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Chemistry

Platform of the Swiss Academy of Sciences

### The 4<sup>th</sup> Young Faculty Meeting – Science and Funding in its Different Varieties

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The fourth *Young Faculty Meeting* (YFM) took place on June 16, 2011 at the University of Bern and brought together over thirty young researchers from all Swiss universities and both federal institutes of technology. This yearly symposium was organized by the «Platform Chemistry» of the Swiss Academy of Sciences (SCNAT) together with **Christian Heinis** and **Nicolai Cramer** (both *EPF Lausanne*) and generously supported by the **Kontaktgruppe für Forschungsfragen KGF** ([www.kgf.ch](http://www.kgf.ch)).

The morning session started with a series of scientific presentations by young academics, during which major fields of chemistry were represented and a very colorful and exciting survey of the various research topics was given.

The first speaker of the morning session, **Alke Fink** (*University of Fribourg*), gave an introduction to the field of material sciences and exposed her holistic approach from controlled nanomaterial synthesis to nanomaterial–cell interactions. She explained that the surface of nanoparticles plays a major role in their cellular interaction, uptake, biodistribution, clearance and cytotoxicity. Her presentation surveyed novel surface derivatization strategies, in particular the synthesis and modification of organelle targeting multifunctional magnetic nanoparticles and their use for early diagnosis of inflammatory diseases. She added that other applications of this technology include organelle-specific drug delivery, study of complex cellular signaling pathways and metabolism, and imaging specific pathologies such as malignant neoplasia. Afterwards, **Andreas Osterwalder** (*EPF Lausanne*) presented his work on the preparation of cold neutral molecules. He discussed different approaches to obtain gas-phase molecules in the temperature range around 1 K, and why the preparation of molecules in these conditions is equivalent with having the highest-possible control over external and internal degrees of freedom. He then discussed the relevance of this research to the study of chemical reaction dynamics and demonstrated the new aspects in chemistry that become accessible under these conditions. Research in the laboratory of **Franziska Schoenebeck** (*ETH Zurich*) combines both experimental and computational techniques to study the origins of chemical phenomena. After giving a short overview on the different research activities in her group, ranging from catalysis to microwave chemistry, Franziska Schoenebeck presented a case study of a combined experimental and computational mechanistic investigation of a solvent-induced selectivity switch in a Pd-catalyzed transformation that was

recently discovered in her laboratory. The last speaker of the morning session, **Dennis Gillingham** (*University of Basel*) discussed his group's interest in a family of natural products that contain a diazo functional group. Held at the precipice of the favorable entropic and enthalpic event of dinitrogen release, the mere existence of these molecules is a curiosity. Dennis and his group hope to glean a deeper understanding of how organisms construct and stabilize the diazo motif through a combination of total synthesis and enzymological studies. The natural occurrence of the diazo group and the attendant implications for its biostability also inspired a study in the Gillingham group on the potential for using the diazo group in combination with an organometallic catalyst as a system for the catalytic alkylation of biomolecules.

The second half of the morning was dedicated to the main topic of this years' «Young Faculty Meeting». Two research funding experts, **Cornelia Sommer** from the Swiss National Science Foundation (SNSF) and **Juliane Sauer** from Euresearch informed about Swiss and European funding instruments that are of potential interest to young faculty members. Cornelia Sommer who is managing funding activities in the Division II (Mathematics, Natural and Engineering Sciences) introduced the organization of the SNSF as well as its policy and gave an overview of the different channels through which the SNSF is supporting research in Switzerland. She informed about the application requirements of programs such as Project Funding, R'Equip, Interdisciplinary Projects, Sinergia or SNSF Professorship, explained the evaluation criteria and gave valuable advice for successful applications. The talk was followed by a question and answer session and a lively discussion. Juliane Sauer, Swiss National Contact Point for Mobility & Research Infrastructures Euresearch (the Swiss Network for European Research and Innovation), informed the YFM participants on the Marie Curie Actions (MCA) and their funding schemes. In a first part, she presented three different Marie Curie fellowships (Intra-European Fellowship, IEF; International Outgoing Fellowship, IOF; International Incoming Fellowship, IFF) that could be of interest to group leaders to finance post-doctoral researchers. In a second part, Juliane Sauer informed on host-driven Marie Curie Actions including the 'Industry-Academia Partnerships and Pathways' (IAPP) and 'Initial Training of



Cornelia Sommer, Swiss National Science Foundation (SNSF).



Juliane Sauer,  
Swiss National  
Contact Point  
(NCP), Euresearch.

Researchers' (ITN) programs. For all the different schemes, she provided important information such as application requirements, financial allowances and success rates.

