262.

Moser, O., Pandis, M., Aberer, F., Kojzar, H., Hochfellner, D., Elsayed, H., Motschnig, M., Augustin, T., Kreuzer, P., Pieber, T. R., & others. (2019). A head-to-head comparison of personal and professional continuous glucose monitoring systems in people with type 1 diabetes: Hypoglycaemia remains the weak spot. *Diabetes, Obesity and Metabolism*, 21(4), 1043–1048.

Nischwitz, S., Bernardelli de Mattos, I., Hofmann, E., Groeber-Becker, F., Funk, M., Mohr, G., Branski, L., Mautner, S., & Kamolz, L. (2019). Continuous pH monitoring in wounds using a composite indicator dressing — A feasibility study. *Burns*, 45(6), 1336–1341. <https://doi.org/10.1016/j.burns.2019.02.021>

Pipper, C., Bordag, N., Reiter, B., Economides, K., Florian, P., Birngruber, T., Sinner, F., Bodenlenz, M., & Eberl, A. (2019). LC/MS/MS analyses of open-flow microperfusion samples quantify eicosanoids in a rat model of skin inflammation. *Journal of Lipid Research*, 60(4), 758–766. <https://doi.org/10.1194/jlr.M087221>

Schimek, D., Raml, R., Francesconi, K. A., Bodenlenz, M., & Sinner, F. M. (2018). Quantification of acyclovir in dermal interstitial fluid and human serum by ultra-high-performance liquid-high-resolution tandem mass spectrometry for topical bioequivalence evaluation. *Biomedical Chromatography: BMC*, 32(6), e4194. <https://doi.org/10.1002/bmc.4194>

Schwarz, C., Stekovic, S., Wirth, M., Benson, G., Royer, P., Sigrist, S. J., Pieber, T., Dammbroek, C., Magnes, C., Eisenberg, T., Pendl, T., Bohlken, J., Köe, T., Madeo, F., & Flöel, A. (2018). Safety and tolerability of spermidine supplementation in mice and older adults with subjective cognitive decline. *Aging*. <https://doi.org/10.18632/aging.101354>

Sukseree, S., László, L., Gruber, F., Bergmann, S., Narzt, M. S., Nagelreiter, I. M., Höftberger, R., Molnár, K., Rauter, G., Birngruber, T., Larue, L., Kovacs, G. G., Tschachler, E., &

Eckhart, L. (2018). Filamentous Aggregation of Sequestosome-1/p62 in Brain Neurons and Neuroepithelial Cells upon Tyr-Cre-Mediated Deletion of the Autophagy Gene Atg7. *Molecular Neurobiology*, 55, 8425–8437. <https://doi.org/10.1007/s12035-018-0996-x>

Terlecki-Zaniewicz, L., Pils, V., Bobbili, M. R., Lämmermann, I., Perrotta, I., Grillenberger, T., Schwestka, J., Weiß, K., Pum, D., Arcalis, E., Schwingenschuh, S., Birngruber, T., Brandstetter, M., Heuser, T., Schosserer, M., Morizot, F., Mildner, M., Stöger, E., Tschachler, E., Weinmüllner, R., Gruber, F., & Grillari, J. (2019). Extracellular Vesicles in Human Skin: Cross-Talk from Senescent Fibroblasts to Keratinocytes by miRNAs. *Journal of Investigative Dermatology*. <https://doi.org/10.1016/j.jid.2019.05.015>

Tiffner, K. I., Kanfer, I., Augustin, T., Raml, R., Raney, S. G., & Sinner, F. M. (2018). A comprehensive approach to qualify and validate the essential parameters of an in vitro release test (IVRT) method for acyclovir cream, 5%. *International Journal of Pharmaceutics*, 535(1–2), 217–227. <https://doi.org/10.1016/j.ijpharm.2017.09.049>

Vogel, F. C. E., Bordag, N., Zügner, E., Trajkovic-Arsic, M., Chauvistré, H., Shannan, B., Váraljai, R., Horn, S., Magnes, C., Siveke, J., Schadendorf, D., & Roesch, A. (2019). Targeting the H3K4 demethylase KDM5B reprograms the metabolome and phenotype of melanoma cells. *Journal of Investigative Dermatology*. <https://doi.org/10.1016/j.jid.2019.06.124>

Zenz, S., Mader, J. K., Regittnig, W., Brunner, M., Korsatko, S., Boulgaropoulos, B., Magnes, C., Raml, R., Narath, S. H., Eller, P., Augustin, T., & Pieber, T. R. (2018). Impact of C-Peptide Status on the Response of Glucagon and Endogenous Glucose Production to Induced Hypoglycemia in T1DM. *The Journal of Clinical Endocrinology and Metabolism*, 103(4), 1408–1417. <https://doi.org/10.1210/jc.2017-01836>

### Luxembourg Institute of Science and Technology (LIST)

Brinchmann, B.C., Skuland, T., Rambøll, M.H., Szoke, K., Brinchmann, J.A., Gutleb, A.C., Moschini, E., Kubátová, A., Kukowski, K., Le Ferrec, E., Lagadic-Gossmann, D., Schwarz, P.E., Låg, M., Refsnes, M., Øvrevik, J., Holme J.A. 2018. Lipophilic components of diesel exhaust particles induce pro-inflammatory responses in human endothelial cells through AhR dependent pathway(s). *Part. Fibre Toxicol.*, 15:21. doi:10.1186/s12989-018-0257-1

Cambier, S., Røgeberg, M., Georgantzopoulou, A., Serchi, T., Karlsson, C., Verhaegen, S., Iversen, T.G., Guignard, C., Kruszewski, M., Hoffmann, L., Audinot, J.-N., Ropstad, E., Gutleb, A.C. 2018. Fate and effects of silver nanoparticles on early life-stage development of zebrafish (*Danio rerio*) in comparison to silver nitrate. *Sci. Total Environ.*, 610-611, 972-982. doi:10.1060/j.scitotenv.2017. 08.115

Chary, A., Hennen, J., Klein, S., Serchi, T., Gutleb, A.C., Blömeke, B. 2018. Respiratory sensitisation: toxicological point of view on the available assays. *Arch. Toxicol.*, 92, 803-822. doi:10.1007/s00204-017-2088-5

Fizeşan, I., Cambier, S., Moschini, E., Chary, A., Pop, A., Kiss, B., Serchi, T., Gutleb, A.C., Loghin, F. 2018. In vitro cellular models, a resourceful tool in respiratory toxicology. *Farmacia*, 66, 573-580. doi:10.31925/farmacia.2018.4.2



Fizeşan, I., Chary, A., Cambier, S., Moschini, E., Serchi, T., Nelissen, I., Kiss, B., Pop, A., Loghin, F., Gutleb, A.C. 2018. Responsiveness assessment of a 3D tetra-culture alveolar model exposed to diesel exhaust particulate matter. *Toxicol. in vitro*, 53, 67-79. doi:10.1016/j.tiv.2018.07.019.

Lacroix, G., Koch, W., Ritter, D., Gutleb, A.C., Larsen, S.T., Loret, T., Zanetti, F., Constant, S., Chortarea, S., Rothen-Rutishauser, B., Hiemstra, P., Frejavon, E., Hubert, P., Gribaldo, L., Kearns, P., Aublant, J.-M., Angeloni, S., Diabaté, S., Weiss, C., de Groot, A., Kooter, I. 2018. Air-liquid interface in vitro models for respiratory toxicology research: consensus workshop and recommendations. *Appl. in vitro Toxicol.*, 4, 1-16. doi:10.1089/aivt.2017.0034

Mehennaoui, K., Cambier, S., Serchi, T., Ziebel, J., Lentzen, E., Valle, N., Guérol, F., Thomann, J.-S., Giambérini, L., Gutleb, A.C. 2018. Do the pristine physico-chemical properties of silver and gold nanoparticles influence uptake and molecular effects on *Gammarus fossarum* (Crustacea Amphipoda)? *Sci. Total Environ.* 643, 1200-1215. doi:10.1016/j.scitotenv.2018.06.208

Wêsierska, M., Dziendzikowska, K., Gromadzka-Ostrowska, J., Dudek, J., Polkowska-Motrenko, H., Audinot, J.N., Gutleb, A.C., Oczkowski, M., Lankoff, A., Kruszewski, M. 2018. Silver ions are responsible for memory impairment induced by oral administration of silver nanoparticles. *Tox. Lett.*, 290, 133-144. doi:10.1016/j.toxlet.2018.03.019

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## BioNanoNet *Member Presentations*



## French microfluidics company FLUIGENT with German office in Jena

Since 2006 FLUIGENT has been internationally successful in the development, production and distribution of innovative microfluidic fluid management. This market is expanding rapidly and allows a paradigm shift for many problems. Today, the company has made a solid name for itself worldwide with more than 5,000 devices sold.

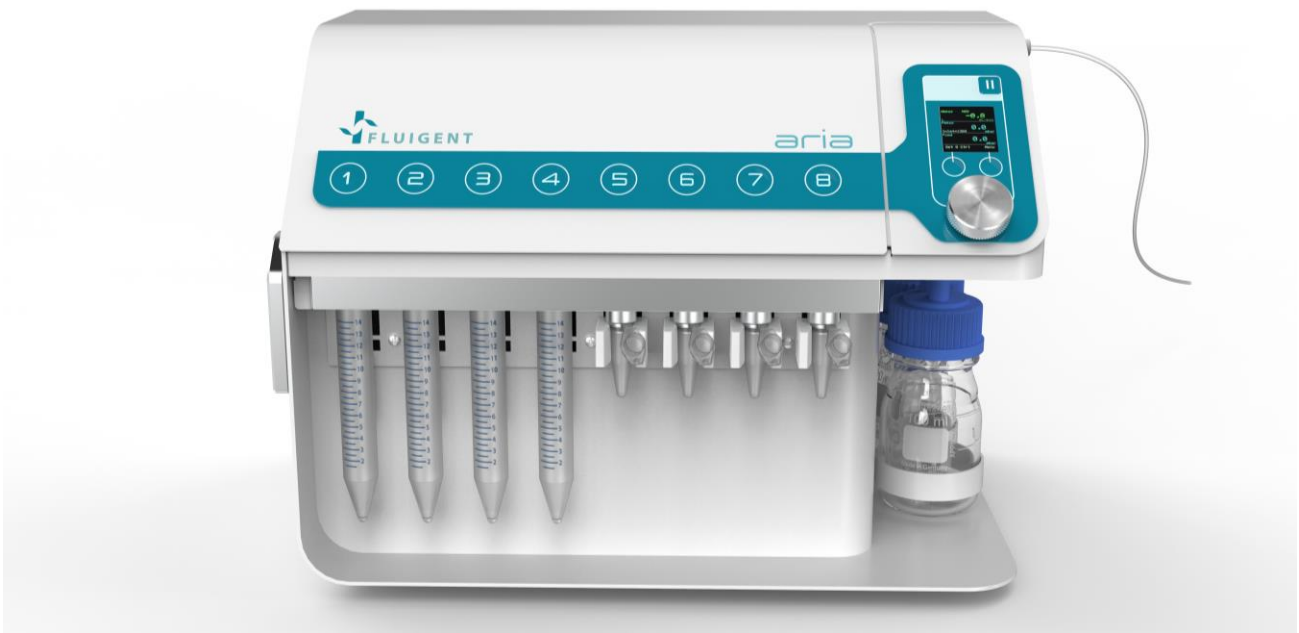
FLUIGENT Deutschland GmbH offers and services the pressure pumps, flow rate sensors, valves, accessories, and software developed in France. What started 5 years ago as a one-man-show developed into a company with a team of six due to the annual average growth of more than 20% in 20 countries and enables the financing of a PhD position at the Leibniz Institute for Photonic Technologies (IPHT) in Jena.

