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Chemistry

Platform of the Swiss Academy of Sciences

The 7th Young Faculty Meeting – A Motivated Generation of Group-Leaders in Switzerland Share their Results and their Experience

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On June 5th, 2014, almost 30 young faculty researchers from the field of chemistry met in Bern for the 7th *Young Faculty Meeting* (YFM), an event established by the «Platform Chemistry» of the Swiss Academy of Sciences (SCNAT). Universities from throughout Switzerland and both federal institutes of technology were represented by Swiss National Science Foundation (SNF) Ambizione Fellows, *Habilitands*, *Maîtres Assistants*, and SNF Assistant Professors coming together to exchange ideas and research experience in what has now become a traditional gathering. This year's symposium was co-organized in collaboration with **Marcel Hollenstein** (University of Bern) and **Gilles Gasser** (University of Zurich) and generously supported by the member companies of the KGF (Kontaktgruppe für Forschungsfragen), BASF, F. Hoffmann-La Roche, Novartis, and Syngenta.

The morning session was dedicated to six presentations by young faculty. The diverse range of different chemistry sub-disciplines presented highlighted the breadth and dynamism of research being carried out by the new generation of independent researchers in Switzerland.

As we enter a post-antibiotic era caused by mounting resistance and a shortage of new antibiotics, novel strategies are urgently needed to address bacterial infections. **Bastien Castagner** (ETH Zurich) presented efforts toward inhibiting the toxins that are responsible for the pathogenesis of *Clostridium difficile* infections. The strategy involves modulating the activity of a cysteine protease domain responsible for auto-cleavage of the toxins. Using a natural co-factor as a starting point, chemical synthesis yielded a molecule capable of irreversibly inactivating the toxin *via* a novel mechanism.



Bastien Castagner

Daniela Donghi

In her talk, **Daniela Donghi** (University of Zurich) first explained the importance of RNA as potential target for both

therapeutic and diagnostic agents, underlying the differences between RNA and DNA structures. She then described how her RNA model system, based on group II introns, was selected, and showed recent results on RNA-platination as well as on the interaction of a mononuclear Re(I) complex with RNA.

Alexandre Fürstenberg (University of Geneva) gave a colourful presentation with a straightforward take-home message: anybody can easily make red-emitting fluorescent probes brighter (by up to a factor of 2.5 times!) by performing experiments in heavy water (D₂O) instead of water. Water indeed quenches the emission of many fluorophores through hydrogen-bond assisted non-radiative deactivation but, owing to the lower vibrational frequency of the O–D bond, this mechanism can be efficiently suppressed in D₂O. He demonstrated in particular how these findings have proven to be useful in the context of single-molecule-based super-resolution imaging in cells with oxazine or cyanine dyes where the precision with which individual molecules can be localized – and therefore eventually the resolution – can be significantly improved.



Alexandre Fürstenberg

Henrik Braband

During his presentation, **Henrik Braband** (University of Zurich) gave an overview of the ongoing projects in the radiolaboratories of the Department of Chemistry of the University of Zurich. He focused on a new synthetic pathway for the preparation of radiopharmaceuticals for diagnostic applications. This new labeling strategy is based on the reaction of high-valent $fac\text{-}\{^{99(m)}\text{TcO}_3\}^+$ complexes with alkenes ((3+2) cycloaddition). He showed that this new labeling strategy can be applied for biomolecules as well as for nanoparticles. This research is a good example, how fundamental research can open up new avenues in applied fields of life sciences, such as nuclear medicine.

The fascinating field of self-healing materials was introduced by **Gina Fiore** (Adolphe Merkle Institute, Fribourg). In her talk, she presented recent examples of mechanochemical transductions with functional metallosupramolecular polymers, where both reversible and irreversible reactions are possible. More in particular, she focused on a metallosupramolecular polymer that was assembled from a europium salt and a telechelic poly(ethylene-co-butylene) with 2,6-bis(1'-methyl-benzimidazolyl)pyridine ligands. The resulting Eu³⁺ complexes serve both as mechanically responsive non-covalent crosslinks and built-in optical probes where their characteristic photoluminescence provides a means to monitor the extent of assembly and disassembly. Dose-dependent, reversible metal-ligand dissociation occurs upon exposure to ultrasound, which

permits for mending of damaged objects. Irreversible metal-exchange reactions are possible after imbibing the polymer with an auxiliary metal salt; the accompanying color change leads to mechanochromic behavior.



Gina Fiore



Koushik Venkatesan

Koushik Venkatesan (University of Zurich) started his presentation by providing a brief overview on the different categories of electronic materials and respective design approaches his group has pursued over the last few years. Following this overview, he showed how specifically crafted elegant design approaches can be used to achieve stable and highly luminescent gold(III) complexes as well as record high emission quantum yields for deep blue phosphorescent emitters based on platinum(II) complexes. He concluded his talk by describing a highly promising and a broadly applicable strategy to engineer molecules in order to harness the singlet fission process and achieve highly tunable and efficient phosphorescence emission based on transition metal and heavy atom free compounds.

During the lunch break, the participants had the opportunity to network and discuss. The exciting discussion and interaction seemed all too short and it was soon time for the afternoon session, scheduled with three senior guest-speakers.

Mirjam Curno (Frontiers) started her presentation by giving a description of the aims of this open-access publisher, which was launched in 2007 by scientists of EPFL. Frontiers comprises 46 community-driven journals in 29 disciplines and partnered with Nature Publishing Group last year. A striking feature of Frontiers is undoubtedly the interactive online platform that merges scientific publishing, researcher networking, and efficient sharing of knowledge. She concluded that Frontiers might be a versatile platform to improve the dissemination of scientific knowledge and data. The presentation raised several interesting points about open-access publishing among the audience.

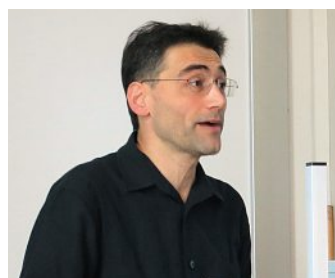


Mirjam Curno



Olivier Wenger

Olivier Wenger (University of Basel) gave a personal account of his move from a SNSF assistant professor at the University of Geneva to an associate professor at the University of Göttingen (Germany) and then to the move which brought him back to Switzerland as a full professor at the University of Basel. Importantly, he explained in detail the negotiations he undertook which allowed him to have the best research and financial conditions in his new positions, as well as the administrative difficulties he sometimes had to face when changing country. Needless to say that such insider information has been highly appreciated by a large majority of the crowd who is itself currently looking for positions.



Antonio Currao

Antonio Currao (Swiss National Science Foundation) gave a thorough overview of all the existing funding schemes supported by the Swiss National Science Foundation, with a particular emphasis on the Ambizione and the SNF professorship programs. He also showed statistics on how many SNF-professors and Ambizione grantees (albeit with less meaningful data due to the relative infancy of the program) managed to stay in academia. Finally, his excellent presentation triggered a lot of questions from the audience, which were continued during both the coffee break and the ensuing aperitif.

The contributions of the senior speakers were received with enthusiasm and generated interesting questions and comments. The lively and intense discussion continued also during the apéro.

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Additional information about the «Platform Chemistry» and its activities may be found at www.chemistry.scnat.ch



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