



**Green  
Chemistry**  
Centre of Excellence

**International Workshop**  
**On**  
**Green Initiatives in Energy, Environment & Health**  
**Dec. 2-3, 2013**



**Organizers**

Green Chemistry Centre of Excellence ([www.york.ac.uk/chemistry/research/green/](http://www.york.ac.uk/chemistry/research/green/))

The Energy and Resources Institute ([www.teriin.org/](http://www.teriin.org/))

Green Chemistry Network Centre, DU (<http://greenchem.du.ac.in>)

Gautam Buddha University ([www.gbu.ac.in/](http://www.gbu.ac.in/))

Green Chemistry Network ([www.greenchemistrynetwork.org/](http://www.greenchemistrynetwork.org/))

**Sponsored by**

*Royal Society of Chemistry London (North India Section)*

RSC | Advancing the  
Chemical Sciences

Venue- Hotel Maidens, 7 Sham Nath Marg, Delhi

## INTRODUCTION & INVITATION

Chemistry, sustainability and innovation—three key components are for the future of our society. Chemistry is an essential tool in our campaign to protect and preserve our environment, biodiversity and natural resources against further degradation. It is also a primary driver both for the growth and sustainable development of the world economy and the well-being and quality of life of its citizens. The challenges for the chemical sciences are the key to solve the challenges that society will face over the next years: energy, food, clean water, medicines and vaccines, protection of our environment and cultural heritage, and economic development. At present, protection of the environment is a huge concern for society. Problems including global warming and ozone depletion highlight the negative effects human activity has on the planet. Not only the environment is getting affected by human endeavors but this also has detrimental effects on human health. Sustainable chemistry is therefore not only concerned with the reduction of hazardous substances and waste and the environmental impact of the chemical industry; it is part of a strategic long-term vision for the future of society, not disjoint from or antagonist to economic development but rather a key factor for innovation and competitiveness.

In the current era there is a serious push towards developing processes that are eco-friendly. This necessitates a shift from the traditional concepts of the process efficiency that focuses exclusively on the chemical yield to one that assigns economic value to eliminating waste and avoiding the use of toxic and hazardous substances and focusing on more environmentally acceptable processes. To keep the green chemistry concern in mind, many industries are trying to synthesize target compounds by green chemistry routes.

Chemistry has to and will play a major role to provide solutions for the crucial problems of the next century such as **Energy; Use of Renewable Resources; Green Pharma and Health; and Elemental sustainability.**

Prompt global action to solve the energy crisis is needed. Such an action should be incorporated in a more general strategy based on the consciousness that the Earth's resources are limited. We are urged to save energy and to use energy in more efficient ways, and we are also forced to find alternative energy sources as soon as possible. The answer to the energy problem confronting this planet deals in the chemist's currency. As chemists, we can help by improving

energy technologies and, hopefully, finding a scientific breakthrough capable of solving the energy problem at its root.

The production of renewable chemicals is gaining attention over the past few years. The natural resources from which they can be derived in a sustainable way are most abundant in sugars, cellulose and hemicellulose. These highly functionalized molecules need to be de-functionalized in order to match the traditional feedstocks for the chemical industry. A fundamentally different approach to chemistry thus becomes necessary, since the traditionally employed oil-based chemicals normally lack functionality. This new chemical toolbox needs to be designed to guarantee the demands of future generations at a reasonable price.

Many low carbon technologies including wind turbines, electric cars and catalytic converters require precious metals or other metals in unprecedented quantities threatening their continued availability. These elements are being dispersed in the form of waste throughout our environment, making them costly & difficult to recover. This emphasises the necessity for a new approach to metal capture & use, thus increasing the lifetime of our reserves.

The Pharmaceutical industry is the most dynamic part of the chemical industry. It is in the forefront for big changes towards “greener” feedstocks, safer solvents, alternative processes and innovative ideas. All these changes will increase the environmental credentials of the pharmaceutical industry, but at the same time will cut down cost and materials for the manufacturing operations making a step in the right direction of sustainability. Encouraging innovation, while integrating green chemistry and engineering into drug discovery, development and manufacturing of new pharmaceuticals is one of the most important issues in the health and pharmaceutical sector.

## **WORKSHOP OVERVIEW**

To find out the solutions to the above mentioned crucial problems of our planet, we are organizing “*International Workshop on Green Initiatives in Energy, Environment and Health*” in the first week of December 2013 in Delhi, India. The speakers in the workshop will present the latest Green Initiatives in Energy, Environment & Health based on their own experiences in either industry or academia and address the challenges and opportunities in Green Chemistry. They will provide strategies for designing, adapting and incorporating new green strategies in industries as well as in academia. Ample time will be made available for participants

to discuss their own plans for adopting Green Chemistry with the speakers and fellow participants.

