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Continuous Flow Synthesis of Medicines

Peter Seeberger, PhD

Max Planck Institute of Colloids and Interfaces, Potsdam, Germany

4:00 p.m. Monday, October 17th, 2022
Wolfe Hall 1205

Peter H. Seeberger

Peter H. Seeberger studied chemistry in Erlangen (Germany) and completed a PhD in biochemistry in Boulder (USA). After a postdoctoral fellowship at the Sloan-Kettering Cancer Center Research in New York he advanced to tenured Firmenich Associate Professor of Chemistry at MIT. After six years as Professor at the Swiss Federal Institute of Technology (ETH) Zurich he assumed positions as Director at the Max-Planck Institute for Colloids and Interfaces in Potsdam and Professor at the Free University of Berlin in 2009. In addition, he serves as honorary Professor at the University of Potsdam. From 2003-2014 he was Affiliate Professor at the Sanford-Burnham Institute for Medical Research (La Jolla, USA). Since 2021, he is a Vice President of the German Research Foundation (DFG) the main funding body in Germany. He is a member of the governing body of the Max-Planck Society ("Senate"). Professor Seeberger's research on the chemistry and biology of carbohydrates, carbohydrate vaccine development and continuous flow synthesis of drug substances spans a broad range of topics from engineering to immunology and has been documented in over 610 peer-reviewed journal articles, four books, more than 50 patents, over 200 published abstracts and more than 900 invited lectures. This work was recognized with more than 35 international awards from the US (e.g. Arthur C. Cope Young Scholar Award, Horace B. Isbell Award, Claude S. Hudson Award from the American Chemical Society), Germany (e.g. Körber Prize for European Sciences, Wissenschaftspreis des Stifterverbandes, Emil Fischer Medal), Holland (Havinga Medal), Israel (Honorary Lifetime Member Israel Chemical Society), Japan (Yoshimasa Hirata Gold Medal), Switzerland ("The 100 Most Important Swiss"), the Philippines ("Gusi Peace Prize") and international organizations (Whistler Award 2012, Int. Carboh. Soc.). In 2013 he was elected to the Berlin-Brandenburg (Prussian) Academy of Sciences. Peter H. Seeberger greatly

supports the idea of open access publishing as the Editor-in-Chief of the Beilstein Journal of Organic Chemistry and serves on the editorial advisory boards of many other journals. Through his work in the area of neglected diseases, Peter Seeberger has become involved in philanthropic causes. He is a co-founder of the Tesfa-Ilg "Hope for Africa" Foundation that aims at improving health care in Ethiopia that recently helped to build a bed-net factory and established an IT training center. The research in the Seeberger laboratory has given rise to nine successful companies in the USA, Switzerland, Denmark and Germany.

Selected Recent Scientific Contributions

1. Hsu, W.-h.; Reischauer, S.; Seeberger, P. H.; Pieber, B.; Cambié, D.: Heterogeneous metallaphotoredox catalysis in a continuous-flow packed-bed reactor. *Beilstein Journal of Organic Chemistry* 1123 - 1130 (**2022**)
2. Guidi, M.; Moon, S.-Y.; Anghileri, L.; Cambié, D.; Seeberger, P. H.; Gilmore, K.: Combining radial and continuous flow synthesis to optimize and scale-up the production of medicines. *Reaction Chemistry & Engineering* 6 (2), 220 - 224 (**2021**)
3. Sletten, E. T.; Danglad-Flores, J. A.; Nuño, M.; Guthrie, D.; Seeberger, P. H.: Automated glycan assembly in a variable-bed flow reactor provides insights into oligosaccharide–resin interactions. *Organic Letters* 22 (11), 4213 - 4216 (**2020**)
4. Guidi, M.; Seeberger, P. H.; Gilmore, K.: How to approach flow chemistry. *Chemical Society Reviews* 49 (24), 8910 - 8932 (**2020**).
5. Guberman, M.; Pieber, B.; Seeberger, P. H.: Safe and scalable continuous flow azidophenylselenylation of galactal to prepare galactosamine building blocks. *Organic Process Research & Development* 23 (12), 2764 - 2770 (**2019**)
6. Tiwari, V.; Singh, A. K.; Chaudhary, P.; Seeberger, P. H.; Kandasamy, J.: Synthesis of photolabile protecting group (PPG) protected uronic acid building blocks: applications in carbohydrate synthesis with the assistance of a continuous flow photoreactor. *Organic Chemistry Frontiers* 6, 3859 - 3863 (**2019**)
7. Pieber, B.; Gilmore, K.; Seeberger, P. H.: Integrated flow processing — challenges in continuous multistep synthesis. *Journal of Flow Chemistry* 7 (3-4), 129 - 136 (**2017**)
8. Plutschack, M. B.; Pieber, B.; Gilmore, K.; Seeberger, P. H.: The Hitchhiker's guide to flow chemistry. *Chemical Reviews* 117 (18), 11796 - 11893 (**2017**)
9. Chentsova, A.; Ushakov, D. B.; Seeberger, P. H.; Gilmore, K.: Synthesis of α-nitro carbonyls via nitrations in flow. *The Journal of Organic Chemistry* 81 (19), 9415 - 9421 (**2016**)

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