"The range of microfluidic applications is very wide," explains managing director Simon Renard. "It ranges from the identification of new yeast strains for beer production to the culture of organ cells in order to avoid animal experiments. Microfluidics is extremely useful for the safe encapsulation of tiny amounts of explosive substances for airbags, or for the discovery of new drug. Also into droplets packed DNA strands opens the door to new fields."

Beside the highly precise pressure pumps, we are continuously expanding our product line.

We recently launched **Aria, an automated solution for cellular perfusion or timed injection protocols for Perfusion Imaging Studies**. Aria enables the automated delivery of up to 10 different solutions into a chamber or microfluidic chip by following user defined protocols.

Our technology allows to save time with automated and timed exposure to antibodies, fluorophores, DNA probes. No manipulation is needed which reduces contamination or changes to cell conditions. It also shows higher reproducibility compared to manual methods for reliable results.

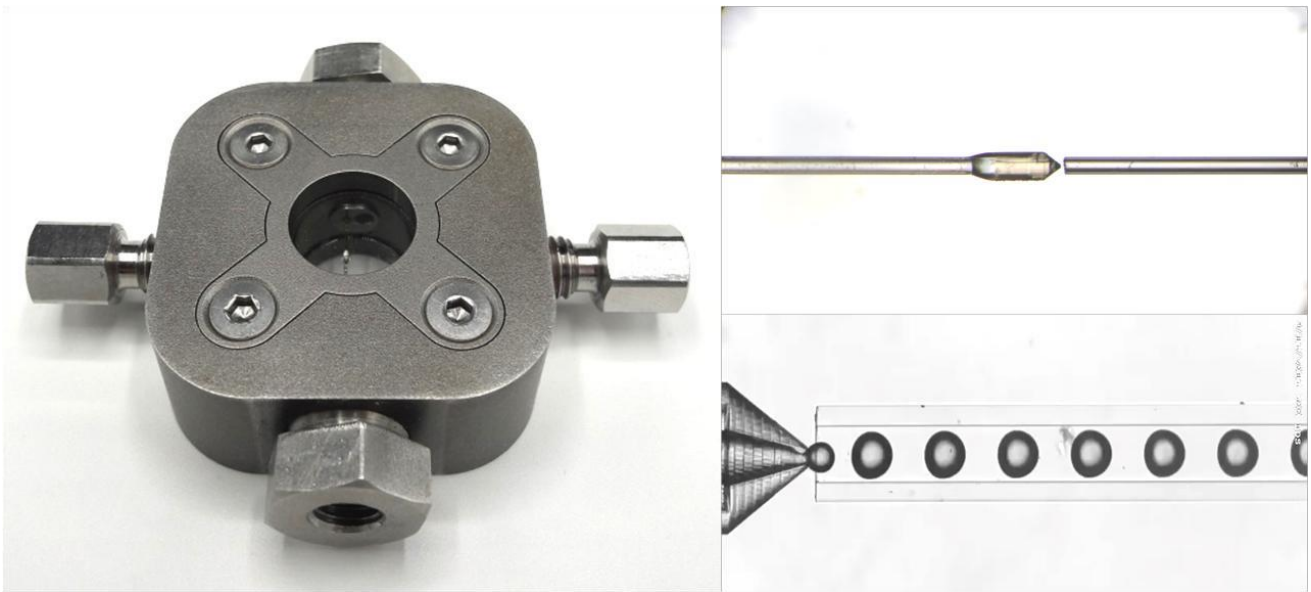


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Aria can be used on protocols of various types by programming timed delivery of up to 10 solutions with rapid transition. The instrument also allows the definition of the injection volume and flow rate, as well as the incubation time. Aria is designed to easily bring microfluidic advantages to all fluid handling experiments for reliable results.

Another new product is the improvement of droplet generation process thanks to **the Flui-gent RayDrop**. What problem does it solve? Glass chips are widely used for droplet microfluidics because they are hydrophobic, resistant to strong chemicals, high pressure compatible among others. However, they are a very expensive disposable, they need a chip holder for tubing connectors leading to leakages, they have a fixed geometry and when a dust or an air bubble enters the chip, it can be very difficult to regenerate the device for further use.

When used for biological experiments, a surface coating is needed to generate water droplet in oil, bringing several issues (droplet stability, chip lifetime for the most important). We present here a brand new device for droplet generation. It uses a **glass co-flow droplet generator** in a stainless steel and glass chamber leading to an amazingly robust device with unequaled reliability.



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Beside the academic researchers, we are intensively cooperating with industrial customers. Therefore, we provide **OEM Microfluidic modules** — a range of OEM products for flow control and fluid handling in microfluidic and nanofluidic applications. Dedicated to microfluidic applications in the demanding industrial environment, they are economically moving liquid without any mechanically moved parts in the liquid path. Main features are high customisation through numerous options, robustness and quality, compactness, and application expertise.

"Our devices help scientists and engineers in all fields to achieve the best results," emphasises Dr. France Hamber, Managing Director of the French parent company. "With our presence in Germany, we want to set an example and to position ourselves strategically. Thuringia and Jena in particular offer a good climate and a high concentration of know-how in the field of microfluidics".

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## NANOMOL Technologies



Nanomol Technologies, S.L. is a privately owned company which delivers advanced solutions to obtain high-added value products by particle engineering and nanoformulation technologies. We offer our Proprietary Platforms for the formulation of innovative functional materials, together with advanced cGMP particle characterisation services.

Nanomol Technologies was founded in 2010 by academic researchers from Materials Science Institute of Barcelona – CSIC, having wide expertise and recognised excellence in the synthesis, processing, and study of molecular functional materials.

Located in the Barcelona Autonomous University Research Park, Nanomol is provided with excellent interaction with scientific technical services, academic research groups and biotech, pharmaceutical and chemical companies.

Nanomol Technologies has developed and commercialises DELOS proprietary platforms, useful to innovate, develop or improve new and existing products in areas like pharmaceuticals, cosmetics, biocides and medical devices. DELOS is a formulation platform based on proprietary technology which improves the quality and performance of actives and ingredients. By this platform we develop next generation nanomedicines and new delivery systems with tailored and improved properties in terms of bioavailability, stability, addressability, and multifunctionality. We protect and transport from small molecules to proteins and biomolecules, integrating and stabilizing them on solid particles or nanovesicles. DELOS is a green and sustainable platform, that uses compressed CO<sub>2</sub> as solvent, that leads efficiently to new drug formulations based on fine particles and nanoencapsulated actives.

Some DELOS-enabled products that we are codeveloping in partnership with pharma, biotech and chemical companies are reformulations of actives and ingredients as particulate materials in order to:

- Integrate and conjugate actives, from small chemical molecules to peptides, proteins and genetic material, into DELOS nanovesicles or nanoliposomes.
- Encapsulate actives in solid polymeric or lipidic micro or nanoparticles.
- Increase their stability with regards to chemical, physical and solid state properties.
- Increase or modulate their solubility and bioavailability.

- Increase their stability in aqueous formulations. Lipophilic molecules can be stabilised in water media.
- Protect biological and/or labile actives.
- Improve their addressability by new delivery systems, that can provide targeting to specific locations.
- Enable topical, parenteral and pulmonary routes of administration.
- Allow for terminal sterilisation of final aqueous formulations.

The benefits and advantages enabled by DELOS technology can be summarised as follows:

- DELOS-enabled products with high added value:
  - Development of New Therapeutic Entities: Reformulations of APIs, development of nanosimilars and supergenerics.
  - New nanomedicines and drug products with superior efficacy for unmet clinical needs.
  - Extending product life cycle with patentable new formulations.
- Technology scaled-up and adapted to pharmaceutical development regulations (ICH, EMA, FDA) following development approaches such as Quality by Design.
- Obtain versatile ingredients or intermediates easy to formulate as liquid, solid, semi-solid, spray and lyophilised final forms.
- Gain cost-effectivity in manufacturing of intermediates (high-added value ingredients) and final products. Consumption of less solvents, less energy in straightforward, lower steps, processes.
- Obtain multifunctional high-added value products: Therapeutic & Antiseptic, Therapeutic & Diagnostic, Protection & Antiseptic, etc.

Nanomol Technologies also provides its clients with high added value services on particle characterisation and analysis techniques.

Deep knowledge and understanding on particle size and shape analysis by Laser Diffraction (LD), Optical and Electron Microscopy and Dynamic Light Scattering (DLS) techniques are complemented by a vast experience to characterise any kind of material such as APIs (raw materials), product intermediates and final formulations.



This contract analysis unit is fully GMP compliant for the characterisation of APIs.

Nanomol Technologies is also active in several European and National Collaborative projects. Specifically, NANOMOL Technologies has been involved in several consortia to carry out the following R+D projects dealing with the application of Micro and Nanotechnology to biomedical and health care purposes ([smart4fabry.eu](http://smart4fabry.eu); <https://healthcarelivinglab.cat/tec-salut/>; <http://nano-oligomed.net/index.php/about>).



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## BioNanoNet *Member Contributions*

### *Contribution from CIBER-BBN*



## Annual CIBER-BBN Conference 2019

CIBER-BBN researchers celebrated the main advances and challenges in the areas of Bioengineering, Biomaterials and Nanomedicine, within the framework of the Annual CIBER-BBN Conference from 21<sup>st</sup> – 22<sup>nd</sup> of October 2019 in Tarragona, Spain. This is the main event for scientists working in these areas in our country and is a reference event to present the projects under development and explore future proposals and new possibilities for collaboration between teams.

The event was inaugurated by the director of ISCIII, Raquel Yotti, the deputy director general of Cooperative Research Networks and Centers of ISCIII and by the scientific director of CIBER-BBN, Ramón Martínez Máñez, who highlighted the importance of collaboration in this field. In this thirteenth edition, the meeting was scheduled in five scientific sessions focused on relevant challenges in current biomedical research, such as big data and artificial intelligence; genetic edition; liquid biopsy; nanobots and future emerging technologies for controlled drug release; and the potential of senescent cells as a target for new therapeutic strategies in the treatment of various diseases.



