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Conference Report

SCS Seminars 2017/1 on Process Chemistry,
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The seminar was held on the 16.–18. January 2017 in the Au Parc Hotel in Fribourg. It was a three-day interactive, educational event with a focus on topics relevant for the Swiss chemical and pharmaceutical industry that are not necessarily part of the academic curricula. The seminar was organized by David Spichiger from the SCS and Prof. Christian Bochet, University of Fribourg. The event was shaped by six excellent speakers from different chemical industries, including pharmaceutical, agriculture, fragrance, custom synthesis, food and chemical supply industry. Further twenty-nine students and three participants from companies attended the seminar. Most Swiss universities were represented with students coming from the University of Fribourg (9), ETH Zürich (5), University of Bern (4), EPF Lausanne (3), University of Basel (3), University of Geneva (2), University of Zürich (2) and Universität Freiburg (GER) (1).



After the opening remarks by David Spichiger and Prof. Christian Bochet, the first presentation of the seminar was given by Dr. Michaël Bersier, group leader at Lonza in Visp. The presentation offered an excellent introduction into the topic of process chemistry discussing the different priorities when choosing a synthetic route in academia and in industrial R&D. A special focus was set on the choice of chemicals, where it is of great importance that they are cheap, safe and recyclable. The concept step of telescoping (skipping the isolation of intermediate products) was then introduced. Using an electronic voting system with which the audience could answer questions in real time Dr. Bersier made this first presentation refreshingly interactive and immediately captivated the audience into the heart of the topic.

Starting with a discussion about the important steps from academic synthetic routes to industrial processes, the second lecture held by Dr. Tomas Smejkal – Senior Team Leader at Syngenta AG – gave deeper insights in process chemistry from the perspective of agrochemical research. After presenting

Syngenta as an interesting potential employer he explained in depth the basics of process development, what it means in terms of prioritizing synthetic routes, identifying problems and also some basics in preliminary cost estimation. Typical process conditions were presented giving a nice outline for the workshops of the next day. Dr. Smejkal concluded with a series of interesting examples out of the Syngenta portfolio to make this presentation a comprehensive summary of information concerning agrochemical process chemistry.

After lunch, all seminar attendees walked through the fresh air of the city to the School of Engineering and Architecture of Fribourg. The third speaker of the day was Dr. Fabrice Gallou, principal fellow at Novartis, who gave a lecture about process research and development. The talk offered the audience a perspective on the topic from the pharmaceutical industries point of view. It included a discussion about regulations, patents and good manufacturing practice (GMP). A few syntheses were analyzed and discussed. The discussion showed that green chemistry, while being too expensive for many other sectors, is a major priority for the pharmaceutical industry.



The next presentation at the School of Engineering and Architecture of Fribourg was given by Prof. Roger Marti. It was a brief presentation about chemical plant safety and upscaling issues. But the real highlight of this talk was the visit of the school's multipurpose plants. We were introduced to the different plant sites and laboratories which have the capacity to perform

reactions in scales from 500 mL up to 630 L. This state-of-the-art educational facility, at which students learn and develop their own skills in process chemistry, is also frequently used by industrial partners or start-ups for pilot plant and upscaling studies. This visit was one of the highlights of the seminar showing the importance of synergistic dialog between academic programs and hands-on experience.





Back at the hotel, the day's last talk was given by Dr. Elena Schaller, head of R&D and project management at Siegfried. In a very interactive talk, she gave insights into the work in a custom synthesis company. We were able to learn about the difference between drug discovery, lab-scale and the final processes, especially concerning drug regulations and safety issues that an academic lab researcher might not be aware of when it comes to upscaling to ton scale. Also the important step of choosing the right site for

production – which is especially important for globally acting companies like Siegfried has been discussed. She concluded with insights into the tight timeframe for process design in customer synthesis.

In the second to last talk, Dr. Heiko Oertling, Senior Scientist for Flavor Science at Nestlé, presented how corporate research can have its impact on the academic world and what fundamental research in large corporations looks like. The presented research concerning co-crystallization and dissolution properties of these co-crystals showed the possible synergies of fundamental research and applications very well. Even though the audience had to use its imagination on how these findings could be applied to real products (as the applications were still confidential), it was a great talk about fundamental science in applied research.

The final speaker of the seminar was Dr. Felix Flachsmann, group leader at Givaudan. He provided an introduction about Givaudan and then discussed the syntheses of three new plant odorants: Rosifolia™, Shisolia™ and Tonkarose™. Further challenges which the fragrance industry has to face were discussed, such as providing products with specific properties for different applications like sunscreen and washing powder while maintaining a low price. As a special treat the audience was given fragrance samples, including an original perfume which was recovered from the sunken Titanic in 2000.

The first day was concluded with a poster session combined with a dinner buffet.



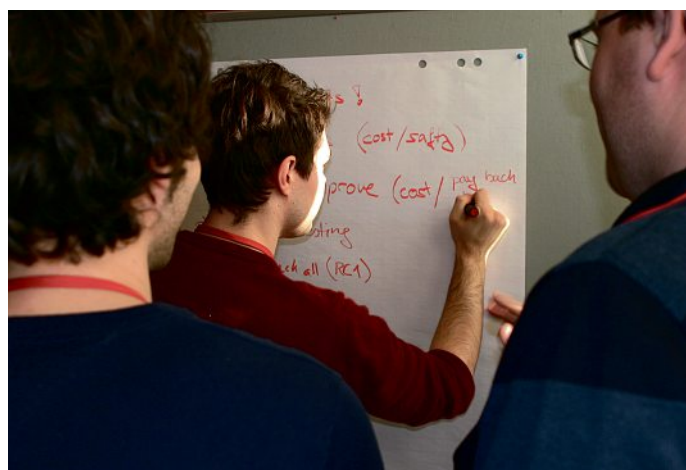
For the workshops the participants were split into three groups. The goals and conditions of the workshops were deliberately left undefined for students and coaches, so not to hinder creativity. Only general keywords were given to orient the focus of each work group. Under the supervision of Dr. Oertling and Dr. Schaller, Dr. Gallou and Dr. Smejkal as well as Dr. Bersier and Prof. Marti, the groups worked either on alternative synthetic routes for existing molecules in combination with regulatory issues and intellectual properties or on an example of the scaling issues due to yield optimization and waste management for synthetic steps out of the participants everyday research. Thus, everyone was able to get hands-on insight into the work of process chemists in industry.

The overall workshop was very well prepared. The results were discussed with the other workshops on the last day in the form of presentations and a poster.



The seminar dinner, which was also attended by members of the SCSF board, closed the second day. During the dinner the groups of SCSF board members, participants and presenters of the workshop mingled for more fruitful discussions. From the personal opinion of the authors, it was truly delightful and stimulating to discuss the Swiss research landscape, research politics and also their own research in the course of their PhD theses.

On the third day the participants presented and discussed the results of the workshops. Ten people gave short presentations with vivid discussions of their findings, which were followed by a live-poster session to give all participants a stage. After the closing remarks given by Mr. Spichiger and Prof. Bochet, the lunch officially closed the seminar. Dr. Gallou spontaneously offered to give an additional Q&A session in the afternoon about the job market situation and the application process. This session was attended by most participants.



The seminar was very well organized and offered a new and diverse perspective on the topic of process chemistry. Speakers were excellently chosen, covering each major field of chemical industry and they encouraged active participation of the students. There also was plenty of room for networking. The accessibility of the industry experts and the friendly atmosphere were highly appreciated.

The SCS seminars will return next year with two new editions.

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