

# NANOTECHNOLOGY IN PRACTICE

## CHALLENGES ON THE WAY TO APPLICATIONS

## NANOTECHDAY FRIBOURG

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# Participants & Abstracts



Dr. Rita Hofmann

### Nanotechnology in Imaging Media

*Dr. Rita Hofmann, Head of R&D, ILFORD Imaging Switzerland GmbH, Marly*

The last 20 years have seen a strong development in the way we look at and print images. With the change in image capture from analogue to digital, there was a need for the output to change from the darkroom to the desk-top. Modern photo prints made with IJ printers have nearly indistinguishable high quality compared to traditional photo prints. This is due to the use of nanoparticles on industrial scale that used to form flexible films on paper with very high transparency, gloss and porosity. A key know-how to make such layers is the surface treatment of the nanoporous mineral-oxide into a dispersion which is manufacturable and solidifies in to a matrix with the best imaging and permanence properties. Interesting future applications are on the horizon the high porosity clear layers.



Dr. Evelyne Vuaridel

### Nanotechnology in Drug Delivery

*Dr. Evelyne Vuaridel, Senior Evaluator Drug Delivery, Debiopharm, Lausanne*

Nanotechnology has a significant impact on the drug delivery sector, affecting every route of administration from oral to injectable, gastrointestinal tract delivery, transmucosal and transdermal delivery. The examples of drug delivery systems developed prior to the current nanotechnology revolution are liposomes, polymeric micelles, microemulsions, nanoparticles, dendrimers, and nanocrystals. Previously insoluble drugs were re-formulated increasing efficacy and decreasing the need for solvents. The bioavailability of drugs was improved. Debiopharm as a precursor in nano/micro technology has developed the Debio® PLGA technology. The formulations have an adjustable release profile of the active principle from 1 week to 6 months. As an example, there are two commercialized formulations for hormone-dependent prostate cancer: Decapeptyl® and Trelstar®. Moapar® has just received marketing authorization by Swissmedic for the treatment of sexual deviations. The expertise of Debiopharm in drug delivery systems is also applied in the development of its new platinum micellar nanoparticles in oncology. The future in drug delivery systems include microchips, micro needle-based transdermal therapeutic systems, layer-by-layer assembled systems, and various micro particles produced by new nano/micro manufacturing processes.



Kaspar Schmid

### Activities for a safe, healthy and environmental development of Nanomaterials

*Kaspar Schmid, Institute for Work and Health, Lausanne*

Nanomaterials have properties that are often very different from normal materials made of the same substance, which can be used to create novel products. However, the health and environmental impact of these nanomaterials is also changed and their potential risk needs to be studied.

There is evidence that some nanomaterials can pass through tissue barriers (including the blood-brain barrier) and cell membranes. This is interesting for medical applications, but it raises concerns about the impact of non-medical nanomaterials. To understand the potential risk, we need to know what can lead to unwanted exposures of workers, consumers and the environment. Then we can prevent the exposure so that even hypothetical dangers cannot result in a real risk.

This talk will give an overview on the current knowledge in this field and about strategies to ensure a safe, healthy and environmental friendly production, use and disposal of nanomaterials.



Dr. Arthur Vayloyan

### Nano - another Black Swan?

*Dr. Arthur Vayloyan, Global Head Private Banking Investment Services and Products, Credit Suisse*

A Black Swan, according to Nassim Nicholas Taleb, is an event with the following three attributes: "First, it is an outlier, as it lies outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility. Second, it carries an extreme impact. Third, in spite of its outlier status, human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable."

Nanoscience and nanotechnology deal with structures of the smallest size. Taking advantage of these structures has the potential to create unprecedented opportunities for human beings or great risks.

Nanotechnology is gradually becoming ubiquitous in the market, capable of influencing areas of global importance. Credit Suisse is actively involved in the topic and is committed to analyzing the related opportunities and risks for its clients.

### Additional participants of the round-table discussion



Prof. Peter Schurtenberger

*Prof. Peter Schurtenberger, Executive director of the Adolphe Merkle Institute, University of Fribourg,*



Dr. Pierangelo Groening

*Dr. Pierangelo Groening, head of the Advanced Materials and Surfaces Division of EMPA*



Etienne Arrivé

*Etienne Arrivé, Rédacteur en chef adjoint, RadioFR, Fribourg*