SCS
Swiss Chemical Society
Division of Chemical Education

Symposium with Workshops

Future of Chemical Education

15.9.2016 University Zürich Irchel

June 2016

Within the framework of the Fall Meeting of the Swiss Chemical Society (SCS) the 15.9.2016 at University of Zürich Irchel, the symposium "Future of Chemical Education" for educators in chemistry, which occupy themselves with theoretical, practical and experimental aspects of chemistry teaching at universities, advanced technical and teacher training colleges, as well as highschools and secundary schools, takes place for the first time.

The symposium launches the formation of the new SCS-Division of Chemical Education and will strengthen the horizontal and vertical exchange among chemical educators and also facilitate contact and access to chemists working in research or industry in Switzerland. The contents of the symposium and workshops shall enrich and amend the chemistry and the way it is tought in classrooms, laboratories or lecture halls. In this spirit we like to invite you sincerely to the symposium "Future of Chemical Education".

Organising committee 2016 „Future of Chemical Education"

Antonio Togni Roger Alberto Hans Peter Lüthi Amadeus Bärtsch Klemens Koch Markus T. Müller

Programm 2016: „Future of Chemical Education" (SCS DCE):

Zeit	**Referent/en**	**Title** (Language: German or English)
08:30 h	Registration	*Welcome coffee*
09:00 h	Prof. Antonio Togni *Lab. of Inorg. Chemistry, ETH Zürich*	*Welcome message*
09:15 h	Prof. Michael Tausch *Bergische Universität Wuppertal, D*	*All we need is Light – Mehr Licht im Chemieunterricht*
10:00 h	Prof. Hans Jakob Wörner *Lab. of Physical Chemistry, ETH Zürich*	*Attosecond Spectroscopy: Watching Electrons in Motion*
10:45h	Pause	
11:00 h	Prof. Catherine E. Housecroft *Dep. of Chemistry, Uni Basel*	*Development of Chemistry Textbooks – an Interactive Process*
11:45 h	Prof. Wendelin Jan Stark *Inst. of Chem. and Bio-Ing. Siences, ICB ETH Zürich*	*Young Entrepreneurs in Chemistry: Getting out of the Laboratory*
12:30 h	Mittagspause	*Poster Session der SCS*
13:30 h	**Workshop-Sessions A-D** of the SCS DCE or Sessions of other SCS Divisions	*Detailed program see below*
17:00 h	Prof. Michael Grätzel *Inst. des sciences et ingénierie chimique, EPF Lausanne*	*Paracelsus Award Lecture* *(part of the SCS general Fall Meeting program)*
18:30 h	Abendessen (Anmeldung)	

** Arbeitstitel*

Programme

Bringing Light into Chemistry Classroms

Michael Tausch opens the plenary session with "All we need is light". In his talk he will illuminate chemistry classrooms of the future and and demonstrate in workshop **C1** a Photo-Blue-Bottle-Experiment for the laboratory. The laboratory workshop **C2** of Franziska Krieg (Prof. Maksym Kovalenko) shows, how fluorescent Cs-Pb-X Perovskit nanocristalls can easily be produced in the laboratory. Hansrudolf Dütsch demonstrates in his lab-workshop **C4** the making of glow sticks and the synthesis of a chemiluminescent oxalic acid ester TCPO. The seminar **A3** of Roger Alberto summarizes actual research trends in the field of "Artificial Photosynthesis" and its possible impact for the energy transition in the near future.

Can we see Molecules, Atoms and Electrons?

The question, whether one can see atoms or molecules will allways be essential in chemsitry classrooms of all levels. The second plenary lecture of Hans Jakob Wörner will show how far he can experimentally go using attosecond spectroscopy to observe and visualize electron motions in molecules. Another way of visualizing what happens on the level of molecules during chemical reactions is demonstrated in the computer workshop **D1** of Moritz Haag and Alain Vaucher (Prof. Markus Reiher). They will present their computer program to explore chemical reactions and reaction mechanisms by playing in a 3D environment with the molecules, bonds and active sites. In workshop **D3** Hans Ueli Ehrensperger presents with the *Atomarium* a program to visualize and explore processes as diffusion, osmosis, cristallisation, changes in state of aggregation and many more in the 2- and 3-dimensional space. Urs Leisinger persents in workshop **D4** how he used Jsmol for his website *www.molek.ch* to visualize molecules, cristalls, complexes and orbitals and much more and how this site can be implemented in our classrooms. Marie-Claude Blatter shows in the *Drug-Design Workshop* **D2** how drug-design works and how easily students can design an own molecule and have it tested by the program on the target rezeptors and compare the interaction in relation to known drugs.

Chemistry textbook and Electronic Media

Catherine Housecroft illustrates in the third plenary talk how nowadays chemistry textbooks are developed and continuously improved over interactive processes. She will also talk about her experiences, the developement and the future potential of the e-learning tools accomapnying her textbooks. Carlo Thilgen and Bernhard Jaun present in the seminar **B1** their 10 year experiences using Moodle as e-learning platform and trainings tool for the OC1 and OC2 lecture. They will also show new tools to draw molecules and reaction mechanisms within Moodle. Niels Sievertsen introduces in workshop **B2** his App "Advanced Problems in Organic Chemistry" (apoc), with which students can study and solve problems of organic chemistry using their smart-phone or tablet computer. Markus Müller shows in the seminar **B3** the problematics of the highschool to university transition from a student- and highschool teacher perspective, and how assimilation can be improved and diversity can be handled. The results of two different Moodle assessments at the beginning of the 1st Semester 2015 and the position-fixing 2016 about basic chemistry knowledge are presented.

