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Chemistry

Platform of the Swiss Academy of Sciences

## The 6th Young Faculty Meeting – A Dynamic Generation of Group Leaders in Switzerland Share Breadth of Results, Network and Explore Chemistry Communication

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On June 6<sup>th</sup>, 2013, almost 30 young faculty researchers from the field of chemistry met in Bern for the 6th *Young Faculty Meeting* (YFM), an event supported by the «Platform Chemistry» of the Swiss Academy of Sciences (SCNAT). Universities from throughout Switzerland and both federal institutes of technology were represented by Ambizione Fellows, Habilitands and 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 **Ján Cvengroš** (ETH Zurich) and **Marc Creus** (University of Basel) and generously supported by the Kontaktgruppe für Forschungsfragen KGF ([www.kgf.ch](http://www.kgf.ch)).



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.



**Juraj Fedor** (University of Fribourg) showed in his talk how measuring the cross sections for individual channels in the resonant electron scattering on molecules can bring information about the nuclear dynamics on the femtosecond scale. He presented several recent examples with the emphasis on cases where the dissociation pathway is opened *via* vibronic coupling of  $\pi^*$  and  $\sigma^*$  states. A stimulating discussion followed about

the limitation of the method with respect to the size and phase of the probed systems.

**Natalie Banerji** (EPF Lausanne) shared her interests in conjugated materials with applications in organic electronics (solar cells, photodetectors, transistors, DNA sensors). Her group uses a variety of time-resolved spectroscopic and photocurrent techniques. In her talk, she presented the advantages of organic

photovoltaics (cheap, light-weight, flexible devices) and outlined recent insights to the field related to the role of the active layer morphology and of short-lived delocalized states. She showed complementary results obtained for a particular conjugated polymer: fullerene system by femtosecond spectroscopy in the visible, mid-infrared and terahertz range, as well as by reflection spectroscopy on working solar cells.



**Maksym Kovalenko** (ETH Zurich and Empa Dübendorf) presented his recent focus on challenges related to the chemistry, physics and applications of inorganic nanostructures. Central to his work is the synthesis of inorganic nanocrystals, and the integration and/or self-assembly of nanocrystals into multifunctional solid state structures. He highlighted how, through the proper design and characterization of nanocrystal surface chemistry and inter-nanocrystal medium, his group aims to transform the individual properties of nanocrystals into useful collective properties of nanocrystal-based solids. Toward possible applications, he shared how his group concentrates on precise engineering of nanocrystals as high-capacity anode and cathode materials for rechargeable Li-ion batteries and synthesis of infrared-active quantum dots for optoelectronics.

After a stimulating coffee break, **Samuel Arey** (EPF Lausanne) presented his work on aqueous reactive halogen compounds as major transformation agents in several different natural and engineered aquatic systems. He introduced the audience to the practical importance of such fundamental work: for example, in sunlit ocean water, aqueous marine aerosols and in swimming pools, diverse halogen species arise that react with natural organic materials, nutrients and pollutants. Despite their importance, aqueous halogen species are short-lived and challenging to study in the laboratory. Using a combination of theoretical simulations and experimental approaches, his research group is making important new advances with these interesting molecules. These advances were illustrated elegantly with case-studies, which suggested that high-quality quantum chemical simulations provide an excellent complement to contemporary experimental techniques for investigating the reaction thermodynamics, kinetics and molecular mechanisms of chemical reaction pathways involving aqueous halogen species.



**Mihaiela Stuparu** (University of Zurich) presented efforts towards creating a research program focused on introducing corannulene chemistry to macromolecular science. Among



many approaches, Mihaiela focused on side-chain corannulene polymers. These polymers have emerged as a new class of fullerene C<sub>60</sub> hosts and are expected to be of high significance and applicability in the area of plastic electronics. Michaela's presentation was memorable for her scientific insights as well as for her sheer enthusiasm in pursuing curiosity-driven research.

Finally, **Felix Zelder** (University of Zurich) presented his research on modified cofactors and cofactor-protein complexes with novel properties and functions. In his presentation he gave two examples of current research activity in his group. First, he introduced semi-artificial vitamin B12 derivatives with a biomimetic peptide backbone as potential anti-vitamins. Inhibition of bacterial growth has been observed for a prototype that is promising for further optimizations. In the second part of his talk, he gave an overview on the development of metal-based chemosensors for anions and reported particularly on a new strategy to control the binding dynamics of the systems. His interdisciplinary work elegantly combines synthetic chemistry, both organic and inorganic, with potential applications in biochemistry and analytical chemistry.



This year, the lunch break was stretched over two hours, during which participants enjoyed the best of hot summer weather. The time was greatly valued and used for vivid discussions that spread across the tables, which were filled with various snacks on a sunny terrace. The exciting discussion and interaction seemed all too short and it was soon time for the afternoon session, scheduled with three senior guest-speakers and dedicated to the theme 'Communicating Chemistry'.