Annual CIBER-BBN Conference 2019. © CIBER-BBN



Research Infrastructures had also a specific session since CIBER-BBN manages a Unique Scientific and Technological Research Infrastructure for the production and characterisation of nanomedicines, biomaterials and devices until the preclinical validation named NANBIO-SIS-ICTS. The Session was chaired by its Scientific Director, Prof. Jaume Veciana who also presented an Annual Summary, following by a new unit presentation dedicated to Oligonucleotide Synthesis presented by its Scientific Director Ramon Eritja Casadellà. And finally, the Infrastructure for OMICS technologies (OmicsTech ICTS): metabolomics for clinical and nutritional research, was presented by Xavier Domingo-Almenara, Centre for Omics Sciences, EURECAT- Rovira i Virgili University.



Annual CIBER-BBN Conference 2019. © CIBER-BBN

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**Contribution from the Graz University of Technology**



## FastNanoToxTest

### **Full title: “Fast nanotoxicity test with multifunctional microfluidics systems on gut microbiota and algae”**

*FFG and CAS - Austrian-Chinese Cooperative RTD Project*

The widespread application of engineered nanomaterials (ENMs) attracts great attention to their environmental and health hazards. The traditional toxicology research focusses on the damage of various organs (heart, liver, spleen, lung and kidney, etc.) caused by various substances, while it neglects the effect of nanomaterials on the intestinal flora (as ‘forgotten organs’), the microbiota. In addition, nanomaterials released into the aquatic environment may affect the growth and reproduction of aquatic organisms and thus induce adverse ecological effects. Current methods of toxicity assessment are mainly based on animal tests and cellular assays. Besides the ethical concerns of animal testing, both methods are time, labour and cost intensive, and suffer from many other drawbacks.

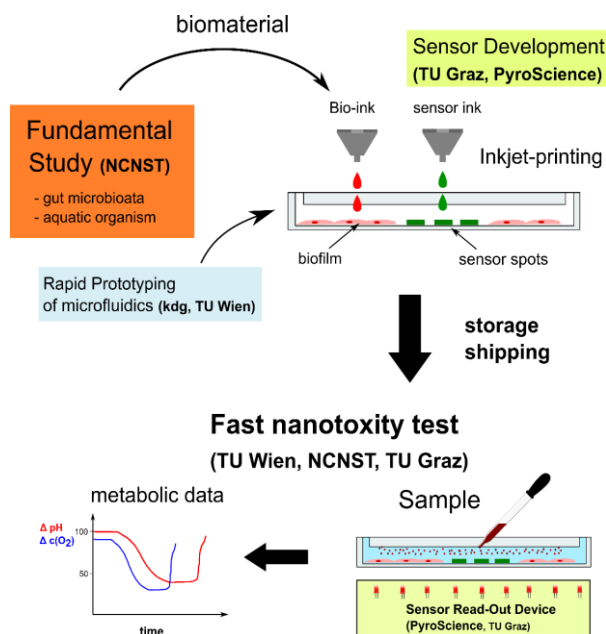
To address the issues of state-of-the art nanotoxicity testing the FastNanoToxTest project aims to develop a multi-functional integrated microfluidic tool to assess the potential toxicity of nanomaterials. The effect of nanomaterials on the cell viability of human and aquatic organisms will be determined using microbiota and algae as model organisms. Real-time and *in-situ* detection of nanotoxicity is realised by incorporating model cells and monitoring of their metabolic data via integrated optical sensors. Bioprinting and inkjet printing realise incorporating of cell and multiple optical sensors. Bioprinting of different indicator cell types (algae and bacteria) is improving the reliability of the assay and enables the transport to other laboratories, thus overcoming a cost- and labour intensive cell culturing step. The lab-on-chip device will also contain a compact multi-channel read out instrument for high precision and non-invasive measurement of acidification and respiration rates. Using additive printing technologies and rapid replica moulding technologies the project will finally demonstrate the feasibility of industrial large-scale, continuous flow production of advanced lab-on-a-chip systems.

The development the rapid nanotoxicity assessment tool is underpinned by a fundamental study to understand the interaction between nanomaterials and the intestinal flora or aquat-

ic organisms elucidating the effect of ENMs on microorganism structure, cellular uptake and distribution and common rules of interaction. 3D-model of intestinal barrier will be constructed to study the penetration efficacy of nanomaterials. Through the above outlined research, we obtain a large data set of the nanotoxic effects on intestinal flora and aquatic ecosystems, thus providing a theoretical reference for designing safer nanomaterials.

Project partners:

- Graz University of Technology, Institute of Analytical Chemistry and Food Chemistry, Applied Sensor Group
- National Center for Nanoscience and Technology of China - CAS Key Lab for Biomedical Effects of Nanomaterials and Nanosafety
- Vienna University of Technology, Institute of Applied Synthetic Chemistry, CellChipgroup
- kdg opticomp GmbH
- PyroScience AT GmbH



*Concept of the FastNanoToxTest approach. The toxic effects of ENMs on the gut microbiome and algae are investigated by fundamental in-vitro studies. Selected organism and cells are bioprinted in microfluidics in combination with ink-jet printed optical sensors for oxygen and pH. The resulting live-cell arrays can be stored refrigerated and shipped to the testing location. After addition of the ENMs containing sample the integrated in-situ sensor provides on the metabolic response of the immobilised cells on the exposure to ENMs. The data will be correlated with the conventional toxicity assays.*

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**Contribution from the Graz University of Technology**



## Innovative powder revolutionises 3D metal printing

*At TU Graz a steel powder has been developed for additive manufacturing which decisively simplifies the production of complex components. In a spin-off funding programme, work is now being done on market maturity.*



*Mateusz Skalon has developed an innovative powder for 3D metal printing and is now working on its marketability. © Hoflehner – TU Graz/IMAT*

Shorter production times, lower costs and fewer production faults. These are just some of the reasons why the metalworking industry is using additive methods more and more frequently. This is also reflected in the market for stainless steel powder used in additive manufacturing. According to estimates, this is increasing by more than 30 per cent per year. Nevertheless, there is still room for expansion in 3D metal printing technology. Especially in selective laser melting (SLM), in which the component is built up in layers, the scope for design is limited with regard to construction and design. The more complex the component, the more extensive support structures are necessary, for example to prevent possible overhangs from sinking during the printing process or other component deformations.

*More design scope and lower printing costs*

This is where the work of Mateusz Skalon starts, a researcher at TU Graz's Institute of Materials Science, Joining and Forming. He has modified the particles' surfaces of conventional 316L stainless steel powder so that the metal liquefied by laser beam behaves in more stable way during 3D printing process. This allows greater freedom of design since

components with low angles of inclination do not collapse during printing. This so-called NewGen SLM powder requires fewer supporting structures, which account for up to 20 per cent of total printing costs. Savings in production are considerably reduced, as Skalon has calculated: “Cost savings of up to 114 euros can be achieved per each kilo of printed metal.” In this context Skalon refers also to the sustainability aspect. Surplus stainless steel powder can be easily recycled at the end of production, which creates additional material savings.

#### *Processing system for innovative metal powder*

Now Skalon wants to implement the research results in business with the support of TU Graz. In the framework of the current Spin-Off Fellowship of the Austrian Research Promotion Agency (FFG), he is scaling the modification process to bring it to market maturity. “We’ll be testing the powder on the most common laser melting systems in the next 16 months. Basing on this, we want to establish a production company in Austria directly after the Fellowship where purchased 316L stainless steel powder will be modified and sold. Target groups will include manufacturers of highly complex metal parts, manufacturing companies in the automotive, aircraft and mechanical engineering sectors as well as research institutions dealing with additive manufacturing methods.

We have already had expressions of interest from business and industry. Skalon is confident that more will follow in the next few months. With his spin-off, he would like to become an important part of the supply chain in additive manufacturing. The young academic is supported by a top-class team. Christof Sommitsch, head of TU Graz’s Institute of Materials Science, Joining and Forming, has taken on the role of supervisor in the project, and the chairman of Junge Wirtschaft Steiermark, Christoph Kovacic, is a mentor. Skalon receives help in the business development from the head of TU Graz’s Institute of General Management and Organisation, Stefan Vorbach, as well as from institute staff Martin Glinik and Elisabeth Poandl.

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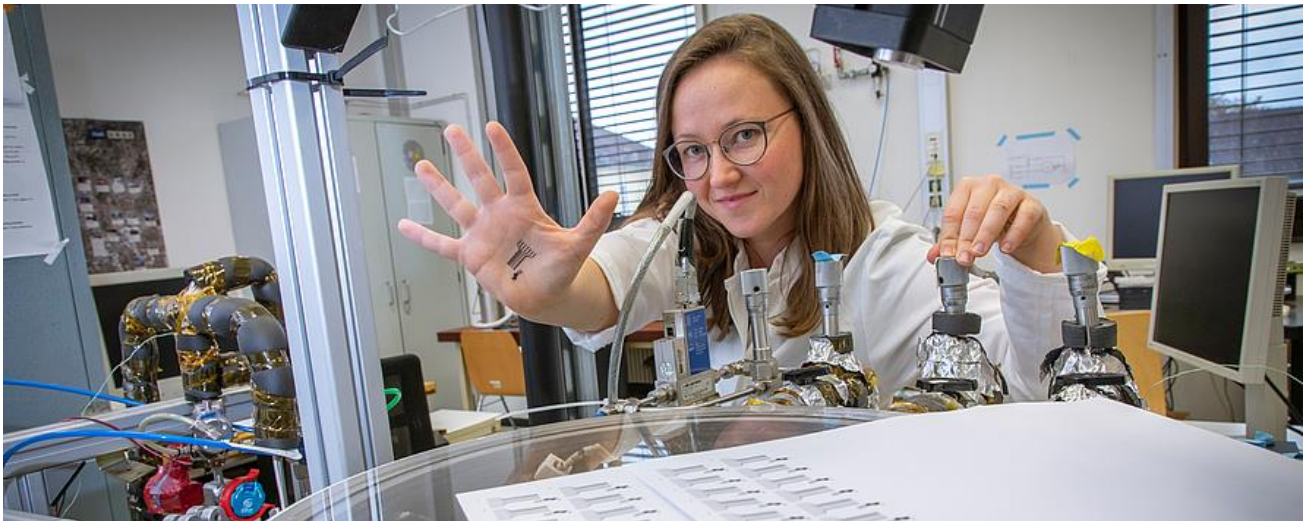


**Contribution from the Graz University of Technology**



## L'Oréal Austria scholarship for TU Graz researcher

*Katrin Unger, PhD student at TU Graz, develops tattoo sensors that measure the acid content of the skin. For this she yesterday received the L'Oréal Austria scholarship "For Women in Science", endowed with 25,000 euros.*



*Katrin Unger, PhD student at the Institute of Solid State Physics at Graz University of Technology, works on polymer materials. She develops removable tattoo sensors to determine the acid content of the skin. © Lunghammer – TU Graz*

Katrin Unger was born in Graz in 1986 and since completing her physics studies has been part of Anna Maria Coclite's research group at the Institute of Solid State Physics, where she is working on the development of tattoo sensors for the early detection of harmful pH changes in the skin.

