

# Diverse Application of Modern Stereoselective Synthesis - Where Now ?

## Overview

The need of enantiomerically pure bioactive molecules has guided the chemist to discover an asymmetric variation of the known reaction, as well as to search for novel asymmetric transformations. Therefore, during the past few decades the stereoselective synthesis has emerged immense importance due to its huge application in the synthesis of complex drug molecules and natural products. A basic understanding of the stereoselective synthesis provides an efficient backbone to design novel complex molecules and catalysts that can be utilized to install multiple stereogenic centres in medicinally active agents. To meet the requirements for the synthesis of medicines to treat several lives threatening disease like cancer, the increasing demands of chemical technology must be taken care in order to create complex chiral centers. The current topic will focus on introduction of a new, simplified classification for stereoselective reactions.

In recognition of this research field enormous amount of work has been invested in order to synthesize complex target molecules. One of such example is the enantioselective multistep synthesis of of (-)-desethylburnamoniine, (-)-vindeburnol and (-)-3-epitacamonine using (-)-acetoxyglutarimide as starting material.

The present course has been structured to present a detailed overview of the organocatalysis. The complete course consist several lectures, tutorials and assignments. The participant will gain valuable concept in a broad range of topics on the synthetic transformations using organocatalysis.

The course intends to fulfill following key-objectives:

- To create exposer for the participants with the fundamentals of organocatalysis
- To understand the multi-disciplinary approaches of organocatalysis
- Exposing participants to the novel areas of organocatalysis and application in broad spectrum of research fields
- To provoke the capability and interest of the participants from north-eastern region of India to align them with recent trends of research.

<b>Course Information</b>	<b>A: Diverse Application of Modern Stereoselective Synthesis - Where Now ?: November 25 – November 30, 2019 Venue: Department of Chemistry, National Institute of Technology Manipur 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 using organocatalysis.</li><li>♣ You are a student, postdoctoral fellow, research scholars or faculty from industry &amp; academic institutions, and interested to learn about modern synthetic tools in organic chemistry.</li></ul>
<b>Fees</b>	The participation fees for taking the course is as follows: Participants from abroad : US \$200 Industry/ Research Organizations: 5000/- Academic Institutions: UG Students: Rs. 1500/- PG Students: Rs. 2000/- Ph.D Students: Rs. 2500/-

Postdoctoral fellow/Research Associate: Rs. 3000/-

Faculty Members: Rs. 3500/-

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 on payment basis.

## The Faculty

**Foreign Faculty:** Prof. (Dr.) Ilan Marek (Department of Chemistry of Technion-Israel Institute of Technology, Israel).

Prof. (Dr.) Ilan Marek, FRSC was born in Haifa (Israel), educated in France, and received his PhD thesis in 1988 from the University Pierre et Marie Curie, Paris, (France) under the guidance of Professor J. F. Normant. In 1989 he was postdoctoral fellow in Louvain-la-Neuve (Belgium) with Professor L. Ghosez and obtained a research position at the CNRS in France in 1990. After obtaining his Habilitation in organic chemistry, he moved to the Technion-Israel Institute of Technology at the end of 1997 where he currently holds a full Professor position. Since 2005, he holds the Sir Michael and Lady Sobell Academic Chair.



He was awarded the First French Chemical Society-Across Price for young Organic Chemist (under 40 years old in 1997); the Japan society for the promotion of Science Visiting Professor Award (1997); the Lawrence G. Horowitz career Development Chair (1998); the Yigal Alon Fellowship (1998); Evelyn and Salman grand Academic Lectureship-USA (1998); the Yosefa and Leonid Allschwang award, administered by the Israel Science Foundation (2000); the Michael Bruno Memorial award 2002, administered by the Rotschild foundation (2002); the Prize for Excellent young Chemist, The Israel Chemical Society (2004); the Merck Sharpe and Dohm Lecturer (2005); the Bessel Award of the Humboldt Foundation, Germany (2007), the Taub Award for academic excellence (2009), The German-Technion for Academic Excellence and Scientific Collaborations (2010), the Royal Society Chemistry organometallic Award from the RSC (2011), the Taiwan National science Council Visiting Scholar (2011), the Janssen Award for creativity in Organic Synthesis (2012), the Israel Chemical Society award for Excellence (2012), the Moore Distinguished Scholar Appointment from California Institute of Technology (CalTech) in 2013, the SFB-guest professor Wilhelms-University Muenster (2015), The Weizmann Prize for exact Sciences (2015), the 17th International Organic Chemistry Foundation Yoshida Lectureship, Japan (2015) and the Yannai Prize for excellence in teaching (2015).

