

# Modern Photochemistry and Photocatalysis

*Under the aegis of MHRD—Global Initiative of Academic Networks*

URL: <http://iiti.ac.in/GIAN/>

## Overview

While our modern society is largely dependent on goods produced by chemical and pharmaceutical industries, the negative environmental impact of these industries remains a highly problematic aspect. Visible light Photochemistry utilizes the unlimited resource of sunlight and thus it can be regarded as one important contribution to the sustainability theme in Chemistry (“Green Chemistry”). Therefore the topic is highly relevant for future industrial manufacture both in developing and industrialized countries. Further, it has a large impact in human medicine where Photodynamic Therapy is an emerging means to treat topical cancers.

The area of visible-light Photochemistry has seen tremendous research progress during the last years and internationally, many academic research groups have enrolled in extensive research programmes dedicated to the development of new chemical methodology, medicinal applications as well as light harvesting for energy production. This makes the topic a highly relevant one, in particular for fostering potential international collaborative research projects.

The primary objectives of the course are as follows:

- ✓ Photochemistry, in particular solar-light driven photochemistry is an area of increasing interest in contemporary synthetic and medicinal chemistry. It enables resource-efficient and “green” production of base chemicals, advanced intermediates and drug molecules. The course will provide an overview from classical photochemical methods to the most recent research activities in visible-light Photocatalysis.
- ✓ In addition, the enabling technology of microstructured reactors for continuous flow processing of chemical intermediates will be introduced and their application in chemical manufacture will be discussed in depth.
- ✓ Further, a perspective on current and future applications of Photo-chemistry in energy harvesting, biology and medicine will be provided.

## Schedule of the Course

<b>Schedule of the course</b>	:Sept 22–Oct 04, 2016
<b>Total Number of days/lectures</b>	: 10 days / 20 lectures and 10 tutorials

## Registration Fee

<b>Participant from outside India</b>	:USD 500
<b>Industry/ Business organization</b>	:Rs. 20,000
<b>Academic Institutions</b>	:Rs. 2,000
<b>Students</b>	:Rs. 2,000

The fee includes all instructional materials, computer use for tutorials, internet facility and lunch. The participants will be provided with accommodation on payment basis.

## Topics Covered

Basic principles of Photophysics and Photochemistry, Photochemical functional group transformations and their synthetic applications, Solar photochemistry for the production of fine chemicals, Visible-light Photocatalysis(including nanoscale catalysts and photocatalytic water splitting), Photochemistry in microstructured reactors for continuous processing and large scale manufacture, Photochemically generated reactive oxygen species (ROS) in synthesis and medicine, Photodynamic therapy for cancer treatment, Energy harvesting with organic solar cells, Photochemistry in chemical industry, Photochemical waste water treatment.

## Faculty Information



### Teaching Faculty

**The course will be delivered by Professor Dr. Malte Brasholz, University of Hamburg, Germany.**

Prof. Dr. Malte Brasholz is an Assistant Professor at the University of Hamburg, and his area of expertise is Organic Chemistry with a focus on Photochemistry and Photocatalysis. He has had an opportunity to gain international experience, working in the U.S. A, the U.K. and Australia. In 2012 he has established an independent research group at the University of Hamburg and since then, his research team has gained reputation for the development of environmental benign and solar-light induced chemical transformations.

His previous curriculum led him to a deeper understanding and strong interest in cross-cultural interaction and collaboration. He has been inspired by a number of former Indian colleagues with whom he worked side by side over the years, and has a sincere respect for the highly diverse Indian culture. As he is a relatively young faculty member, he started to look for opportunities to foster international collaborations in order to initiate collaboration projects with other researchers in the field of Green Chemistry.



### Co-ordinating Faculty

**Dr. Chelvam Venkatesh**, an Organic Chemist and Chemical Biologist is an assistant professor in the Discipline of Chemistry and Centre for Biosciences and Biomedical Engineering at IIT Indore. His long term goal is to establish a centre of excellence in the field of bio-science especially for detection and treatment of cancer and inflammatory diseases at IIT Indore. He has more than 7 years experience in imaging and microscopic techniques from postdoctoral training at the Purdue University, USA. He was also a postdoctoral fellow in the laboratory of Prof. Hans-Ulrich Reissig at Freie University Berlin, Germany in 2006-2008, where he was awarded Alexander von Humboldt fellowship and worked on total synthesis of natural products for cancer. He has published 24 peer reviewed journal papers in highly reputed international journals and some of his outstanding discoveries were published in prominent journals such as *Nanomedicine*, *Journal of Nuclear Medicine*, *Journal of Cell Sciences*, *Journal of Medicinal Chemistry*, *Journal of Organic Chemistry*, *Organic Letters*, etc. His revolutionary work on diagnosis and therapeutic applications of cancer and inflammatory diseases are US patented, and currently in clinical trials. Moreover he had appeared in ABC news for developing technology for intra-operative guided surgery of ovarian cancer in patients.

### Who should attend this course?

1. Executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories.
2. Undergraduates, M.Sc, and PhD science stream students. Any student with a basic chemistry background will be able to follow these lectures and gain a lot from them.
3. B.Sc and M.Sc level teachers who wish to update their photochemistry and catalysis knowledge.

### Course Co-ordinator

**For any further information and registration, please contact:**

**Dr. Chelvam Venkatesh**

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