### *Combination of ink jet printing and chemical vapour deposition*

Using an ink-jet printer, Unger prints electrical conductors made of plastic with a resolution thinner than a human hair on blank tattoo paper, as known from children's tattoos. A polymer gel is then chemically evaporated onto these plastic electrodes in a vacuum. "Thanks to the vacuum-based method, we can work under gentle conditions and do not have to expose the substrates to high temperatures or solvents," explains Unger.

The evaporated gel layer is pH-active, i.e. it reacts to the pH value of the liquid surrounding it. Unger explains: "I use hydrogel, which can be imagined as a kind of sponge that absorbs water. Depending on the pH environment the gel is in, it absorbs more or less liquid, or in the case of the tattoo sensor, sweat, and thus changes the electrical properties of the sensor." This then provides information about the condition of the skin.

In her project, Katrin Unger combines the work of Anna Maria Coclite, who received the ERC Starting Grant for her Research approach for the production of smart artificial skin in 2016, with that of the working group led by Francesco Greco, who is developing printed tattoo electrodes for medical diagnostics.

#### *Long-term skin monitoring*

The average pH value of healthy skin is 5.5. The acid mantle that covers the human body is a barrier against viruses and bacteria. Environmental influences, diseases or medical treatments can change the pH value, destroy the protective coating and increase the risk of infection. Unger's tattoo sensors are designed to help diagnose these pH changes over long periods of time. And all this without disturbing the wearer: due to their composition, the tattoos move flexibly with the skin.

#### *Sensitivity of polymers and adhesion of layers as a challenge*

However, the path to application is still a long one. Sweat contains many different analytes that can act on the signal, making it difficult to clearly assign a pH value. Current challenges in Unger's research work are the improvement of the signal of the electrodes and the adhesion of the different layers. For an exact measurement – despite constant movement and stretching of the body – there must be no ablation from the tattoo to the electrodes, from there to the hydrogel or from the gel to the skin. "The tattoo sensor is supposed to be only a few micrometers thick in the end. Such thin layers tear easily and have to be treated carefully in order to establish contact with a measuring device," says Unger, who is building a bridge between basic material research and an application-oriented sensor with her project.

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**Contribution from Graz University of Technology**



## The microbiome: Our planet's tiny engine

*We carry through life around two kilograms of microorganisms on and inside ourselves. TU Graz researcher Gabriele Berg explains why this is more vital than frightening.*

"In the beginning we were surprised about the sheer diversity of all the things we found!" Gabriele Berg is still delighted today when she talks about the year 2000. The new millennium saw the start of what over the next 20 years would prove to be a true treasure trove for countless scientific disciplines: research on everything related to microbiomes.

The microbiome is a community of microorganisms that exist in a certain habitat or in and on living organisms. Among other things also in and on us humans. They include bacteria, archeas, fungi, algae and other microscopically small organisms. "We used to know that microorganisms can cause sickness," explains Gabriele Berg. "Today we know that the majority of our smallest fellow occupants are responsible for our health."

### **What is a microbiome? Gabriele Berg explains.**

Microbiota – the individual microbes – form communities with an incredible diversity, communicate, share tasks and thus control vital processes in our body and environment – such as the carbon, nitrogen and sulphur cycles. We carry them on the skin, in our organs, absorb them through our food and excrete or exhale them again. They migrate through discharge pipes, spread in our breathing air or in watercourses. "Microorganisms thus build up a worldwide network," explains Berg. "That's why it's so incredibly important that we preserve their diversity. There are many reports on the extinction of insects and plants, which has taken on extreme dimensions. And we are only beginning to understand the diversity and the functions of microorganisms. But if certain types of microorganisms die out, our planet won't survive."

### *Intestinal infections and choice of partner*

Intestinal bacteria, for example, have a major influence on our lives, ensuring a balanced intestinal flora and thus the smooth functioning of our digestion. If the microbiome is out of balance due to an infection, for example, this can have negative consequences for us humans. "We all know how miserable an intestinal infection feels," explains Berg. What is



new, however, is that the microorganisms in the intestine also have effects on our psyche. "Research has been able to establish a connection between mental illnesses, such as depression, and an impoverished intestinal microbiome," explains Berg. "For example, 80 percent of serotonin is formed in our intestines. But we are still at the very beginning; the system is very complex."

But the microbiome does not only have a direct influence on our health. It also influences our choice of partner. "Microorganisms are responsible for our body odour. And these in turn are controlled by our immune system," explains the researcher. So how we smell says a lot about our own immune system. In order for our offspring to be born with the best chances of survival, we want to equip them with a robust immune system. And this in turn occurs when we give them a microbiome that is as diverse as possible. "We do not subconsciously choose a particularly beautiful, intelligent or strong person for reproduction. But rather a person whose smell we like."

#### *Hygiene – what is appropriate?*

So if these tiny creatures influence our lives so much, how can we make sure that they (and thus ourselves) remain healthy and efficient?

The microorganisms that are important for us are given to us by our mother at birth in the birth canal. In the course of our lives more and more microorganisms are added. Those that we take in with our food, but also those that we get from our environment. "For example, researchers have found that there are significant differences in the microbial composition of children who have grown up on a farm and those who grow up in an urban environment. In cities, we now have a very impoverished microbiome." There is increasing evidence that this impoverishment is related to common diseases of civilisation, such as asthma, irritable bowel syndrome or allergies.

"We now know that we have probably already eradicated some types of microorganisms through hygiene measures," says Gabriele Berg. "Hygiene is important in an environment that must be sterile. In an operating theatre, for example. But we're also sterilizing our food now. And that's not so good."

This is where Gabriele Berg and her staff at the Institute of Environmental Biotechnology come in. "My vision is to carry out research on a healthy food microbiome. A healthy diet is the best prophylaxis," explains Berg. The research team aims to provide farmers and the food industry with tools to produce healthy food.



*The apple research team: Peter Kusstatscher, Gabriele Berg and Birgit Wassermann. © TUG*

The apple is currently the most popular research fruit at the institute. A research project has just come to an end that has attracted a lot of attention. It deals with the microbiome of this fresh autumn fruit. [You can read their work here.](#)

In the coming year, two new, EU-funded projects will start, which will again deal with the apple. The [first deals with apple plantations](#) and how to reduce pesticides and replace them with biological alternatives. [In the second project](#), the team, aided by Marie Skłodowska-Curie scholar Ahmed Abdelfattah, is investigating how the apple's diverse core microbiome, which was only discovered last year, actually gets into the apple. The researchers examine the fruit throughout the year, from flowering to storage.

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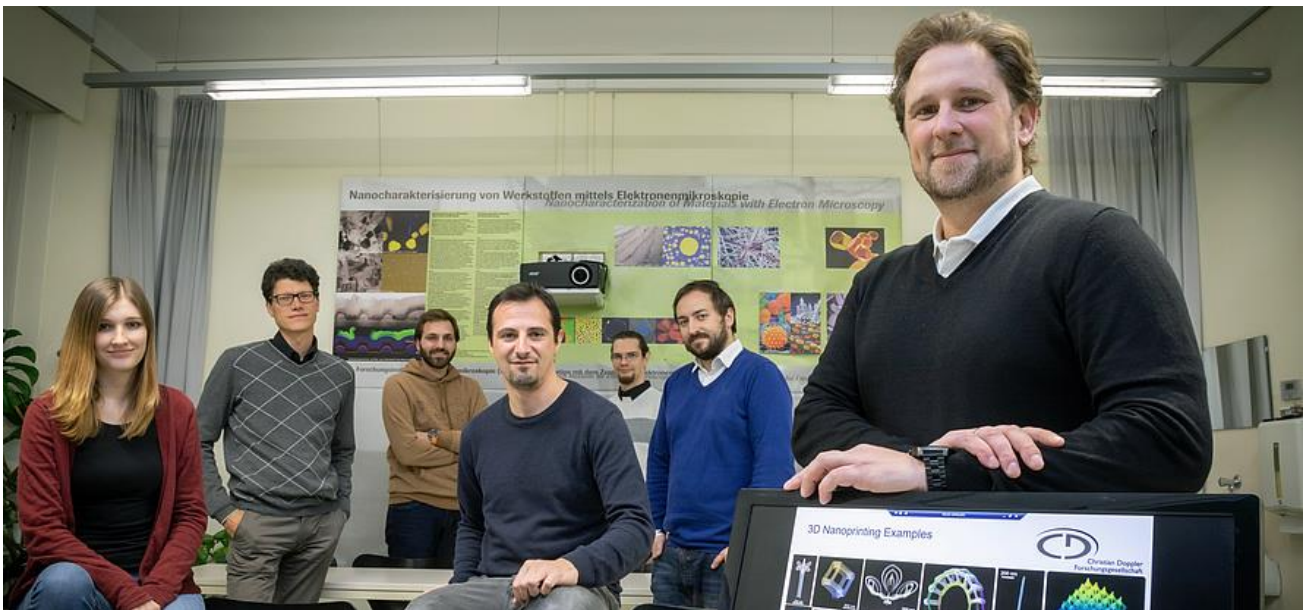
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**Contribution from the Graz University of Technology**



## TU Graz researchers develop new 3D printing for the direct production of nanostructures

*A team from Graz University of Technology succeeded in using the FEBID method to produce complex 3D-printed nano-components for the first time without additional support structures.*



*Harald Plank (r.) and his team were able for the first time to produce complex 3D-printed nano-components without a additional support structures. © Lunghammer – TU Graz*

In the nanometer range, complex, free-standing 3D architectures are very difficult to produce in a single step due to the required precision. In the Christian Doppler Laboratory for Direct Write Fabrication of 3D Nano-Probes, scientists at Graz University of Technology are therefore devoting themselves to the fundamentals of 3D Nanoprinting to push its possibilities beyond current limitations. For that, the research group uses the technology Focused Electron Beam Induced Deposition (FEBID), which is already used successfully in the production of complex but often flat nanostructures.

### *More efficiency and more possibilities*

The CD lab research team has advanced the technology in such a way, that even complex three-dimensional nanostructures can be produced in a highly controlled and predictable

way. In addition to the production of new structures, the process also enables the modification of already finished micro and nano components. The individual, nanometer thin layers, which finally form the 3D architectures, adhere to virtually any material and surface morphology. That saves time because FEBID does not require any pre- or post-treatment of the samples. On the other hand, it also enables fabrication on uneven or rough surfaces. "This type of 3D nanoprinting opens up completely new playgrounds for science and industry," says Harald Plank from the Institute of Electron Microscopy and Nanoanalysis at TU Graz and head of the CD lab. With the new technology, future challenges can be mastered that are barely possible with alternative nanofabrication methods such as electron beam lithography. "With this method, it would also be possible to produce 3D nanostructures on a pencil tip in a single step, which is very difficult to do with alternative technologies," explains Plank.

