

Young Career Focus: Dr. Sukalyan Bhadra (CSIR – Central Salt & Marine Chemicals Research Institute, India)

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. Sukalyan Bhadra (CSIR – Central Salt & Marine Chemicals Research Institute, India).

Biographical Sketch



Dr. S. Bhadra

Sukalyan Bhadra received both B.Sc. and M.Sc. degrees in chemistry from the University of Calcutta, India and a Ph.D. degree from the Indian Association for the Cultivation of Science, India (Supervisor: Professor Brindaban C. Ranu). After two subsequent postdoctoral stints – at TU Kaiserslautern, Germany (Advisor: Professor Lukas J. Goossen) and Chubu University, Japan (Advisor: Professor Hisashi Yamamoto) – he began his independent research career in 2016 at CSIR-Central Salt and Marine Chemicals Research Institute Bhavnagar, India, where he currently works as a Senior Scientist. His research interest revolves around the development of novel methodologies towards metal-promoted organic transformations, cooperative catalysis, asymmetric catalysis and synthesis of fine chemicals and API molecules having industrial and/or marine relevance. He is the recipient of Green Talent Award (2010), JSPS Postdoctoral Fellowship (2013), DST-INSPIRE Faculty Award (2016) and Thieme Chemistry Journal Award (2023) among others.

INTERVIEW

SYNFORM *What is the focus of your current research activity?*

Dr. S. Bhadra Our group works in the diverse field of organic synthesis and molecular catalysis including catalysis by transition metals and others, asymmetric catalysis, decarboxylative transformations and synthesis of drug molecules/intermediates having industrial and/or marine relevance. One of the major research areas of our group is catalytic α -functionalization of common organic compounds, e.g. acids, amides, esters, ketones, heterocycles etc. in a manner that is both step- and atom-economic, as well as sustainable. We also design ligands that work in a bio-inspired fashion towards metal-catalyzed α -functionalization reactions. In general, mild conditions, broad scope, excellent regio- and stereoselectivity, scalability, achieving bioactive compounds and synthetic intermediates constitute merits of our α -functionalization strategies. Further, we focus on the development of non-infringing and greener processes for perfume-ry chemicals and approved drugs including marine drugs.

SYNFORM *When did you get interested in synthesis?*

Dr. S. Bhadra I began to be fascinated by the art of organic synthesis in high school and undergraduate college, when organic chemistry was introduced in the curriculum. In particular, stereoselective synthesis of complex molecules having multiple stereogenic centres caught my attention, and I decided to study organic synthesis. Later, I pursued organometallics in catalysis and their applications in organic synthesis, in which I continued my independent research career.

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

Dr. S. Bhadra Invention of new classes of synthetic strategies is always important to upgrade traditional synthesis. In many cases, traditional synthesis yields unacceptable amounts of chemical wastes, thus increasing environmental threats. Furthermore, synthesis of complex molecules requires multistep processes. Modern science has nurtured traditional organic synthesis in many ways. For example, with the advent of catalytic C–H bond functionalization reactions, approaches involving organocatalysis, photo-redox catalysis, electro-catalysis, etc. have simplified the retrosynthesis of complex molecules. Likewise, automation, e.g. continuous-flow synthesis, has played a significant role in the synthesis of drug molecules. In addition, modern science has enabled the identification of numerous new molecules as drug candidates that have entered into clinical trials or have been approved. This has opened up new opportunities for the improvement of many lives.

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

Dr. S. Bhadra Outside the lab, I like to listen music and attend concerts. I love to listen to Indian classical music and instruments, in particular sitar. Sarod and violin also caught my interest.

SYNFORM *What is the most exciting aspect of your job, the one you like the most?*

Dr. S. Bhadra Inventing new reactions and designing new catalyst systems have always been a thrilling experience and an incredible venture. Establishing something that has never existed before is perhaps the toughest but most exciting job, particularly when it gives a concrete result. As synthetic chemists, we develop new chemical transformations and entities; however, the challenges remain to apply that chemistry in solving real life problems. To me, it is really exciting to develop some fundamental chemical strategy in the laboratory that can be taken forward to industry for scaling up towards the benefitting of mankind.