The post-prandial session was opened by **Howard Riezman** (University of Geneva) who has held the directorship of the National Center of Competence for Research in Chemical Biology for the past three years. In the first part of his talk, he



briefly introduced NCCR as an innovative funding instrument provided by the SNSF which fosters interdisciplinary collaboration as it uses chemistry tools to visualize and control biological processes ([www.nccr-chembio.ch](http://www.nccr-chembio.ch)). Besides its purely exploratory activities, NCCR equally puts emphasis on communicating science outside the scientific community. A broad palette of events and programs is organized in order to improve the public

image of chemistry and to encourage young people to enter the field of science. Special attention is being paid to the advancement of women, through childcare support. In the ensuing discussion, the speaker frankly but perhaps controversially advised against part-time work, since it puts young researchers at a disadvantage in a very competitive academic environment. Moreover, he suggested that young faculty should not invest too much time and energy on science outreach before they are well established academic researchers, *i.e.* research and publications are much more crucial than activities such as science outreach, especially for young faculty trying to establish a scientific reputation. Several attendants later reflected that it is perhaps a pity that such socially-important extra-academic activities are undervalued and poorly rewarded.



**Catherine Housecroft** (University of Basel) gave an entertaining and informative presentation encompassing many aspects relevant to the competent communication of chemistry. The speaker has had an unusual and very successful international research career and it became obvious in her presentation that as well as writer of famous reference books of chemistry and executive editor of a respected scientific journal of inorganic chemistry (*Polyhedron*), she is also passionate teacher and communicator. With such a rich personal experience, the audience paid careful attention to her practical and well-argued advice, including very useful lists of 'do's and don't's', such as: i) when writing to an editor, do try to address all reviewer's suggestions, even when resubmitting to another journal (it often ends up on the E-mail inbox of the same unhappy reviewer) and don't just suggest your friends and colleagues as reviewers; ii) when teaching do try to learn all names of students for a more personal and valued teaching-approach and don't just rely on slide presentations, because typically too much information is offered that students cannot always follow; iii) when teaching or writing books, do try to illustrate techniques with up-to-date and relevant case-studies, preferably taken from real case news-reports and don't avoid (or be upset by) very harsh feedback from trusted peers, as incorporation of their suggestions will undoubtedly improve your output.



A vibrant finale to the event was delivered by **Michael Klymkowsky** (University of Colorado Boulder, currently on sabbatical leave at ETH Zurich) who is one of the founding co-directors of CU Teach, science and mathematics certification program at UC Boulder. Besides his research activities, mostly in cell biology, he dedicates significant efforts to the design of courses and curriculum and to the preparation of teachers and tutors. In collaborations with other academics, new approaches are





being explored to generate more interactive learning experience, including new courses incorporating undergraduate chemistry, such as CLUE (Chemistry, Life, the Universe and Everything). Recurring themes of his presentation were “what are the expected roles of Universities?” and “how do we really know whether Universities are doing a good job”? The speaker demonstrated convincingly that many novel and imaginative strategies can be implemented, which are very different to the classical approaches to teaching, but which may lead to improved learning outcomes. He introduced several tools which are used to modify conventional testing approaches, such as BeSocratic™ (*besocratic.chemistry.msu.edu*). He pointed out that passing an exam or a degree is not the same as knowing or understanding the topic and that University administrators often confuse “sorting students” with “providing understanding”. Although some of the various tutorials, virtual laboratories, multiple-choice instruments presented help students to recognize, confront, correct, and expand their understanding of the topic, this provides a dilemma, since they do not necessarily provide facile standard tests simply to “sort-out students” in a fast and convenient manner. Rather, these tools draw attention to areas where students fail to grasp important concepts, but which standard exams often fail to reveal.

All the senior speakers contributed to the general topic of the meeting in a memorable way and received enthusiastic acceptance from the audience. The young faculty reciprocated with plenty of questions and comments and the intense discussion continued also during the apéro. Feedback from participants included the comments such as “it was an interesting mix of science and soft skills” and “bringing together young researchers in Switzerland is really something important”. We cannot agree more and look forward to next year’s event.

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Additional information about the «Platform Chemistry» and its activities may be found at [www.chemistry.scnat.ch](http://www.chemistry.scnat.ch)

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## The Quantum Atom at 100 – Niels Bohr’s Legacy

The Annual Congress 2013 of SCNAT is dedicated to commemorate Bohr’s strike of genius 100 years ago and to pay tribute to its impact on parts of the development of physics and its applications that followed from it. Nobel Laureate Serge Haroche and other distinguished speakers will cover a selection of different topics. A public evening lecture, given in German, will address some particular characteristics of quantum mechanics.

For more information and registration: [www.congress13.scnat.ch](http://www.congress13.scnat.ch)

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