

Conference Report

CHanalysis – 3rd Meeting of the Division Analytical Sciences of the Swiss Chemical Society

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The Division of Analytical Sciences (DAS) of the Swiss Chemical Society (SCS) gathered in Beatenberg on November 18–19, 2016, to discuss state-of-the-art analytical trends presented by domestic and distinguished international speakers. **Karin Mölling** (University of Zurich) opened the meeting with a plenary lecture on viruses, with novel insights emerging from sequencing technologies.^[1] A surprising reflection suggested abandoning our default misconception that viruses, beyond the layman's link to influenza, AIDS, Ebola or Zika, are just 'natural-born killers'. Viruses, instead, carry their evolutionary importance for the entire 'biosphere'.

The minuscule, energy-efficient and task-oriented entities turned out to be a well-chosen visualization of current analytical trends, as highlighted by a series of top lecturers:

Tools get smaller and smaller: **Bernhard Blümich** (RWTH Aachen) discussed the challenges in NMR spectroscopy miniaturization,^[2] lately enabled by the invention of small



permanent magnets, which permit stable and homogeneous magnetic fields in a benchtop setup, enough to resolve chemical shifts and hence closing the gap with traditional high-field NMR spectrometers, and making NMR analyses possible within minutes, at moderate equipment cost.

In another talk, **Daive Bleiner** (Empa Dübendorf) addressed miniaturization in XUV sources^[3] for absorption or mass spectrometry, which aims at replacing beamtime-limited synchrotron experiments. The use of contactless microprobes at wavelengths close to 10 nm improves the spatial resolution for mass spectrometry, and leads to stoichiometric sampling thanks to the photolytic ablation of high photon energies. Further along this line, but in a completely different analytical context, **Hubert Girault** (EPFL Valais) discussed micro-fabricated soft probes for imaging biological samples, such as cells or tissues, which has great potential for high-throughput screening of complex samples. He also discussed a novel ionization method for MS, which allows to spray both cations and anions with a single electrostatic pulse and to carry out online microchip reaction analysis. Additional talks, some given by early stage researchers, continued discussing various aspects of this trend of miniaturization (**Ralf Dumler**, **Lu Wang**, **Nadezda Pankratova**).

Analytical customization for specific target applications: **Stefan Reimann** (Empa Dübendorf) showed for the first time worldwide measurements of hydrofluoro alkenes at Jungfrauoch, using a proprietary preconcentration method and GC-MS. The analysis of industry-released organic compounds, e.g. the CFCs known to affect the ozone layer, is a scientific task with major societal impact. The optimization of the measurement technology and the embedment in a large network is essential to monitor the geographic and temporal evolution. **Frank Dieterle** (Novartis Basel) gave a practical demonstration of a customized analytical unit, the size of a small PC, for personalized healthcare, now available for private households. Its efficient and task-tailored functionality provides complex medical screening at the patient's fingertip. Similarly, the talk by **Yingdi Zhu** (EPFL Valais) showed a quick diagnostic tool for bloodstream infection based on immunoaffinity MS. **Sophie Bravo-Veyrat** (University of Geneva) presented a high-throughput differential mobility spectrometry-MS method for blood stability check in transfusion bags, and **Debora Käser** (ETH Zurich) compared femtosecond versus nanosecond UV pulses for the laser ablation ICP-MS analysis of geological samples.

'Smart compact models' validated to make 'complex analytical cases' lab-addressable: For instance, banana skin spots were investigated as a model for a (pre-clinical) study of melanomas **Hubert Girault** (EPFL Valais). **Rolf Kipfer** (Eawag Dübendorf) showed noble gas analyses from Black Smokers in the Gulf of California, which support the hypothesis that the Paleocene-Eocene-Thermal maximum 55 million years ago was caused by magmatism and Black Smoker activity in response to the formation of the Atlantic Ocean. **Carla Rigling** (ETH Zurich) questioned the oversimplifying assumption that a single dominant molecular conformation in solution can represent all the experimental NMR data, whereas molecules are constantly subjected to conformational changes, which may indeed lead to misinterpretation of data: results on peptides exhibiting antimicrobial activity were shown. **Myriam Guillevic** (METAS Bern) showed a four-step method to produce smart reference gas mixtures for the complex analysis of fluorinated gases in a SI-traceable way.

The 18 oral presentations and 19 posters attracted full audiences all day long, creating the conditions for a fertile inter-analytical forum. Based on this success, the CHanalysis will now move from the current 18-month interval to an annual meeting, with the next one taking place in spring 2018 in Beatenberg. Finally, the DAS general assembly thanked end-of-term president **Gérard Hopfgartner** (University of Geneva) for his commitment to the DAS during the past 7 years and welcomed 'president-elect' **Marc Suter** (Eawag Dübendorf) as the next chairman.

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[1] K. Moelling, 'Viruses: More Friends Than Foes', 2016, 420pp, World Scientific, ISBN: 978-981-3147-81-2.

[2] B. Blümich, *eMagRes* 2010, DOI: 10.1002/9780470034590.emrhp1004

[3] D. Bleiner, Y. Arbelo-Pena, L. Masoudnia, M. Ruiz-Lopez, *Phys. Scripta* 2014, T162, 014050.