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Chemistry

Platform of the Swiss Academy of Sciences

The First Meeting for Young Chemistry Faculty, Organized by the "Platform Chemistry" of the Swiss Academy of Sciences (SCNAT)

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The first meeting for young chemistry faculty members was organized on November 28th, 2008 at the University of Bern and brought together over twenty different researchers from all Swiss universities. The symposium was sponsored by the 'Platform Chemistry' of the Swiss Academy of Sciences (SCNAT) and coordinated by Barbara Winter-Werner (Chief Science Officer, Platform Chemistry SCNAT), Karl Gademann (Ecole polytechnique fédérale de Lausanne, EPFL) and Michele Cascella (University of Bern) in order to promote both scientific exchange and networking for young academics in chemistry.



Christian Leumann and Yury Tsybin.



The organizing committee: Karl Gademann, Barbara Winter-Werner, Michele Cascella (from left to right).

The program started with an opening address by Karl Gademann, during which the guests Prof. Dr. E. Peter Kündig (President, Platform Chemistry SCNAT), Prof. Dr. Christian Leumann (University of Bern) and Dr. Lukas Weber (Executive Director, Swiss Chemical Society) were warmly welcomed.

The morning of this event was dedicated to the scientific part, where every participant could introduce her or his research to his colleagues in a short five minutes timeframe. **Andreas Zumbuehl** from the University of Geneva started this session, and introduced the audience to his research on lipids. He pointed out that in contrast to four nucleosides and twenty amino acids, there are over 600 different lipids of relevance to biological processes. His lab aims at studying these lipids and therefore coined the term 'chemical lipidology' for this endeavor. Another biologically relevant compound, vitamin B₁₂, is the

subject of research by **Felix Zelder** (University of Zurich) and his group, and he presented several interesting new facets of this fascinating natural product. **Stefan Willitsch** (University of Basel) outlined a fascinating area of research: Whereas chemists are used to carry out reactions at room temperature, his group investigates processes close to 0 K. Interesting kinetics as well as Coulomb crystals can be observed in these systems by a sophisticated experimental setup. A colleague from Basel, **Hermann Wegner** presented his research on (metal-mediated) domino processes for the generation of complex polyaromatic structures. In one case, he discovered a new Au-mediated cascade for the efficient preparation of *bis*-coumarin structures, which hold promise as fluorophores. **Jérôme Waser** (EPFL) then pointed out that the synthesis of complex natural products is still hampered by the efficiency of synthetic methodology. He presented novel approaches for the synthesis of polycyclic natural products as found in many alkaloids. **Koushik Venkatesan** (University of Zurich) introduced his colleagues to current challenges in materials design and presented an outline of his research efforts spanning from novel phosphorescent polymers to new metal-polymeric hybrids.

The focus then turned to theoretical chemical physics, where **Jiri Vanicek** (EPFL) confronted the audience with striking drawbacks of current kinetic theories, and how his research addresses these shortcomings with novel theoretical approaches. In addition, he developed a novel algorithm that predicts microRNA targets in several viruses. His colleague from the EPFL, **Yury Tsybin**, presented his research utilizing sophisticated mass spectrometry techniques for protein analysis, both for structural and sequential purposes and compared top down and bottom up processes in proteomics. Also using mass spectrometry methods, **Sönke Szidat** (University of Bern) introduced the audience to complex analyses in environmental sciences. For example, his group identified the origin of organic particles in the environment based on ¹⁴C analysis and also demonstrated the usefulness of this method for metabolite tracing of pharmaceuticals. **Bernhard Spingler** (University of Zurich) represent-



Interesting discussions during coffee break: Ive Hermans, Cristina Nevado and Nathan Luedtke (from left to right).

ed the field of nucleic acid chemistry and outlined his research efforts on DNA structure and modulation by metal ions.

After a short coffee break that allowed for lively interaction between participants, **Cristina Nevado** (University of Zurich) gave an overview of her research, which combines synthetic methodology, total synthesis and medicinal chemistry. She gave an example of the synthesis of a terpene through an elaborated Au-mediated cyclization reaction. Continuing in the research area of catalytic synthesis, **Clément Mazet** (University of Geneva) showed the usefulness of late transition metals in catalysis. Based on a mechanistic rationale, he developed a novel process in catalysis. **Piero Macchi** (University of Bern) presented his research on high-pressure studies of crystals and the resulting effects on bond angles and bond strengths. Interestingly, in the initial stages of increasing force on crystals, the lengths of lateral bonds increased, due to favorable rearrangement in the unit cell. **Nathan W. Luedtke** (University of Zurich) presented his research in bioorganic chemistry, and presented a porphyrin with potential applications in photodynamic therapy or as anticancer agent. His research interest focusses on the interaction of small organic molecules with DNA, and the detection of G-quadruplexes. **Damien Jeannerat** from the University of Geneva introduced the audience to a newly developed approach for the resolution of HSQC spectra, which can be readily implemented using standard equipment. He demonstrated the power of this method by resolving a complex mixture of diterpenes. The goal of avoiding mixtures was a driving force for **Xile Hu** (EPFL), who presented the selective cross coupling of Grignard reagents using a newly developed pincer complex. By using this Ni catalyst, Grignard reagents can be coupled to functionalized electrophiles involving ester, keto, amino and ether functional groups. Catalysis is also the driving force for the research of **Ive Hermans** (ETHZ), but with a clear technological focus on applications. His interest centers on oxidation catalysis, and he pointed out key requirements for efficient processes in this area. The concept of antibody miniaturization was presented by **Christian Heinis** (EPFL), where he was able to develop highly efficient inhibitors for proteases of medical interest using a combination of chemistry and phage display. **Karl Gademann** (EPFL) presented research strategies combining organic synthesis and chemical biology, where biological processes such as nuclear transport can be controlled using synthetic natural products. Another field of activity is the combination of medical devices and drugs using natural product hybrids. Natural products are also in the focus of **Nicolai Cramer** (ETHZ), who presented the successful total synthesis of largazole, a his-