#### *How the new 3D nanoprinting technology works*

The new process will be used in cooperation with industrial partners GETec Microscopy (Vienna) and Anton Paar GmbH (Graz) in the field of atomic force microscopy for the production of functional nano-probes with apex radii of less than ten nanometers. "The printing process takes place in the vacuum chamber of electron microscopes. The functional gases are introduced with a fine capillary in close proximity to the sample. The gaseous molecules then adsorb on the surface and are chemically broken down and immobilised by the focused electron beam – they remain in place through interaction with the electrons," explains Plank. "You can imagine 3D nanoprinting like a ballpoint pen: The electron beam acts like a ballpoint pen refill and the gas is the ink."

Plank and his team were inspired by Lego bricks for printing inclined structures: "To build a tilted architecture using Lego, the next higher layer of bricks must always be moved sideways. This is exactly what we have transferred to 3D nanoprinting: Before applying the next layer, we shift the electron beam and literally print diagonally upwards."

#### *Successful implementation*

During the last 20 months, the CD lab was able to deliver the first proof-of-principle. In more detail, FEBID was successfully used for the production of electrically conductive nano-probes, whose performance is significantly higher than that of alternative, commercially available products. Plank and his team are satisfied with the result: "Small series production

will start in Vienna in the coming months and open up new possibilities for the industrial partner GETec Microscopy.”

### *International cooperation*

To ensure that the new process does not remain a niche technology, the researchers in the CD lab are currently developing a new software for FEBID based 3D Nanoprinting, which will allow fabrication of complex nanostructures even without broad prior knowledge. For that, Plank and his research group have joined forces with Oak Ridge National Laboratories (USA) and the Institute of Physics at the Goethe University Frankfurt (GER), which together with Graz University of Technology are among the world's leading research institutions in this field. This project also focuses on extending the process to 3D surfaces and multi-material structures, which further increases the design flexibility and thus the relevance of this technology in research and development.

**VIDEO of the Additive Direct-Write 3D Manufacturing of 3D Nanostructures using the FEBID method.** *This video is hosted by Youtube, clicking on it will send data to Youtube. The privacy policy of Youtube applies.*

[Play video](#)

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**Contribution from Graz University of Technology**



## Two new CD labs for TU Graz

*Two new CD labs of TU Graz are working on producing proteins and high-quality plastics efficiently and cost-effectively.*



*The two latest CD lab directors of TU Graz: Anton Glieder (l.) and Christian Slugovc. © Lunghammer – TU Graz*

With the opening of two new CD labs on 24<sup>th</sup> of September, TU Graz is once again acting as an interface between science and industry. The pharmaceutical company Novo Nordisk, Sesam-Biotech GmbH and Biogrammatix are company partners of the *CD Laboratory for Innovative Pichia Pastoris Host and Vector Systems*, which under the leadership of Anton Glieder is investigating basic biological mechanisms of the yeast species *Pichia pastoris*. The results should lead to higher quality enzymes and biopharmaceutical proteins being produced at a lower price. In the *CD Laboratory for Organocatalysis in Polymerisation*, laboratory head Christian Slugovc and his team are working together with the companies Allnex and Hilti to produce high-quality plastics using alcohols in a more cost-effective and environmentally friendly way. The participating companies are jointly financing the seven-year research in the Christian Doppler labs along with public funds. The research budgets amount to a total of 1.9 million euros (CD lab for Innovative *Pichia Pastoris* Host and Vector Systems) and 1.4 million euros (CD lab for Organocatalysis in Polymerisation). The most important public funding source is the Federal Ministry of Digital and Economic Affairs (BMDW).

*The Economic Ministry promotes application-oriented basic research*

“Whether better and cheaper medicines or more environmentally friendly plastics – these two CD labs make a contribution to the quality of life and competitiveness of the location,”

emphasises Elisabeth Udolf-Strobl, Federal Minister of Digital and Economic Affairs. “The efficient use of resources is becoming an increasingly important cost factor in production, which is why innovative methods are needed to gain a decisive advantage over the competition. Location-relevant research is the key for our companies and here the close networking with excellent institutions such as TU Graz helps us.”

*Win-win situation for all concerned*

Altogether, eleven CD labs are currently active at TU Graz, in which researchers from the University cooperate intensively with business partners. "Research cooperations with industry and business are part of our everyday life as an entrepreneurial university. In this regard, I am extremely grateful to our researchers and their corporate partners for their ongoing efforts to establish new CD labs. Both sides benefit from this funding model. With this support, our scientists can carry out basic research at a high level, secured for the long term. Companies can incorporate the acquired knowledge directly into the development of new products and processes," says TU Graz Rector Harald Kainz.

*Details about the two new CD labs*

**CD Laboratory for Innovative Pichia Pastoris Host and Vector Systems**

**Head:** Anton Glieder - **Corporate partners:** Novo Nordisk A/S, Biogrammatix, Inc., SeSaM-Biotech GmbH

Biopharmaceutical drugs are mostly produced using animal cell cultures and coli bacteria (Escherichia coli), while cheap enzymes often originate from filamentous fungi. This is a well known and proven manufacturing method, which has been used for decades. However, it is caught between the necessary high complexity of the target proteins on the one hand and a cost-effective and simple production on the other. This conflict could be resolved with the help of Pichia pastoris. The yeast species has the potential of combining the three essential factors in the production. They are as easy to cultivate as Escherichia coli, as efficient as filamentous fungi and as complex as mammals in terms of post-translation processes. For this purpose, the mechanistic principles in existing and emerging Pichia pastoris expression strains must be clarified within the framework of the CD lab supported by Dr. Julia Feichtinger from Medical University of Graz. In addition, laboratory head Anton Glieder and his team are designing and developing new generations of simple and stable DNA vectors together with company partners. This should provide the yeast with the necessary genetic information for the production of pharmaceutical proteins without having to

change methods or systems. In the long term, this will enable the production of inexpensive biopharmaceuticals and new technical enzymes.

This CD lab is anchored in the Field of Expertise "Human & Biotechnology".

### **CD Laboratory for Organocatalysis in Polymerisation**

**Head:** Christian Slugovc - **Corporate partners:** Hilti AG, Allnex Austria GmbH

The focus of this CD lab is on the cost-effective, environmentally friendly and at the same time precise and reproducible production of high-quality plastics, which are used, for example, for bonding, coating or protection against corrosion. Together with the company partners, researchers at TU Graz are looking for ways to replace toxic and foul-smelling sulphur or nitrogen compounds as well as toxic metal compounds currently used in plastics production with more readily available, cheaper and less toxic alcohols. So far, such experiments have failed due to the low reactivity of alcohols, which – unlike thiols or amines – only react at high temperatures. One way of allowing alcohols to react under milder conditions is by organocatalysis. In this method, organic materials are used to accelerate chemical reactions. To this end, the CD lab is now advancing the basics and knowledge of the activation of alcohols, developing tailor-made organocatalysts and investigating the properties of alcohol-based plastics in fastening technology and corrosion protection.

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**Contribution from Institute of Technology Assessment of the Austrian Academy of Sciences**



## **New Project: Standardisation of Nanotechnologies**

**The aim of NanoStandards is to create general awareness that scientific input is crucial when it comes to the standardisation of nanotechnologies. It points out the oftentimes overlooked importance of standardisation and conveys that scientific expertise is important and desirable.**

The work of standardisation is little known in the academic world for several reasons. There are, however, numerous ongoing activities in the area of nanotechnologies. The ITA is already participating in standardisation in Austria and aims to further expand the scientific network around it.

### **Fostering cooperation**

Internationally, a large number of standardisation projects on nanotechnology are underway, especially at the ISO and CEN levels. These activities are regularly monitored and commented upon by the Austrian Standards Institute (ASI). The standardisation committee 052.73 "Nanotechnology", chaired by ITA scientist Dr. André Gzásó, is responsible for doing so. It is composed of transdisciplinary members (AUVA, BMVIT, TU Vienna, BOKU, BioNanoNet and others).

The aim is to intensify the communication between the standardisation bodies and the Austrian nano-expertise in order to obtain clear ideas what goals Austria and Austrian representatives can pursue in international nano standardisation. Standardisation work is to be gradually linked more closely with Austrian nanotechnology expertise through increased community building and the establishment of appropriate communication processes.

In the course of this process, additional knowledge on nano R&D, nano safety research and technology assessment will be generated and documented for open exchange.

**About us:**

*The ITA deals with the impacts of new technologies on society, the environment and the economy. It carries out scientific technology assessment (TA) on a variety of topics. The results of this work support policy-makers, administration and the public with regard to issues of technology policy.*

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**Contribution from Materials Center Leoben Forschung GmbH**



## Materials Center Leoben celebrated its 20<sup>th</sup> anniversary

The renowned research institution Materials Center Leoben Forschung GmbH (MCL) celebrated its 20<sup>th</sup> anniversary on 20<sup>th</sup> November 2019 with a ceremony at the Montanuniversität Leoben. The event was a great success with around 350 visitors, including prominent guests from politics, business and science.



*From left to right: DI Otto Starzer (FFG), Gerd Holzschlag (SFG), DI Dr. med. Andreas Weber (BMVIT), Dipl.-Betw. Gisele Amancio, MBA (MCL), Univ.-Prof. Dr. Reinhold Ebner (MCL), Rector Wilfried Eichlseder (Montanuniversität Leoben), KR Willibald Mautner (Finance Officer City of Leoben), Mag. Stefan Riegler (BMDW).  
© Foto Freisinger*

The MCL was founded in 1999 as a Kplus center. The founding partners, various institutes of the Montanuniversität Leoben, the Graz University of Technology, the Vienna University of Technology and the Austrian Academy of Sciences, as well as the JOANNEUM RESEARCH and the city of Leoben, pursued the goal of creating a new research institution that, on the one hand, establishes a platform for the acquisition and execution of larger joint research projects and, on the other hand, closes the gap in the competence portfolio and in the infrastructure of the partners. After 20 years of excellent research achievements, the research institution, which started with 10 employees with emphasis only on experimental

materials research, exceeds all expectations: it acts with 180 employees in the international research landscape and it is a recognised partner in the fields of characterisation and modeling of materials as well as in its simulation on all length scales (from the atomic level in the material to the macro level in components). Based on these competences, MCL is successfully expanding its expertise combining physical models with artificial intelligence in order to, for example, develop precise life-time models for materials and components.

