



SusChem Switzerland

A CHIMIA Column

National Technology Platform for Sustainable Chemistry in Switzerland



SusChem Switzerland, Phase II

Edouard Godineau*

*Correspondence: Dr. E. Godineau, Process Research Chemistry, Syngenta Crop Protection Werk Stein, Schaffhauserstrasse, CH-4332 Stein
E-mail edouard.godineau@syngenta.com

Keywords: Green & Sustainable Chemistry · SusChem

We are all observers of the impact of climate change. The consumption – at an increasing pace – of our world's finite amount of natural resources, the continuous increasing release of CO₂ and other greenhouse gases in highly impacting amounts^[1] are two very clear challenges for society, which needs answers and solutions. Such utmost challenges place sustainability on the very top of the agenda of both industry and academia.

Within the chemistry community, in the past 15 years, a fair number of initiatives have appeared to tackle these highly relevant environmental challenges. In 2005, a global consortium of pharmaceutical corporations together with the ACS Green Chemistry Institute[®] formed the ACS GCI Pharmaceutical Roundtable.^[2] This organization has promoted, over the years, innovations within the field of Green and Sustainable Chemistry (G&SC).^[3] In 2012, a European-lead effort was initiated and resulted in the creation of the highly useful learning and educational platform CHEM21,^[4] which raises awareness of researchers towards sustainable manufacturing concepts. These initiatives are only two among many other networks which exist today, and which cannot exhaustively be listed here.

G&SC has also become part of master degree educational programs. *Circular economy*,^[5] a concept coined at the beginning of the current decade, is in particular taught in such programs. Students are therefore getting a preliminary view on how to respond to the immediate demand for more sustainability in the way we produce and consume. Minimizing the energy required for a particular chemical transformation, valorizing waste and searching renewable substitutes to fossil feedstock are clear research directions taken by numerous groups, organizations and academic institutes worldwide.

These environmental challenges have not escaped the attention of the Swiss Chemical Society (SCS) who adopted an active role in addressing such high societal concerns. SCS has been hosting, since 2013, *SusChem Switzerland*,^[6] which is the Swiss entity of the *SusChem*^[7] European Technology Platform for Sustainable Chemistry. In addition, SCS proactively promotes G&SC via co-organization of the *Clariant Clean-Tech award* (recognition of students who have distinguished themselves with outstanding scientific achievements in areas such as resource efficiency, renewable energy, renewable raw materials or green technologies and environmental protection). Finally, in 2017, the DIAC division of the SCS put together a high-quality symposium on 'Green-Chemistry – from Concept to Reality' where a number of sustainability-improving innovations from both industry and academia were presented.

Well-aware of the growing relevance of G&SC, the SCS clearly expressed in 2017 a strong wish to accelerate and further emphasize its support in this direction. To this end, the SCS support-

ed the formation of a working group composed of scientists from the industry (Maud Reiter, Firmenich; Fabrice Gallou, Novartis Pharma AG; Edouard Godineau, Syngenta Crop Protection) and from academia (Paul Dyson, EPFL; Christophe Copéret, ETH Zürich) in charge of promoting further SCS support to G&SC within Switzerland. This group (further supported by Hans-Peter Lüthi and David Spichiger) is now forming one single entity with *SusChem Switzerland*.

The refreshed SusChem Switzerland team set itself the following challenges:

- **Provide greater visibility** about ongoing actions on G&SC within Switzerland.
- **Further educate on G&SC** at various levels (*i.e.* students, academia, industrials, if possible, non-scientists as well). Promote communication on sustainable processing, provide sound and fair comparisons between the benefits of chemical and the benefits of naturals. Provide visibility and understanding to sustainably indexes.
- **Innovate in the field of G&SC** by bringing to life novel and pre-competitive scientific collaboration models between academia and industry. To the former to drive the science, to the latter to implement it.
- **Identify common area of interest(s)** by taking advantage of Switzerland's unique portfolio of high-tech chemical companies to build cross-sectorial collaborations (ex: on solvents, catalysis, use of renewable feedstock, *etc.*...).
- **Act as influencing group to match the interests of academia and industry** (ex: catalysis recyclability, renewable feedstocks, *etc.*...).