From Chemistry to Practice

In the 4th plenary talk Wendelin Stark talks about the transition from university to practice and shows on the basis of examples from his research group, that the foundation of a start-up and the attendance of young entrepreneurs can also work in the field of chemistry. Some of the works of his research group are presented by Robert Grass in the laboratory workshop **C2** about Nanotechnology and functional Polymers to make these topics and applications accessible for the chemistry classes and practical experience.

Chemical knowledge and Visualization of Chemical Processes

Paolo Lubini and Michele D'Anna present in Seminar **A1** the role and implementation of the chemical potential and entropie in highschool chemistry teaching in the canton of Ticino. Juraj Lipscher focusses in his seminar **A2** on what we really know about climate change. Very fast chemical reactions have been filmed by Giorgio Zambrino and Lukas Sigrist using high-speed cameras and slowed down to Super-Slow-Motion Movies that are presented in the seminar **A4**. The role of emulsions in chemistry is presented by Peter Hild in his experimental workshop **C5** about day- or night crème. Marcel Ottinger presents in Workshop **D5** a new edition of the "Kurt Pfefferkorn" animations.

Workshop-Sessions A-D "Future of Chemical Education"

Work shop	**Referent/en** Workshop-Session A– Seminar (SekI / SekII / BS)	**Title (*working title), workshops are held in German (G) or English (E)**
A1	Dr. Paolo Lubini, *Liceo Cant. Lugano 2* Dr. Michele D'Anna, *Liceo Cant. Locarno*	*Chemical Potential and Entropie in Highschool Chemistry – Why not? (G)*
A2	Dr. Jurai Lipscher, *Rupperswil*	*Climate Change – What we really know? (G)*
A3	Prof. Roger Alberto, *Uni ZH* Dr. Urs Leutenegger, *KS Zug*	*Artificial Photosynthesis* (G)*
A4	Giorgio Zambrino, *KS Enge* Lukas Sigrist, *ETH Zürich*	*Chemical Reactions in Super-Slow-Motion (G)*

Work shop	**Referent/en** Workshop-Session B – Seminar (FH / PH / HS)	**Title (*working title)**
B1	Prof. Carlo Thilgen, *ETH Zürich* Prof. Bernhard Jaun, *ETH Zürich*	*The use of Moodle in OC1 & OC2 lectures (Exercises, training, exams?)**
B2	Niels Sievertsen, *ETH Zürich*	*Advanced Problems in Organic Chemistry (apoc) at Students' Fingertips*
B3	Dr. Markus T. Müller, *KS Frauenfeld* Prof. Antonio Togni, *ETH Zürich* Prof. Carlo Thilgen, *ETH Zürich*	*The Highschool - University - Interface on the example of AC1 und OC1 and results of self-evaluation in AC1/OC1 HS2015 & 2016*
B4		

Work shop	**Referent/en** Workshop-Session C Chemistry Laboratory	**Titel (*working title)**
C1	Prof. Michael W. Tausch, *Bergische Universität Wuppertal, D*	*Photo-Blue-Bottle – A model experiment for the photo-synthesis – respiration cycle*
C2	Dr. Robert Grass, *ETH Zürich*	*Nanotechnology and functional Polymers for highschool chemistry*
C3	Franziska Krieg et. al, *ETH Zürich* Prof. Maksym V. Kovalenko, *ETH Zürich*	*Simple synthesis of highly fluorescent Cs-Pb-Halide-Perovskite Nanocristalls – a colourful Laboratory for Highschools*
C4	Dr. Hansrudolf Dütsch, *Zürich*	*Glow sticks and synthesis of a chemiluminescent oxalic acid ester TCPO*
C5	Pitt Hild, *PH Zürich*	*Day creme or night creme?* *Emulsions in the lab and classroom*

Work shop	**Referent/en** Workshop-Session D Computerraum(Visualisierung, Animation, Simulation)	**Titel (*working title)**
D1	Dr. Moritz Haag, *ETH Zürich* Alain Vaucher, *ETH Zürich* Prof. Markus Reiher, *ETH Zürich*	*Interactive Exploration of Chemical Reactivity in Education (3D-Modelling of chemical reactions)*
D2	Dr. Marie-Claude Blatter, *SIB Geneva* Dr. Antoine Daina, *SIB Geneva* Dr. Vincent Zoete, *SIB Geneva* *SIB: Swiss Inst. of Bioinformatics*	*Computer-Aided Drug Design explained in a few simple steps (Drug Design Workshop)*
D3	Dr. Hans Ueli Ehrensperger, *Frauenfeld*	*Visualisations in Chemistry - the Atomarium and other Animations*
D4	Dr. Urs Leisinger, *KS Zug*	*Visualisations of molecules, complexes, cristall structures using JSmol - www.molek.ch*
D5	Marcel Ottiger, *Hedingen*	*New edition of the „Kurt Pfefferkorn" animations*

Workshop: Zeitplan und Räume

Zeit Raum				
13:30 - 14:15h	A1	B1	C1	D1
14:15 - 15:00h	A2	B2	C2	D2
15:15 - 16:00h	A3	B3	C3 & C5	D3
16:00 - 16:45h	A4	D5	C4	D4

Plan