On Data, Discovery and Sensitivity in (Photo)Catalysis

Frank Glorius*

Institute of Organic Chemistry, University of Muenster, Corrensstr. 40, 48149 Muenster, Germany
glorius@uni-muenster.de, https://www.uni-muenster.de/Chemie.oc/glorius/

Catalysis is a key technology, since it allows for increased levels of selectivity and efficacy of chemical transformations. While significant progress can be made by rational design or engineered step-by-step improvements, many pressing challenges in the field require the discovery of new and formerly unexpected results. Arguably, the question "How to discover?" is at the heart of the scientific process. In this talk, (smart) screening strategies for accelerated discovery and improved reproducibility will be presented,[1] machine learning for chemistry will be discussed,[2] together with new photocatalytic transformations.[3,4] If time allows, an additional exciting area will be addressed briefly:

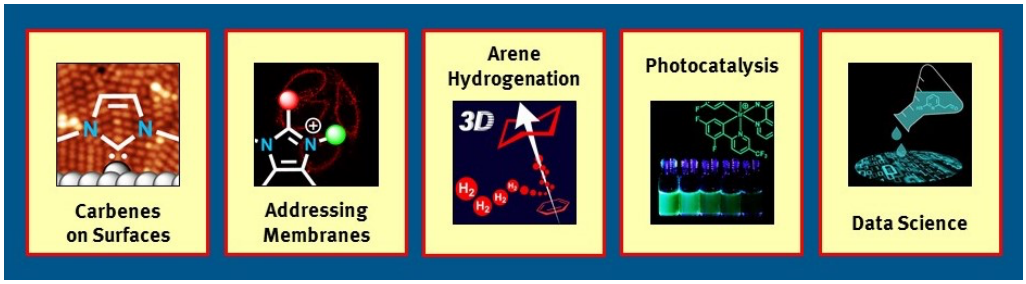

Figure 1.

Biological membranes and their constituents are some of the most important and fundamental building blocks of life. However, their exact role in many essential cellular processes as well as in the development of diseases such as cancer or Alzheimer's is still not very well understood. Thus, we design, synthesize and evaluate imidazolium-based lipid analogs that can integrate into biological membranes and can be used as probes for live cell imaging or to manipulate membranes.[5]

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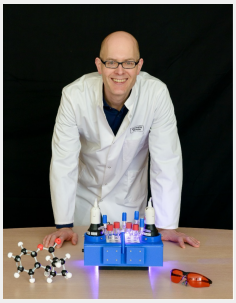

Universität Münster

Frank Glorius *studied chemistry at the University of Hannover, including a 9 month research stint to the group of Paul Wender at Stanford University. After a PhD with Andreas Pfaltz at the Max-Planck-Institut für Kohlenforschung and University of Basel, he did a postdoctoral stay with the late David A. Evans at Harvard University. In Summer of 2001 Frank started his independent career at the MPI für Kohlenforschung and became Assoc. Prof. at the University of Marburg in 2004. Since 2007 he is Full Professor at the University of Muenster. His research program for one focuses on the development of new concepts for diverse areas of catalysis such as photocatalysis, C-H functionalization, smart screening and data-based technologies including machine learning, N-heterocyclic carbenes (NHCs) in organocatalysis and in (asymmetric) arene hydrogenation. He is also interested in the design of functional molecules for modern batteries, surface modification (with NHCs) and in-membrane applications. He has published nearly 500 peer reviewed papers, many of which are highly cited (Clarivate/Thomson Reuters Highly Cited Researcher, each year since 2014). His work was highlighted by several awards such as the German Leibniz Award, the Emil Fischer Medal of the GDCh, the American ACS Cope Scholar Award, the Japanese Mukaiyama Award or MSD Award of the British RSC. He is most proud on the more than 180 excellent group members he has mentored, many of which have become leaders in industry and academia themselves.*