The G&SC team is starting its concrete activities this fall, during the ILMAC fair, taking place in Basel.^[8] A program was put together with contributors coming from Swiss industries and academia, which we hope will attract many scientists. More detailed about this free-to-attend event can be found at <https://scg.ch/ilmac/2019>.

Let me in particular focus on a special event that will be taking place on Thursday late-afternoon September 26th. In a 'TED-inspired' type lectures format, Professor John Warner and Dr. Rafael Cayuela will be inspiring us and telling us about more scientists who are bringing along fantastic innovations to tackle the world's sustainability challenges. A panel discussion will follow, which we hope to be a constructive forum as well a unique networking opportunity for open discussions on sustainability. We truly hope to be counting on you there.

Edouard Godineau, on behalf of the *SusChem Switzerland* team

Biographical Sketches

Greet Van Eetvelde holds engineering degrees in bioscience and chemistry, an advanced Master's degree in environmental sciences, and a PhD from Ghent University in Belgium. In 1994 she was granted a British Council fellowship at Building Research Establishment in outer London. Appointed professor in 2000, she leads the Energy & Cluster Management unit at the UGent faculty of Engineering and Architecture (10%), while successively heading the university's Environmental department and (in 2007)

becoming director of its Energy platform Power-Link as well as CEO of its Greenbridge science park.

Since 2011 she is employed at INEOS Europe AG where she is Group head of Energy & Innovation Policy. She steers the pan-INEOS carbon & energy network and directs research & innovation projects tackling grand industrial climate challenges. She represents INEOS in the Cefic Climate & Energy as well as Research & Innovation programme councils, is INEOS' delegate in the SPIRE partnership, and is chairwoman of SusChem Switzerland. In April 2015 she was assigned visiting professor at EPFL in Switzerland, in the Industrial Process and Energy Systems Engineering group.

Maud Reiter is the Director of New Ingredients Discovery at the corporate R&D Division of Firmenich S.A. in Geneva (Switzerland). Maud received her undergraduate degree from Imperial College, London in 2002, followed by a DPhil under the supervision of Professor Véronique Gouverneur at the University of Oxford. After postdoctoral work with Professor David MacMillan at Caltech/Princeton University, Maud joined Merck& Co. in 2008 in Rahway, NJ, USA as a medicinal chemist. In 2011, Maud moved into her current position at Firmenich, where she is overseeing the discovery of novel & sustainable perfumery ingredients.

Edouard Godineau received his PhD from the University of Bordeaux in 2007, with Prof. Yannick Landais. After a post-doctoral stay with Prof. A. Fürstner, he joined Syngenta Crop Protection in 2009 as a process chemist. Since 2014, he is leading the process chemistry group at Syngenta where he is responsible to identify and design most cost-effective possible synthetic routes to new active ingredients.

Fabrice Gallou received his PhD from The Ohio State University, USA, in 2001 in the field of natural products total synthesis. He then joined Chemical Development at Boehringer Ingelheim, USA. He subsequently moved in 2006 to the Chemical Development group at Novartis, Switzerland, where he is now responsible for global scientific activities worldwide, overseeing development and implementation of practical and economical chemical processes for large scale production of active pharmaceutical ingredients (APIs).

Prof. Christophe Copéret – PhD in chemistry with Prof. E.i. Negishi (1996) followed by a postdoctoral stay with Prof. K.B. Sharpless (Scripps), started his career at CNRS in 1998 and was promoted CNRS Research Director in 2008. Since 2010, he is Professor in the Department of Chemistry and Applied Biosciences, ETH Zurich. His scientific interest lies at the frontiers of molecular, material and surface chemistry as well as NMR spectroscopy with the aims to design molecularly-defined catalysts and efficient (sustainable) processes. He is involved in setting-up Cat+, an Opened Swiss Platform for High-Throughput Experimentation, he is a board member of SCS and currently President of the Platform Chemistry of SCNat.