MCL is responsible - since the beginning of 2018 - for the COMET K2 center "Integrated Computational Material, Process and Product Engineering" (IC-MPPE). The thematic focus of the COMET center and also of MCL is the simultaneous computer-aided design and development of materials, manufacturing processes and products.

### **Future perspective**

The jubilee celebration was entitled: "Material technologies of the future: Characterisation-Modeling-Digitalisation". Gisele Amancio, MBA, Commercial Director at MCL explains: "The new era of digital transformation is also changing the materials research approach. In addition to the classical characterisation and analysis methods, digital technologies, complex algorithms, computer models, neural networks and data collections are crucial to a comprehensive and fast development of material-based innovations". MCL recognised these trends and is therefore focusing on the targeted application of computer-aided technologies (complex material modeling and simulations as well as artificial intelligence) coupled with state-of-the-art characterisation and analysis methods. "This combination of experimental and virtual methods contributes considerably to shorten development times, to accelerate innovation processes and to advance the digitalisation of products and manufacturing processes", explains Prof. Dr. Reinhold Ebner, Scientific Director at MCL.

With more than 180 highly qualified employees, MCL has the interdisciplinary expertise to significantly contribute to the future innovations and to the "Internet of Things". The proportion of women is currently around 30 percent. Amancio and Ebner agree that this ratio should be notably increased in the next few years.

### **Funding agencies:**

The Materials Center Leoben Forschung GmbH, as the host of the COMET-K2-Center IC-MPPE - "Integrated Computational Material, Process and Product Engineering", is funded within the framework of COMET - "Competence Centers for Excellent Technologies" by the Austrian Federal Ministries of Transport, Innovation and Technology (BMVIT) and for Digitalisation and Economic Affairs (BMDW), both represented by the Austrian Research Promotion Agency (FFG), as well as by the Federal Provinces of Styria, Upper Austria and Tyrol.

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## BioNanoNet *retrospect*

# NanoSafety Cluster Week 2019



7<sup>th</sup> – 10<sup>th</sup> October 2019, Copenhagen, Denmark



The EU [NanoSafety Cluster](#), together with the EU H2020 projects [caLIBRAte](#), [NanoCommons](#), [NanoSolveIT](#) and [NanoInformaTIX](#), organised a 4-days event dedicated to “**Building confidence in risk assessment and governance of Nanomaterials Innovation**” in Copenhagen (Denmark), 7<sup>th</sup>-10<sup>th</sup> October 2019. The event was well-attended by about 180 participants, mainly beneficiaries of NSC projects, NSC members, industry, scientific community, policy makers and customers.

The event kicked off on October 7<sup>th</sup>, with the **caLIBRAte final workshop** focused on current knowledge and future outlook on stakeholder risk perception and information needs and nanosafety data availability. caLIBRAte also presented nano-specific human and environmental risk assessment and management tools tested in the project, plus the decision support tool developed, the [NanoRisk Governance Portal](#).

The **NanoSafety Cluster Scientific Conference** on October 8<sup>th</sup>-9<sup>th</sup>, under the title “*Towards in silico nanosafety assessment – integrating experimental and computational approaches*”, focused on the increasingly important roles of data accessibility and predictive modelling in nanomaterials governance and risk assessment.

[Beatriz Alfaro, from BioNanoNet-Team \(BNN\)](#), participated in the poster session of the conference with the **NanoCommons project**, offering an overview of its [Transnational Access](#) schema: *what* it is, *how* to apply, *who* can apply, *for whom* is it and the main *benefits* for the



users. The NanoCommons Transnational Access (TA) is the ability of nanosafety Researchers from industry, academia and regulatory bodies to access the state-of-the-art NanoCommons expertise (in **nanoinformatics and data management tools, modelling and risk assessment services**) free of charge and take advantage of the NanoCommons [services](#), facilities and knowledge to advance their work, solve problems and take their research to the next level.

**NanoSafety Cluster business** closed the conference on October 9<sup>th</sup> with the NSC-Steering Group meeting (bringing together all nanosafety-project coordinators), and added on October 10<sup>th</sup>, the NSC open forum meeting, including Working Group meetings, to progress key community-driven activities. Participants further more benefited from training sessions along that day, featuring several tools developed in numerous different EU projects (e.g. **ACEnano knowledge warehouse**, etc.).



*Organisers and participants at the NanoSafety Cluster week 2019. © BNN*



*GUIDEnano training during the NanoSafety Cluster week 2019. © BNN*



caLIBRAte  
nano risk governance



NanoSolveIT



ACEnano  
ANALYSIS AND CHARACTERISATION FACILITIES

These projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 686239, 731032, 814572, 814426 and 720952.

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## Open Campus 2019 Precision Medicine Day



**22<sup>nd</sup> of October, 2019, at MED CAMPUS, Graz, Austria**

On 22<sup>nd</sup> of October, 2019, BNN, HTS and the Medical University of Graz organised an Open Campus on the topic “Precision Medicine”.

Precision medicine integrates a global approach for disease diagnosis, treatment and prevention that takes into account individual variability in genes, environment and lifestyle for each person. It spans from genomics, biomarker research, multi-omics approaches to advanced therapy and diagnostics including bioinformatics, computational modeling and machine learning. For this event, internationally recognised top researchers in this area could be attracted as a key note speakers.

The Gottfried Schatz Research Center of the Medical University of Graz presented its approach from genetic epidemiology to advanced therapy and computational modelling. Helena Schmid talked about “Dissecting Human Aging by Genetic Epidemiology: The Graz Study on Health & Aging”, Ruth Prassl introduced the topic of “Nanomedicine – Targeted Drug Delivery”, and Christoph Augustin presented “Digital Twin Models of Cardiac Function



*Open Campus 2019 Precision Medicine Day. © BNN*

Hans Peter Digner from the German Hochschule Furtwangen gave an invited lecture on “Next Generation Diagnostics in Precision Medicine”, Amin El-Heliebi from CBmed talked

about “How to Develop Biomarker for Precision Medicine”, and last but not least Torsten Ullrich from the Fraunhofer Austria Research GmbH gave insights into the topic “Visual Computing in Medicine”.

The interesting lectures were topped by an interactive networking session that allowed the participants to get into conversation with the speakers, ask questions and discuss critical issues. A big thanks to all speakers, participants and organisers, and special thanks to the Medical University of Graz for hosting the event.



*Susanne Resch from BNN speaking at the Open Campus 2019 – Precision Medicine Day in Graz. © BNN*

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## IMAGINE19: With AI in the fight against fake news & for optimal concrete mix

**22<sup>nd</sup> of October, 2019, Ottakringer Brauerei, Vienna, Austria**

Artificial Intelligence (AI) is designed to make a lasting difference to our society, from self-driving cars to energy system controls and self-learning surveillance systems to automated financial transactions and accurate medical diagnostics. However AI often has an image problem because it challenges its creator precisely in the field on which its identity is based - thinking.

So how do Austrian excellence in research, development and application in the field of information and communication technology (ICT) actually look like?

Since 2014, there has been an annual platform called IMAGINE within the framework of the funding program ICT of the Future of the Federal Ministry of Transport, Innovation and Technology (BMVIT). The conference series aims to communicate innovations, visions and trends in an interactive and creative way. The IMAGINE19 dedicated itself to the subject of Artificial Intelligence (AI), focusing in particular on its influence on media, working environments and smart cities.

Together with the Ministry's technology platforms and numerous participants from research and industry, discussions, workshops and discussions were held to discuss the latest developments, as well as methodology and new ways around Artificial Intelligence technologies. In the exhibition area, start-ups and companies from the field had the opportunity to present prototypes, products and ideas, the audience could test them in live demos or simply use the opportunity to network with experts from the field.

Michael Wiesmüller, Head of Key Technologies for Industrial Innovation: ICT, Production and Nanotechnology at the BMVIT, happily looked at the future in the light of the successful conference: "The discussions on *AI for Good* at this year's IMAGINE, in particular, provided a significant input to the coming *ICT of the future* call, which will open in mid-November."

The *Idea Marathon* was first held at the IMAGINE Conference with the goal of presenting concrete ideas for existing or future artificial intelligence projects that focus on people and



address the societal challenges of our time. In addition, the acceptance of artificial intelligence in everyday life should be increased and informed about dangers and opportunities.

In general, the IMAGINE conference series should help in the early identification of ICT-relevant challenges, including social aspects, and enable a discussion in the context of European developments and trends. Target groups are research institutions, companies, start-ups, universities, polytechnics, students and pupils.

BNN was invited to participate in the event as one of the Ministry's technology platforms and could further strengthen its network by connecting with Austrian researchers and industrial stakeholders towards future collaboration in the area of "Data & Sustainability".

Info box: The future of information and communication technology in Austria is one of the strategic priorities of the BMVIT. With the *ICT of the Future* program, the BMVIT promotes research-intensive innovation and technology development in the field of information and communication technology, interlinking them with fields of application and social issues. The focus is on the cooperation of companies with research institutions in projects of industrial research and experimental development and, depending on the call for tenders, also exploratory projects, lead projects and R&D services in this area.



*Impressions from IMAGINE 2019. © BMVIT*

 Federal Ministry  
Republic of Austria  
Transport, Innovation  
and Technology

Article source: <https://infothek.bmvit.gv.at/ imagine19>

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## Blickpunkt Forschung: Klimaschutz konkret @ TU Wien

### 23<sup>rd</sup> of October, 2019, TU Wien, Austria

Act sustainable, but how? In this year's research focus, the Vienna University of Technology, in cooperation with the Vienna Economic Chamber, presented solutions for companies that want to make their use of resources more sustainable.

The effects of climate change are already clearly noticeable. Climate packages and packages of measures are being adopted on a global scale to help reduce greenhouse gas emissions, increase energy efficiency and increase the use of renewable energy sources. In recent years, however, it has also become apparent that achieving the goals is difficult. It needs concrete solutions.

In this context, research groups of the Vienna University of Technology and their company partners pointed out what the technical sciences can contribute to countering climate change.

In three sessions, the application-oriented research results were presented:

- Climate-friendly infrastructures (AI)
- Climate-friendly products and production (KP)
- Climate-friendly technologies (KT)

The audience experienced short contributions from different fields of engineering science. Ideas and further information could be exchanged in an accompanying exhibition.

Finally, it was possible to participate in a technical tour of the Institute for Process Engineering, Environmental Technology and Technical Biosciences.

The event was aimed at manufacturing companies, in particular from the chemical industry, metalworking industry, energy industry, construction industry, municipal infrastructure, and planning companies as well as decision-makers from energy and spatial planning.



BNN participated in the event to further strengthen its network towards the strategic areas “Enabling technologies” and “Data & Sustainability”.