tone deacetylase inhibitor from a cyanobacterium. His group is also working in catalysis, and a Rh-mediated desymmetrization reaction of cyclobutanones was introduced. **Michele Cascella** (University of Bern) introduced the audience to challenges in the computational simulation of biologically relevant processes. He could demonstrate that certain strategies offer large advantages to traditional methods with respect to time constraints, but retaining the predictive power of these methods. **Dominik Brühwiler** (University of Zurich) gave an overview of solid state approaches relevant for photonics and solar cell applications. Moreover, he presented an interesting concept for the generation of highly efficient luminescent solar concentrator devices. The scientific part was closed after the lecture by **Martin Albrecht** (University of Fribourg) on non-classical carbenes. He was able to utilize these compounds as ligands in catalysis and found several interesting applications in hydrogenation or cross coupling.

The scientific part of the morning gave an interesting overview of the scientific activities currently pursued by young researchers in academia. It is interesting to observe which topics have been selected, as these selected areas will certainly impact research in Switzerland for some time, in particular when the young group leaders will strengthen their research activities and increase their group size.

The lunch break in a nearby Italian restaurant gave the participants the opportunity to get to know each other more personally and lively discussions took place over lunch. The afternoon program included two parallel workshops that gave the participants the opportunities to exchange experiences. The topics, which were chosen to address especially young faculty, were: 'funding opportunities', 'work/life balance', 'the cultural heritage of chemistry' as well as 'group organization and recruiting'.

Concerning 'funding opportunities', finding financial resources is of central importance for every research program. Therefore, young faculty members need to be aware of the different funding sources, and they might need mentoring and guidance towards a successful application. As there are many funding opportunities, young scientists who have recently moved to Switzerland found it difficult to gain an overview of all possibilities. The Swiss National Science Foundation (SNSF), which was for most of the participants the major funding resource, and the Swiss Confederation's Innovation Promotion Agency (CTI/KTI) were well known among the participants, as well as some larger company-based foundations. As a consequence, the participants concluded that a comprehensive list of public and private foundations would be very useful.

A discussion of the advantages and disadvantages of the different funding opportunities followed and some attendees had already broad experience with funding. They pointed out potential conflicts of interest between academic scientists and funding companies that may arise regarding the dissemination of scientific results. Some participants also shared their experience regarding the application process for industrial and KTI/CTI funding, which was perceived as very time consuming. In addition, European grant applications were described having a bad 'outcome/application effort' ratio, which might be a direct consequence of the extremely high competitive nature of these grants, limiting funding to below 5% of all applications. Finally, it was recommended to pool with other research groups for equipment and infrastructure applications.

As the second topic, the work/life balance of the individual participants was discussed. The participants agreed that they are under a considerable strain, and stated the need to work long hours, as there is only one chance for an academic career. Questions about a fair balance of the workload and other activities were raised by some participants, in particular those young scientists with family and children. Some participants pointed out the benefits of using modern communication technologies that allow



The conference participants of the 2008 young faculty meeting.

working almost anywhere and at any time. These tools results in more freedom where to work, but render it also more difficult to clearly separate between work and family or social life. Interestingly, roughly a third of all participants felt stressed (in a positive or negative way?) and complained about a shortage of sleep. The plenum agreed on the benefits of having administrative staff, and about half of the participants have access to administrative staff. Finally, everybody agreed on the importance to live as healthily as possible in order to identify symptoms of a beginning burnout or physical troubles as early as possible.

The question of recruiting and group management was also considered important for the young participants. It was generally stated that, as there is competition between young and established professors for the best talent, often the best master students join established groups. Another problem that was discussed concerned the recruitment of talented co-workers, especially from abroad. In many cases, PhD students are selected based on their paper credentials only, and no on-site interview takes place. In order to address this problem, the EPFL for example has a separate fund to allow group leaders to invite promising students for an interview at no cost for the lab in the context of their graduate school. Several participants advocated the hiring (and training) of master students as a prime source for excellent PhD students. In addition, job advertisement platforms such as TeleJob (www.telejob.ch) or the Gesellschaft Deutscher Chemiker (www.gdch.de) were found to be helpful. Graduate schools that have been established at the University of Zurich and the EPFL Lausanne were found helpful to identify promising students.

Finally, the issue of social contacts within the research group was discussed. These questions arise especially in newly established research groups, because of the smaller group size and the similar age between principal investigator and PhD students. There was a consensus among the participants that too much socializing with group members might be challenging. Organized activities as a dinner at the end of the year were found helpful, but informal social activities as “a beer after work” were mostly found inappropriate.

The cultural heritage of chemistry in Switzerland was the subject of the last part. Different ideas how to preserve the cultural heritage of chemistry were discussed, *e.g.* organizing special lectures in honor of great scientists at the Fall Meeting of the Swiss Chemical Society (SCS), or publishing short articles about highlights in chemistry and historical topics in CHIMIA. Furthermore, it was mentioned that discoveries of Swiss chemists should be part of the teaching in Bachelor and Master classes.

After a long day filled with interesting scientific expertise and stimulated discussions, the participants expressed their desire to repeat this event the next year. The Platform Chemistry of the Swiss Academy of Sciences (SCNAT) agrees with this suggestion and thanks all participants for their genuine interest.

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