Young Career Focus: Dr. Bernd M. Schmidt (Heinrich Heine Universität, Germany)

Background and Purpose. SYNFORM regularly meets young up-and-coming researchers who are performing exceptionally well in the arena of organic chemistry and related fields of research, in order to introduce them to the readership. This Young Career Focus presents Dr. Bernd M. Schmidt (Heinrich Heine Universität, Germany).

Biographical Sketch

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Dr. B. M. Schmidt

Bernd M. Schmidt completed his Ph.D. studies with Dieter Lentz at the Freie Universität Berlin, Germany, and with Hidehiro Sakurai at the Institute for Molecular Science in Okazaki, Japan, where he worked on aromatic buckybowls. Bernd received a Humboldt research fellowship to work with Makoto Fujita at the University of Tokyo, Japan, and Stefan Hecht at the Humboldt University of Berlin, Germany. Since February 2018, he has been an independent research group leader at Heinrich Heine Universität (HHU), Düsseldorf, Germany. He became a member of the Young Academy of the North Rhine-Westphalian Academy of Sciences, Humanities, and the Arts in 2020, where he served as speaker from 2021–2023. In 2023, he was accepted into the prestigious Heisenberg Programme from the German Research Foundation (DFG) to continue his group's work investigating functional and responsive supramolecular systems. Bernd is Germany's Young Investigator 2020 of the EuChemS Division of Organic Chemistry (YIW2020) and is a recipient of the Dr. Otto Röhm Memorial Foundation Award (2022), a JSPS BRIDGE Fellowship (2022), and a Thieme Chemistry Journals Award (2024).

INTERVIEW

SYNFORM *Which field of organic chemistry are you interested in the most and why?*

Dr. B. M. Schmidt I am particularly interested in supramolecular chemistry within the field of organic chemistry. In our research group, we leverage self-assembly to develop novel compounds and materials, spanning from individual molecules to intricate assemblies. Our aim is to explore the interdisciplinary applications of supramolecular structures in materials chemistry, photochemistry, macromolecular chemistry, and biochemistry.

SYNFORM *Following that, what is the focus of your current research activity?*

Dr. B. M. Schmidt My research group deals with various aspects of supramolecular chemistry (Figure 1), such as porous imine-based organic compounds containing fluorinated motifs, which we were able to establish with a series of publications. This is complemented by our pioneering work in the field of mechanoresponsive macromolecular supramolecular systems for releasing guests from aqueous solutions, as well as supramolecular building blocks that react to visible light. We combine the possibilities of organic synthesis chemistry with the self-organisation of complex molecular structures and molecular recognition in solution and in the solid state.

In the beginning of 2024, we published our work on multifold post-modification of macrocycles and cages by isocyanate-induced azadefluorination cyclisation. For this project, we designed suitable building blocks using organic chemistry knowledge, self-assembled them using dynamic-covalent imine chemistry, and transformed the supramolecular structures into (non-dynamic) covalent compounds by reduction with sodium borohydride. Reactive isocyanates can be used to introduce functional groups into the cages

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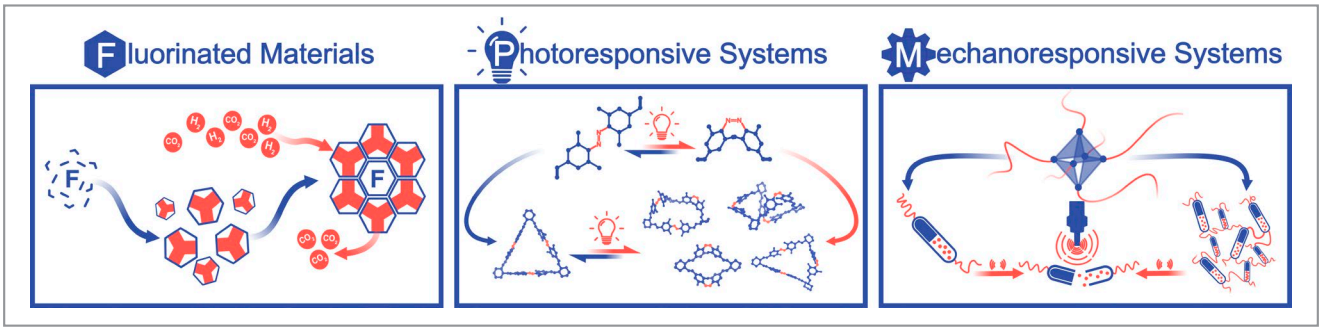

Figure 1 Current areas of research in the Schmidt group: fluorinated materials, photoswitchable supramolecular assemblies, and ultrasound-induced mechanochemistry in complex systems.

and macrocycles, leading to rigid and chemically stable molecules that can undergo further reactions. It is a dream to use concepts like this, combining the strength of supramolecular chemistry, the one-step self-assembly of complex structures, with the power of organic chemistry to make further precise modifications thereof.

SYNFORM *What do you think about the modern role and prospects of organic chemistry?*

Dr. B. M. Schmidt Organic chemistry provides the foundation for understanding the structure, reactivity, and synthesis of organic molecules, which are essential building blocks in supramolecular systems. Supramolecular chemists can then design and construct a wide range of molecular architectures with tailored properties and functions. In terms of prospects, organic chemistry continues to play a vital role in driving innovation and advancing scientific knowledge, extending over various fields, particularly within the dynamic and rapidly evolving field of supramolecular chemistry.

SYNFORM *Which difficulties are there for young upcoming chemists in your field? Do you have any tips?*

Dr. B. M. Schmidt The status of junior researchers in Germany, particularly in the phase before obtaining a lifetime professorship, is currently varied and often not aligned with their responsibilities in this important qualification phase. In contrast to counterparts abroad, who often have clearly defined roles (e.g., assistant professor) with specified rights and duties, Germany lacks nationwide uniform standards. Even when standards are proposed by funding organisations, such as for Emmy Noether research groups, implementation might vary. As a result, individuals frequently need to advocate for their rights in order to carry out their work effectively.

I co-authored a recent discussion paper on this topic in German (link).

SYNFORM *What is your most important scientific achievement to date and why?*

Dr. B. M. Schmidt My most significant achievement lies in the dedicated effort I've invested in nurturing and guiding the next generation of scientists. I take pride in training and preparing them for the challenges they may encounter in their future roles, regardless of the specific positions they choose to pursue. I am very grateful to see how they surpass themselves and find success.

The most important scientific achievement is always the next big project or paper for me, I do not like looking back.

SYNFORM *Could you tell us something about yourself outside the lab, such as your hobbies or extra-work interests?*

Dr. B. M. Schmidt I am an absolutely crazy foodie, and I love cooking (and eating), exploring things, restaurants, and everything. I also got into wine during the pandemic, so there's a whole new field to explore for me, too. I even interned in a restaurant before studying chemistry because I was wondering if I should become a chef.

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