*Participants at Blickpunkt Forschung. © TU Wien*

Article source: [https://energiewelten.tuwien.ac.at/blickpunkt\\_forschung](https://energiewelten.tuwien.ac.at/blickpunkt_forschung)

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## Trust and Tech Regulation Workshop

**TIGTech** | Earning Trust  
in Tech Governance



**29<sup>th</sup> October, 2019, in London, UK**

Organised by “TIGtech – Earning Trust in Technology Governance”, a workshop on “Trust and Tech Regulation” took place on 29<sup>th</sup> October 2019 at the Royal Society of Art in London, UK.

Benefits, risks and public trust in technology innovations are usually the focus of political and societal attention. Almost entirely overlooked is the need for the governance of these technologies, in its own right, to be trustworthy and to earn trust. The TIGTech initiative seeks to understand how governance may differ, and in what ways, if the trustworthiness of governance and the earning of societal trust is considered and systematically incorporated into governance design.

The interactive workshop explored topics on the science of human thinking and how trust is built, specific trust drivers, as well as key competences to earn trust from civil society.

BNN participated to this workshop to elaborate, how the topic of trust and trustworthiness can be introduced to the development of the Nano Risk Governance Council within the Gov4Nano project. For further information on Gov4Nano, please visit the project’s website:

[www.gov4nano.at](http://www.gov4nano.at)



Gov4Nano has received funding from the European Union’s Horizon 2020 Research and Innovation Programme under Grant Agreement 814401.

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## EPPN Workshop 2019

5<sup>th</sup> November 2019, San Sebastian, Spain



The [European Network for Pilot Production Facilities and Innovation Hubs \(EPPN\)](#) organised a workshop on [Pilot production lines for the health, transport, and industry](#) in San Sebastian (Spain) on November 5<sup>th</sup>, 2019.

This EPPN Workshop, in collaboration with The Basque Government's Business Development Agency SPRI, under the Department of Economic Development and Infrastructure, and the Basque Science, Technology and Innovation Network, addressed the opportunity to exchange experiences between pilot plants and establish future relationships with the industry.

Achieving successful pilot production, from a laboratory scale to small pilot scales of production, is a major success factor in the innovation and management potential of productive companies. The attendees of the workshop were able to learn about the opportunities that these open access pilot plants offer to European industry; furthermore, they had the chance to visit some of them on-site and get to know first-hand their characteristics.

The workshop was attended by about 100 participants from academia, industry, investors, scientific community, policy makers and end-users.

[Beatriz Alfaro, from BioNanoNet-Team \(BNN\)](#), presented the NanoCommons project, **supporting the pilots and the OITBs** as NanoCommons provides access to state-of-the-art of NanoCommons expertise (in **nanoinformatics and data management tools, modelling and risk assessment services**) free of charge (by means of the [Transnational Access \(TA\)](#) activities) and taking advantage of the NanoCommons [services](#), facilities and knowledge to advance their work, solve problems and take their research to the next level.

The Consortium partners [Bundesinstitut für Risikobewertung \(BfR\)](#) as well as [BioNanoNet \(BNN\)](#) were attending the event.

BNN-member [Centro de Investigación Biomédica En Red – Bioengineering, Biomaterials and Nanomedicine \(CIBER-BBN\)](#), participated, as well, in the workshop.



*Organisers and participants of the EPPN workshop 2019. © EPPN workshop Organising Committee*



NanoCommons has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731032.

[www.nanocommons.eu](http://www.nanocommons.eu)

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## Boosting Innovation Tour

### 18<sup>th</sup> – 19<sup>th</sup> of November 2019, Brno, Czech Republic

The European Commission together with Technology Centre CAS, Ministry of Industry and Trade, JIC, Office of the South Moravian Region for Interregional Cooperation, CEITEC Brno University of Technology, Amires, Eurocentrum Brno, and MSIC, organised the Boosting Innovation Tour Event on November 18-19<sup>th</sup> 2019 in Brno.

On November 18<sup>th</sup> a small delegation could do a **site-visit** at CEITEC Brno and get to know the competences and infrastructure provided by the Czech Research Center. The guided visit to the state of the art facilities of CEITEC BUT (Central European Institute of Technology, Brno University of technology) demonstrated the innovative environment in which their researchers operate. CEITEC is among other topics active in advanced polymers and (nano)composites, computer modelling and simulations.



Site visit at CEITEC [f.l.t.r.]: **Evangelos Meles**, (EC, DG GROW), one of our guides **Christian Iffelsberger** (CEITEC), **Barend Verachtert**, EC; HoU DG RTD Materials for Tomorrow) and **Andreas Falk** (BioNanoNet). © BNN

The **conference** took place on 19<sup>th</sup> of November in Brno and about 80 participants attended the event. This was the fourth and last event in the series of *Boosting Innovation Tour* in 2019, first taking place in Ljubljana, Slovenia on 3<sup>rd</sup> of April 2019, second in Tallinn, Estonia on 29<sup>th</sup> of May 2019 and third in Bucharest, Romania on 14<sup>th</sup> of June 2019.

The main objective of the conference was to present different EU national and regional initiatives to support innovation, access to research and technology infrastructure and financial support to boost innovation beyond 2020.

The conference showed several successful examples of innovation support with special emphasis on the Czech Republic, with opportunity to provide feedback to high level EU representatives and discuss the needs of the local industry. It also provided a great opportunity for networking and matchmaking between companies, research institutes, universities, laboratories, agencies, clusters and other institutions from the Czech Republic and the wider region.

Andreas Falk (BNN) presented in his talk “*BNN – A Successful Example of Innovation Support for Industry and the Region*” the core competence in the development of tailored nanosafety concepts with industry. Furthermore, he showed highlights from several completed and ongoing H2020 projects (e.g. Hi-Response, INSPIRED, R2R Biofluidics, ACEnano, NanoCommons, Gov4Nano), and explained the BioNanoNet ecosystems’ members which are coming from 13 countries – a mix of research centres, academic scientists, SMEs and industry, joining forces in specific thematic areas. In the discussion he outlined that a call for funding for an open innovation test bed on nano safety is still missed.



These projects have received funding from the European Union’s HORIZON 2020 research and innovation programme under grant agreement n° 720952, n° 814401 and n° 731032.

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# Campus Krems Innovation Forum Medical Engineering and Medical Biotechnology

19<sup>th</sup> of November 2019, Krems, Austria



On 19<sup>th</sup> of November, the Campus Krems Innovation Forum 2019, took place at the Campus Krems, in Austria, hosted and organised by the Donau Universität Krems, the IMC Fachhochschule Krems and the Karl Landsteiner Privatuniversität. The participants could benefit from an interacting-promoting event format in a relaxed atmosphere, focused on the development of medical technology and medical biotechnology.

During the morning session a broad range of sessions and short talks covered important aspects of regenerative medicine, big data and other current pharmaceutical research and development topics. It was followed by three different round tables

organised in small groups in order to continue with fruitful discussions about the topics of the morning talks.

The afternoon was divided in visits to different laboratories of Donau Universität Krems, the IMC Fachhochschule Krems and the Karl Landsteiner Privatuniversität, all of them located in the Campus Krems. The visits were followed by bilateral meetings among the participants (nimbly organised in advance by the b2match mobile application) with the objective to speak in detail about new collaborations and to discuss specific questions arisen during the whole event.

The Department of Health Sciences and Biomedicine of the Donau University Krems is BNN member, involved in the fields of nanomedicine and biotechnology.

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## 8<sup>th</sup> EU-Korea NanoWorkshop

25<sup>th</sup> of November 2019, Brussels, Belgium



© BNN

The European Commission, Directorate-General for Research & Innovation, together with Korean Convergence Technology Division, R&D Policy Bureau, Ministry of Science and ICT, organised the 8<sup>th</sup> EU-Korea NanoWorkshop on November 25<sup>th</sup> 2019 in Brussels. The workshop was structured in a “Nanosafety”- and a “Characterisation of Nanomaterials” session, both with speakers from Korea and from EU NanoSafetyCluster respectively.

The following items have been presented:

- Nanomaterials definition under the EU and other sectors; need for a harmonised definition
- Methodologies briefly discussed including outcomes from EU projects, OECD and standards (ISO)
- in vitro experimentation, artefacts and the need to perform physico-chemical characterisation to allow for correlation of toxicological outcomes
- Data harmonisation, good quality data and FAIR principles
- Risk assessment approaches regarding nanomaterials
- Societal perception
- Needs for Governance due to the cross-cutting nature of nanotechnologies

Furthermore, an open session took place to discuss collaboration opportunities between Korea and European researchers. Amongst other topics, “nanoplastics”, reference materials, nanomaterial-mixtures and/or complex materials as well as nanomaterial release have been in the focus of discussions. Minimal requirements for industry have been mentioned to be needed for future nano-enabled innovation. Once more, the urgent need to call for a dedicated open innovation test bed (OITB) on nanosafety - complementary to the already funded characterisation, medical technologies/IVD, and materials-driven OITBs - arose from the discussions.

Andreas Falk (BNN) presented in his role as “*innovation-oriented*”-representative of the coordination team of EU NanoSafetyCluster the clusters activities towards innovation, and highlighted the relevant expertise from Austria-based association BioNanoNet. Additionally, he could give insights into the safe-by-design implementation guided by BNN in H2020-projects Hi-Response, INSPIRED, R2R Biofluidics and Smart-4-Fabry, and the impact of this work for ongoing projects e.g. Gov4Nano, NanoCommons, BIORIMA, and ACEnano.

Furthermore, BioNanoNet members Blanca Suarez-Merino (TEMAS, Switzerland) and Tommaso Serchi (LIST, Luxembourg) contributed presentations during the Nanosafety session.

During the discussion several items on which collaboration shall be envisaged or intensified have been discussed, e.g. “nanoplastics”, nanomaterial mixtures, use of reference materials, or to set minimum requirements for industry that are seen necessary for future nano-based innovation. It was also mentioned that international dialogue-formats might be connected with each other, i.e. Andreas Falk announced the **4<sup>th</sup> EU-Asia Dialogue on Nanosafety**, which will take place on **June 15<sup>th</sup> 2020 in Vienna** (hosted by the Austrian Ministry of Transport, Innovation and Technology), back-to-back with an OECD-WP-meeting.



*Impressions from the 8<sup>th</sup> EU-Korea NanoWorkshop. © BNN*



*These projects have received funding from the European Union's HORIZON 2020 research and innovation programme under grant agreement n° 814401 and n° 731032.*

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## SusChem Stakeholders Event 2019

27<sup>th</sup> of November 2019, Brussels, Belgium



 Federal Ministry  
Transport, Innovation  
and Technology

On November 27<sup>th</sup> 2019, the SusChem 2019 Stakeholders event took place in Brussels. Main highlight of the event was the launch of the [“Sustainable Chemistry to solve global challenges: the new SusChem Strategic Research and Innovation Agenda”](#). The document outlines priorities for sustainable chemistry-related research, development and innovation with the aim of building sustainable societies in Europe and globally.

