

# Organic Synthesis and Catalysis Towards Greener Horizons: Challenges and Scope

## Overview

The persistent technological growths in the arena of chemical sciences have stimulated steps up opportunities in newer dimensions. To appeal in the revolutionary workplace of tomorrow, one has to have impeccable combination of theory and practical insight. Synthesis of drug molecules for life threatening diseases is the field of future which is profitable to the individual as well as the nation. To achieve this purpose, development of novel greener methods that are widely applicable and serve to expand familiar methodological devices in the synthetic arsenal is highly desirable. In this regard, a number of methods such as domino reactions, multicomponent reactions, transition metal catalysed reactions, organocatalysis and catalysis using efficient materials have extensively been explored. In homogeneous catalysis, one of the recent topic of interest refers to the explicit alteration of C-H into C-C bonds, which is arguably imperative in modern experimental chemistry, as it concede for yielding target compounds which are otherwise only reachable via lengthy strategies implicating multi-step synthesis. Catalytic C-H functionalization is the most enticing approach to attain this goal, as it does not require stoichiometric amounts of activating reagent and delivers less waste as side product. Moreover, it follows high atom economy with considerably less number of steps with a particular focus on high compatibility with a very broad range of functional groups, regioselectivity and stereoselectivity. The evolution of such technology offers a decisive input to unique, amended and more sustainable, and greener synthetic pathways and is expected to be immensely warranted for drug discovery purposes. Since, recently the topic has found eminent impact in both industrial and academic research, therefore the proposed course would be an ingredient of attracting the interest of participants on the challenging innovations in this field, which is shaping a superior tomorrow for industry in terms of atom economy. Afar from the homogeneous catalysis, the fundamentals and the magnificent application of the heterogeneous catalysis will be featured in great details during this course.

This course has been shaped to high-light the underlying perception of sustainable horizon of synthesis and catalysis, which consists an array of lectures, tutorials and assignments. The participant will achieve generous knowledge regarding the recent trends and technological devices of green synthesis and catalysis in both homogeneous and heterogeneous catalysis which will inspire and provoke the participants towards involvement in the evolution of greener approach in synthesis and catalysis.

<b>Modules</b>	<b>A: Greener Horizons of Organic Synthesis and Catalysis: October 24 - October 28 2016</b> <b>Number of participants for the course will be limited to eighty.</b>
<b>You Should Attend If...</b>	<ul style="list-style-type: none"><li>▪ you are a chemical engineer or research scientist interested in exploring green aspects of organic synthesis.</li><li>▪ you are working in pharmaceutical company interested to learn application of recent advances in green synthesis.</li><li>▪ you are a student, postdoc, research scholars or faculty from academic institution interested in learning how to do research using modern synthetic tools.</li></ul>
<b>Fees</b>	The participation fees for taking the course is as follows: <b>Participants from abroad : US \$200</b> <b>Industry/ Research Organizations: 5000/-</b> <b>Academic Institutions:</b> UG Students: Rs. 1000/- PG Students: Rs. 1500/-

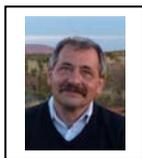
Ph.D Students: Rs. 2000/-

Postdoctoral fellow/Research Associate: Rs. 2500/-

Faculty Members: Rs. 3000/-

The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. If available, the participants will be provided with accommodation in hostel.

## The Faculty



Prof. Uwe Beifuss is second Vice Dean of the Faculty of Natural Sciences of the University of Hohenheim, Stuttgart, Germany and a member of faculty at University of Stuttgart. He received his doctorate in 1987 from the University of Göttingen, Germany with Prof. L. F. Tietze. After a postdoctoral stay with Sir A. R. Battersby in Cambridge, UK, he obtained his habilitation in Organic Chemistry in 1996 at the University of Göttingen, Germany. In 2001, he was appointed as a full Professor in Institute of Chemistry at the University of Hohenheim, Stuttgart, Germany. From 2004 – 2010, Prof. Beifuss was a member of the Senate at the University of Hohenheim, Stuttgart and from 2006 – 2010 he was a member of the SFB 706 catalytic selective oxidation of C-H bonds. He received a number of awards for his excellent contribution towards the development of sustainable synthetic methods. His research interest includes the development of selective and efficient transition metal- and enzyme catalyzed synthetic methods using greener synthetic approach, C-H bond activation, the isolation and synthesis of natural products, and also the development of pressure and temperature sensitive luminescent materials. He has published more than 166 papers in international peer-reviewed journals and is co-inventor of a number of patents. Moreover, for his recognition in scientific community, Prof. Beifuss has delivered more than 115 invited/ plenary talks across the globe.



**Prof. H. Ila** is currently a Hindustan Lever Research Professor at Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore. She has held INSA Senior Scientist/honorary Professor position at JNCASR, Bangalore (2010-2014), Professor position at Department of Chemistry, IIT Kanpur (1995- 2006) and Principal Advisor position - Chemistry at Jubilant Biosys Limited, Bangalore (2007-2009). She was appointed as Lecturer, Reader, Professor at Department of Chemistry, North Eastern Hill University, Shillong, India (1977-1995) and as Scientist at Medicinal Chemistry Division, CDRI, Lucknow (1970-1977). Including a number of distinguishes awards and honors, and academic and professional membership, in 2001, Prof. Ila was elected as Fellow of Indian National Science Academy (FNA) and in 1990, she was elected as Fellow of Indian Academy of Science, Bangalore (FASc). For her recognition inscientific community she has delivered more than 250 invited /plenary lectures in national and international conferences and visited several countries US, Japan, and in Europe as visiting professor. Prof. Ila has published more than 250 research papers in international journals and trained more than 60 Ph.D students. Her current research interest includes design and development of new diversity oriented synthetic methods for biologically important heterocycles and drug intermediates; development of new efficiency increasing reactions such as domino reactions and multicomponent coupling reactions.

**Dr. Chandi Charan Malakar** currently an Assistant Professor in Department of Chemistry at National Institute of Technology (NIT) Manipur. After Completing M.Sc from IIT Kanpur and working as a research fellow at Ludwig-Maximilians University Munich (LMU Munich), Germany, Dr. Malakar awarded his doctorate degree in 2011 from University of Hohenheim, Stuttgart,



## Course Co-ordinator

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Germany with Prof. Uwe Beifuss. Followed by three successive Postdoctoral Research stay at University of Antwerp, Belgium and University of Heidelberg, Germany, Dr. Malakar has joined a Canadian Pharmaceutical Company called SignalChem LifeSciences Pvt. Ltd as Senior Principal Scientist. Afterwards, he worked as research associate at Indian Institute of Science (IISc) Bangalore and as Assistant Professor (on contract) at NIT Jalandhar. He has awarded several fellowships such as MCM scholarship for M.Sc study, Pegasus Marie Curie postdoctoral fellowship, PBC postdoctoral fellowship and BOF - IWO postdoctoral fellowship etc. Apart from a number of abstract high-lights in scientific magazine, chemical catalogues and conference papers, he has published more than 25 research articles in high impact factor international peer-reviewed journals. His current research targets on developing novel methodologies on transition-metal catalysis, C-H activation, organocatalysis, frustrated Lewis Pairs, cooperative dual catalysis, *asymmetric catalysis*, chemistry of heterocycles and green chemistry.