After an enjoyable lunch, the first speaker of the scientific session in the afternoon, **Martin Lochner** (*University of Bern*), reported on the recent progress of his group in the development of molecular probes for the study of ion channels and their site-selective chemical modification. He presented the detailed synthesis, structural characterization and biological data of fluorescent probes based on the serotonin receptor ligand granisetron and emphasized potential application of these compounds in cellular imaging and fluorescence-based binding assays. Furthermore he also showed some examples of granisetron derived photoaffinity probes. Finally, he concluded his presentation with some recently synthesized molecular probes, which will be used for the study and covalent modification of a cardiac potassium channel. **Clemence Corminboeuf** (*EPF Lausanne*) highlighted the ubiquitous role of dispersion forces in many structural and energetic chemical phenomena such as host-guest chemistry, crystal packing of organic molecules,  $\pi$ - $\pi$  stacking of nucleic acids in DNA and non-covalent assemblies of aromatic rings into supramolecules. These interactions represent a major challenge for standard density functional approximations that dramatically fail to describe weak molecular interactions arising from small electron density overlaps. To overcome this drawback, her laboratory recently developed a very efficient and accurate (non-empirical) dispersion correction that is derived solely based on density-dependent information (*i.e.* system-dependent). She discussed the major improvements obtained for standard density functionals and presented results for a broad variety of reaction energies and geometries. The second last speaker of the afternoon session was **Ryan Gilmour** (*ETH Zurich*) who gave a presentation entitled 'Exploiting Fluorine Conformational Effects in Organocatalyst Design'. In his lecture, Gilmour described his group's efforts to emulate the conformational dynamics of enzymes in the design of small molecule organocatalysts. Key to their approach is the strategic incorporation of a fluorine atom into the scaffold such that the system benefits from stabilizing stereoelectronic or electrostatic interactions upon substrate binding. This is necessarily accompanied by a conformational change, which facilitates enantioinduction. Gilmour's recent work on organocatalyst design, application and mechanistic studies were disclosed. Last but not least, **Greta R. Patzke** (*University of Zurich*) presented an overview of her work on functional oxide materials. Her group develops facile and efficient routes to nanostructured oxides environmental applications, focusing on mechanistic insights, synthetic optimization and the investigation of resulting properties. She illustrated this approach with the tuning of bismuth containing oxide photocatalysts for water

purification and oxidation as a selected example. Gas sensor development with nanostructured oxides, such as molybdenum-based materials, is another research branch of her team. On the molecular level, her laboratory is working on the development of polyoxometalates with interesting bio-medical (*e.g.* antiviral and antibacterial) and catalytic properties. A novel drug carrier route has recently rendered POM/polymer composites more biocompatible.

The other half of the afternoon was dedicated to the second part of this year's main topic, putting the highly competitive Starting Grants from the European Research Council (ERC) into focus. ERC-Grants have evolved as a major funding instrument within European Community's Seventh Framework Program with an emphasis on scientific excellence as sole selection criterion. Three experts, **Katja Wirth-Bürigel** (Euresearch, National Contact Point (NCP) of European Research Council (ERC)), **Jay Siegel** (University of Zurich, former chair of the panel PE5 – Materials and Synthesis from the ERC) and **Xile Hu** (EPF Lausanne, recent ERC-starting grant recipient) gave presentations from their perspective on this topic. The presentation from Katja Wirth-Bürigel comprised an introduction to the ERC funding scheme and focused on important characteristics and technical aspects of the application process. She informed as well on the different training workshops and assistance offered by Euresearch to improve the quality of the grant applications. She pointed out that the success rate of applicants from Switzerland is the highest in Europe and remarked further that the EPF Lausanne and ETH Zurich are among the top five universities endowed with the most ERC grants. Jay Siegel provided a closer insight in the reviewing process and stressed the importance of the personal interview with the applicant and the panel members for the second stage of the evaluation process. He remarked that a majority of applications focused on socially important 'hot' scientific issues even though the call is specifically intended to fund all areas of basic research. As a general hint, he gave the advice that an appealing project should be groundbreaking and well thought-out, without losing one's scientific expertise and track record or the credible feasibility for the project. Xile Hu shared his experiences and perspective of the application process. His presentation started with a personal insight on the selection of the right and competitive topic "a balance between the own track record and high impact theme". He illustrated the different stages of the application and gave valuable hints to help avoid the common pitfalls occurring during the application and interview process. The strong interest of the young academics was reflected by an intense discussion with that panel that followed the individual presentations. The covered topics of the discussion encompassed specific questions such as a promising track- and publication record as well as general and scientific strategies for a successful application.



Jay S. Siegel  
(University of  
Zurich), ERC panel  
member.



Xile Hu (EPF Lausanne), ERC Starting Grant 2010 recipient.



Katja Wirth-Bürgel, National Contact Point (NCP) of European Research Council (ERC).



Moderated panel discussion: (from the left) Xile Hu, Jay Siegel, Katja Wirth-Bürgel, Nicolai Cramer.

This informative and diverting day was concluded with a small aperitif. The «Young Faculty Meeting» was again a success and the «Platform Chemistry» of the Swiss Academy of Sciences (PFC-SCNAT) is looking forward to welcoming the community of young researchers in the field of chemistry as of next year.

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