“This is an important day for SusChem – you have shaped expectations,” said Peter Dröll, Director of Prosperity at the European Commission’s Research and Innovation directorate. “Horizon Europe is about sustainability and supporting the economic agenda of the new Commission.”

“Over 100 experts, from across Europe and across the innovation ecosystem, were involved in formulating the technology priorities outlined in the new SusChem SIRA” said Vivi Filippousi, SusChem Manager at Cefic, praising the extensive co-creation and collaboration resulting in the new SIRA. “The journey towards the new SIRA was also supported by the SusChem Board members, the SusChem network of National Technology Platforms (NTPs) as well as the European Commission with consistent feedback along the way”.

The **Austrian national technology platform “SusChem-AT”**, coordinated by BNN, was represented at the Event and in a panel discussion by Andreas Falk, member of the leadership team of all SusChem-NTPs.

A great achievement of SusChem-AT was the direct contribution to the strategy development (e.g. with members-consultations) and furthermore the nomination of national experts to be part of the co-creation process of the SIRA. Thus, national priorities could be directly delivered to the European level, as well as trends and ideas could be transferred back – a perfect bidirectional benefit.





*Discussion Panel during SusChem-Stakeholder-Event: (f.l.t.r.) Dusan Sandor (European Commission), Philippe Mengal (BBI-JU), Andreas Falk (BNN; SusChem-AT), Àngels Orduña Cao (A.SPIRE a.i.s.b.l.), Philippe Jacques (EMIRI). © SusChem*

During the Stakeholders event, discussions focused on digital transformation opportunities in the chemical and industrial biotechnology sector, the future role of Horizon Europe partnerships and platforms, and the requirements to enable the circular economy and the low-carbon energy transition.

### **About the SIRA:**

Three interconnected challenge areas are identified in the new SusChem SIRA: circular economy and resource efficiency; a low carbon economy; and environmental and human health. Connecting with these three overarching priorities, SusChem's technology priorities and their specific challenges are clearly articulated in the document. With a horizon of 2030, the SusChem SIRA presents innovation priorities that could be implemented under the next European Commission Framework Programme for Research and Innovation (Horizon Europe) and other large-scale collaborative initiatives. The technology priorities range across Advanced Materials, Advanced Processes as well as the implementation and co-development of Enabling Digital Technologies within the chemical sector and associated sectors and value chain partners. Horizontal topics are equally addressed and highlighted, including sustainability assessment innovation, safe-by-design for chemicals and materials, as well as building on education and skills capacity in Europe.



*Thanks to SusChem-Europe for providing the report about the Stakeholders Event and SIRA-launch.*

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## BioNanoNet *Conference Calendar*

### BNN events

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#### BNN Networking Event



**When?** 27 February 2020

**Where?** Graz, Austria

For more information and registration click [HERE](#).

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#### Rare Disease Day 2020



**When?** 28 February 2020

**Where?** Graz, Austria

The Rare Disease Day takes place on the last day of February each year. The main objective of the Rare Disease Day is to raise awareness about rare diseases and their impact on patients' lives amongst policy makers, public authorities, industry representatives, researchers, health professionals and anyone who has a genuine interest.

Building awareness of rare diseases is important because 1 in 20 people will live with a rare disease at some point in their life. Despite this, there is no cure for the majority of rare diseases and many go undiagnosed.

The Rare Disease Day improves knowledge amongst the general public of rare diseases while encouraging researchers and decision makers to address the needs of those living with rare diseases.



The campaign started as a European event and has progressively become a world phenomenon, with the USA joining in 2009 and participation in over 100 countries all over the world in 2019. For more information on the campaign please visit [www.rarediseaseday.org](http://www.rarediseaseday.org).

In 2020, BioNanoNet will co-organise an event in Graz, Austria, bringing together experts from different areas and facilitating interesting presentations and knowledge exchange. Save the date for this event and stay tuned! Further information will be provided soon.

For more information and registration click [HERE](#).

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## Think Tank “People in Change through Digital Innovations”



**When?** 16 April 2020

**Where?** Graz, Austria (Med Campus Graz, Neue Stiftingtalstraße 6)

The Think Tank “People in Change through Digital Innovations” takes place on April 16<sup>th</sup> 2020 in Graz, Austria. This event will be organised together with the Know-Center, Human.technology Styria, BioNanoNet (BNN) and the Center for Knowledge and Technology Transfer.

For more information and registration click [HERE](#).

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## BNN on site events

### **Nanosafety Training School - From Basic Science to Risk Governance**

**When?** 22 – 27 March 2020

**Where?** Venice, Italy



Registration now open!

**Nanosafety Training School:  
From Basic Science To Risk  
Governance**

22-27 March 2020 | Venice, Italy  
The school is free of registration fees.

### **Interprofessional Education Training School & Young Scientist Forum 2020**

This year the Venice Nano Training School celebrates its 10th anniversary. The Training School, organised within the EU funded Horizon 2020 projects BIORIMA, Gov4Nano, GRACIOUS, NanoInformaTIX, NANORIGO, PATROLS and RiskGone and will take place in San Servolo (Venice, Italy) from 22nd to 27th March 2020.

[Registration and Abstract Submission](#) are open now! Please download the [School Flyer](#).

The school will feature keynote speeches, hands-on sessions and a dedicated Young Scientist Forum Day (23rd March) during which early career researchers (PhD students, PhD candidates and Post-Docs) will have the opportunity to present their work.

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

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

Become part of an interactive, exciting week and enrich your knowledge by developing multidisciplinary expertise!

### **Who should attend?**

Early-stage researchers

PhD students and Post-Docs

Senior researchers

Industry

Governmental Agencies

Medical Personnel

Anyone interested in Safe Nanotechnology, Risk Assessment and Nano-Medicine

### **School Topics:**

Hazard to Human Health & Environment

Fate & Exposure Assessment

Nanomedicine: from the lab to the market

Modelling

Grouping & Read Across Approaches

Risk Governance

For more information visit the [BioNanoNet website](#).

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## BNN Member-Event Notifications

### PITCH & PARTNER 2020

**When?** 27 – 28 January 2020

**Where?** Med Campus Graz, Austria

The **Health Tech Hub Styria (HTH Styria)** is an initiative of 6 leading stakeholders in the Styrian innovation system (Human.technology Styria, Joanneum Research, Medical University of Graz, SFG, Science Park Graz and City of Graz).

Following a very successful kick-off event in 2019, HTH Styria Pitch & Partner 2020 returns, this time in a 2-day format. This more comprehensive event has a larger range of fascinating topics such as international keynotes, a corporate challenge, pitching sessions, prearranged b2b meetings and more.

The goal is to build a strong network encompassing all relevant players in technology transfer, academia/industry collaborations as well as early-stage innovations and to foster a European marketplace for pre-seed and seed investments in the health tech and life sciences field.

For more details visit the [website](#).

The poster for the HTH Styria Pitch & Partner 2020 event features a central graphic with four interconnected blue shapes labeled 'IDENTIFY', 'DEVELOP', 'BENEFIT', and 'MEET'. Above this graphic is the HTH Styria logo and the text 'FOSTERING INNOVATION & EXCHANGE'. To the right, a vertical list of logos includes Human.technology Styria, Joanneum Research, SFG, Enterprise Europe Network, Science Park Graz, Das Land Steiermark, and Tourismus Graz. The event details 'PITCH & PARTNER 2020', '27th – 28th January 2020', and 'MED CAMPUS GRAZ' are prominently displayed. The website 'www.hth-styria.com' is at the top right, and a tagline at the bottom reads 'The new European Partnering Event for Innovations and Exchange in the Health Tech and Life Sciences Field'.

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## QM4Students: Quality Management in Life Science

**When?** 10 - 17 January 2020

**Where?** Graz, Austria



**QM4STUDENTS**  
**QUALITÄTSMANAGEMENT**  
**IN DER LIFE SCIENCE**  
**BRANCHE**

10. & 17. JÄNNER 2020  
15:00 - 19:00 UHR  
NEUE STIFTINGTALSTRASSE 6  
HS MC 4

**50€**  
FÜR  
STUDIERENDE

No matter if you're studying or you already have your degree – additional skills are a welcome gimmick in every company. Quality management is basis for every product – especially in producing companies. Get your qualification for a really nice price at our QM4Students workshop in January 2020. More info at [www.humantechnology.at](http://www.humantechnology.at).

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## Final Countdown: Medical Devices Regulation

**When?** 23 January 2020

**Where?** Vienna, Austria

A promotional graphic for a seminar. The background is light blue with a stethoscope and a notebook. A white box in the top left contains the title. A red banner in the center features a discount offer. The bottom left shows the date and location. The top right has the 'imh' logo and the text 'KONFERENZEN SEMINARE Wissen, das bewegt'.

Final Countdown:  
Medizinprodukte-Verordnung

**-20% Rabatt für Clusterm Mitglieder!**

23.01.2020 09:00 -17:30  
Hotel Vienna South, Hilton Garden Inn

imh KONFERENZEN  
SEMINARE  
Wissen, das bewegt

Only a few months to go for the new certification decree according MDR and IVDR. In cooperation with Institut Manfred Hämmerle, we offer -20% discount on this seminar to all of our cluster members. For more information please send an email to [office@human.technology.at](mailto:office@human.technology.at)

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## Corporate Challenge @ HTH Styria Pitch and Partner

**When?** 27 – 28 January 2020

**Where?** Graz, Austria



The Health Technology Hub is back in Graz. On this 2-day event we are looking for your innovative start-up to apply to the corporate challenge. If you have an innovative product or idea, you have the possibility to pitch in front of executives of four corporates, rewards are waiting for you! More info at [www.hth-styria.com/page-4901](http://www.hth-styria.com/page-4901).

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## Lounges Karlsruhe: Cleanroom Processes

**When?** 28 – 30 January 2020

**Where?** Karlsruhe, Germany



**LOUNGES**  
**CLEANROOM PROCESSES**

28. - 30. Jänner 2020  
Messe Karlsruhe

Sichern Sie sich **IHREN STANDPLATZ**  
auf der **LOUNGES 2020** in der  
Messe Karlsruhe. Alle Infos unter  
[www.humantechnology.at](http://www.humantechnology.at)

\*Unternehmen aus Österreich erhalten vergünstigte Konditionen!

For the first time human.technology.styria is organising the LISA group-booth at the fair for cleanroom technologies – Lounges Karlsruhe. If you're an interested Austrian company get your booth for special conditions. More info at [katharina.weinzerl@human.technology.at](mailto:katharina.weinzerl@human.technology.at).

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*Finally*

We hope you enjoyed our BioNanoNet newsletter!

Please do not hesitate to contact us if you would like to give us any suggestions or feedback.

Our next BioNanoNet newsletter will be published in March 2020.

BioNanoNet partners are welcome to send their contributions until 13<sup>th</sup> of March 2020.

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