Prof. Paul Dyson is a professor at the EPFL with research interests in sustainable chemistry, mostly linked to the development and application of new greener solvents, catalytic processes and the use of renewable starting materials such as biomass and carbon dioxide. Based on technology developed in his group he co-founded Embion Technologies that is producing naturally derived prebiotics. In 2018 he received the European Sustainable Chemistry Award of the European Chemical Society for his multidisciplinary initiatives in the field of green and sustainable chemistry.

Hans P. Lüthi, Director SCS Foundation, obtained his MSc and PhD degrees in chemistry from ETH Zurich and the University of Zurich. After post-doctoral studies at the IBM Almaden Research Center in San Jose, California, and a visiting professorship at Minnesota Supercomputer Institute, he returned to ETH Zurich in 1987, where he was involved in the creation of the Swiss National Supercomputing Center. Later, he joined the ETH Department of Chemistry and Applied Biosciences as an adjoint professor. His research interests are in molecular modeling and design. He is currently the treasurer of the Swiss Chemical Society (SCS) and director of the SCS Foundation.

Eric Plan, MSc Mechanical Engineering EPFL, is the Head of energy and environment initiatives at CimArk Ltd in Sion. He led on-site measurement campaigns in Asia/USA for ABB Power Generation (now GE). Joined 1996 the Swiss State Secretariat for Economic Affairs (SECO) as deputy manager for the STEG unit (safety of technical installations). Since 2010, he is General Secretary of CleantechAlps, the cleantech leading cluster in Switzerland and managed SusChem Switzerland's secretariat till spring 2019. During his many years of practical experience in the field, he has developed particular networks within the political, governmental, economic, academic and financial spheres, and plays an active role in both national and international networks in crosscutting industrial branches.

About SusChem (suschem.eu)

SusChem is the European Technology Platform for Sustainable Chemistry. It is a forum that brings together industry, academia, policy makers and the wider society.

SusChem's vision is for a competitive and innovative Europe where sustainable chemistry and biotechnology together provide solutions for future generations.

SusChem's mission is to initiate and inspire European chemical and biochemical innovation to respond effectively to societal's challenges by providing sustainable solutions.

SusChem was officially launched in 2004 as a European Commission supported initiative to revitalise and inspire European chemistry and industrial biotechnology research, development and innovation in a sustainable way.

In partnership with European and national public authorities, SusChem contributes to initiatives that aim to provide sustainable solutions to society's big challenges. Together we develop and lead large-scale, integrated research and innovation programmes with chemical sciences at their core. These public private initiatives link research and partners along the value chain to real world markets through accelerated innovations.

SusChem Switzerland

SusChem is also a network of national platforms as the European vision needs to be firmly rooted in the national strategies.

SusChem depends vitally on the partnerships with member states to provide information on national strategies and priorities. The national platforms work on initiatives within their own countries and also in joint NTP initiatives through the network organisation. The Swiss Chemical Society hosts the Swiss NTP of SusChem since 2013.

-
- [1] C. Le Quéré, *et al.*, *Earth Syst. Sci. Data* **2018**, *10*, 2141.
- [2] <https://www.acs.org/content/acs/en/greenchemistry/industry-roundtables/pharmaceutical.html>
- [3] S. G. Koenig, D. K. Leahy, A. S. Wells, *Org. Proc. Res. & Dev.* **2018**, *22*, 1344.
- [4] <https://www.chem21.eu/>
- [5] G. Kaur, K. Uisan, K. Lun Ong, C. Sze Ki Lin, *Curr. Opin. Green Sus. Chem.* **2018**, *9*, 30.
- [6] <http://www.suschem.ch/>
- [7] <http://www.suschem.org/>
- [8] <https://scg.ch/ilmac/2019>