He is a member of the International Scientific Committee of European Symposium on Organic Chemistry (ESOC), including the position of Chairman (2007-2009), Chairman of the organic Division of the European Association of Chemical and Molecular Science (EuChemS), member of Advisory Board of Chemical Communications (RSC), Organic and Biomolecular Chemistry (RSC), European Journal of Organic Chemistry (Wiley), Angewandte Chemie International Edition (Wiley), Chemistry a European Journal (Wiley), Synlett (Thieme); Synthesis (Thieme), The Chemical records (Wiley), Helvetica Chimica Acta (Wiley). He is associate editor of Beilstein Journal of organic chemistry and of the Israel Journal of Chemistry and serves as senior editor of the Patai's series. He is also volume editor of comprehensive organic synthesis (Elsevier) and Science of Synthesis (Thieme).

He is concerned with the design and development of new and efficient stereo and enantioselective strategies for the synthesis of important complex molecular structures. He is particularly interested in developing Carbon-carbon bond forming as well as Carbon-Carbon bond activation processes, which efficiently create multiple stereocenters in a single pot operation. Understanding of reaction mechanisms gives insight into the origins of chemo and stereoselectivity, and governs optimization towards the most efficient and general protocols for his methodologies. His vision is that we should provide and answer to challenging synthetic problems but it has to be coupled with unique efficiency and elegance. In recognition of his excellent scientific career, apart from his endless number of publications Prof. Marek has several publications in top ranking journals like Science and in Nature. Please follow the link of his research webpage @ <http://chemistry.technion.ac.il/members/ilan-marek/>

**Course Coordinator:** Dr. Chandi Charan Malakar, Assistant Professor Department of Chemistry, National Institute of Technology (NIT) Manipur.

Dr. Chandi C. Malakar currently working as Assistant Professor at the department of chemistry, National Institute of Technology (NIT) Manipur. After completing M.Sc from IIT Kanpur, he moved to Ludwig Maximilians University Munich



(LMU Munich), Germany as research fellow. Dr. Malakar awarded his doctorate degree (Ph.D) in 2011 from University of Hohenheim, Stuttgart, Germany under the supervision of Prof. (Dr.) Uwe Beifuss. Followed by three successive Postdoctoral Research work (during 2011-2014) at University of Antwerp, Belgium and University of Heidelberg, Germany, Dr. Malakar joined (in 2014) a Canadian Pharmaceutical Company called

SignalChem LifeSciences (P) Ltd. as Senior Principal Scientist. Afterwards, in 2015 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 in IIT Kanpur, Pegasus Marie Curie postdoctoral fellowship in Belgium, PBC postdoctoral fellowship in Israel and BOF - IWO postdoctoral fellowship from University of Antwerp, Belgium. Apart from a number of abstract high-lights in scientific magazine, chemical catalogues and conference papers, he has published more than 40 research articles in international peer-reviewed journals. He has been recognized as the recipient of Early Career Research Grant sponsored by Science & Engineering Research Board (SERB) and three courses under Global Initiative of Academic Network (GIAN) sponsored by MHRD, Govt. India. His current research target rely on developing novel methodologies in the area of transition-metal catalysis, C-H activation, organocatalysis, frustrated Lewis Pairs, cooperative dual catalysis, asymmetric catalysis, chemistry of heterocycles and green chemistry.

Please follow the link of his research webpage @ <https://chdeepm.wixsite.com/mysite>

## More information:

Further information on the registration form and other details will be given in the NIT Manipur website @

<http://www.nitmanipur.ac.in/>

For any queries please contact the course coordinator Dr. Chandi Charan Malakar, Mobile: 9862532117, E-Mail:

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