In this two days workshop, we will be focusing on following four themes, each to be led by one of Green Chemistry leaders:

- Bio-based products and waste valorization (Brazil)
- Energy (India)
- Elemental Sustainability (Korea)
- Green Pharmaceuticals and Health (UK) (York / Berkeley)

Each theme will be given half day for the deliberations. A special evening session will be dedicated to the meeting of International Green Chemistry leaders to exchange experiences and ideas, and discuss a new shared website hosted by GCN.

## **REGISTRATION**

**Registration Fee (non refundable):** Applicants are required to pay the registration fee via demand draft drawn in favor of **Royal Society of Chemistry, London** payable at Delhi. Details are available on website.

## **SPONSOR THIS EVENT**

If you would like to have your company brand linked to Green initiatives, why not promote your products and services at International Workshop. We have flexible sponsorship options available, from adverts and inserts to coffee breaks – email [rksharmagreenchem@hotmail.com](mailto:rksharmagreenchem@hotmail.com) to find out more.

## **PATRON**

**Dr. R. K. PACHAURI**

Director General  
TERI, Darbari Seth Complex  
IHC Complex, Lodhi Road  
New Delhi-110003

## **PRESIDENT**

**PROFESSOR JAMES CLARK**

Director  
Green Chemistry Centre of Excellence  
Department of Chemistry  
University of York, United Kingdom

## CONVENOR

### Dr. ALOK ADHOLEYA

Director  
TERI, Darbari Seth Complex  
IHC Complex, Lodhi Road  
New Delhi-110003

### PROFESSOR R. K. SHARMA

Honorary Secretary,  
Royal Society of Chemistry (LONDON)  
North India Section  
Co-ordinator,  
Green Chemistry Network Centre,  
Department of Chemistry, University of Delhi  
Email: [rksharmagreenchem@hotmail.com](mailto:rksharmagreenchem@hotmail.com)

## SECRETARY

### PROFESSOR ANURADHA MISHRA

Dean, School of Vocational Studies & Applied  
Sciences, Gautam Buddha University  
Greater Noida, Gautam Budh Nagar-201 310, India

## CHAIRMAN

### PROFESSOR S. M. S. CHAUHAN

Head Department of Chemistry, D.U

## CO-CHAIRMAN

### PROFESSOR P. N. KAPOOR

Hon. President, RSC North India Section

## ORGANIZING COMMITTEE

### Dr. AVTAR MATHARU,

Deputy Director, Green Chemistry Centre of Excellence,  
University of York, UK

Dr. RAKESHWAR BANDICHHOR, Associate  
Director, API – R &D Innovation Plaza Dr. Reddy's  
Laboratories, Hyderabad

Prof. B. S. GARG, GCNC, D.U.

Prof. ASHOK. K. PRASAD, D.U

Prof. SUNIL SHARMA, D.U

Prof. R. K. SETH, D.U

Prof. VEENA AGGARWAL, D.U

Prof. MANMOHAN, D.U

Dr. P. VENKATESU, D.U

Dr. INDU T. SIDHWANI, Gargi College, D.U.

Dr. RANJANA SHARMA, Ramjas College, D.U.

Dr. ANJU SRIVASTAVA, Hindu College, D.U.

Dr. MEENAKSHI GARG, BCAS, D.U.

Dr. RAJEEV GOEL, INMAS, DRDO

Dr. ASHU GUPTA, Shyamal College, D.U

Dr. H. K. RAJOR, Ramjas College, D.U

Dr. RAGINI GUPTA, MNIT Jaipur

Dr. ANIL WALL, FITT, Delhi

Dr. O. P. SIDHU, NBRI, Lucknow

Dr. SHAILESH N. SHARMA, NPL, New Delhi

Dr. P. C. ABHILASH, IESD, BHU, Varanasi

Dr. SEEMA DWIVEDI, GBU, Greater Noida

Dr. ABHA DUBEY, MMH College, CCSU

Dr. ATHAR HUSSAIN, GBU, Greater Noida

Dr. GEETA DURGA, Sharda University

Dr. VANDANA SINGH, GBU, Greater Noida

Dr. UPMA SINGH, GBU, Greater Noida

Dr. ALPA YADAV, GBU, Greater Noida

## ADVISORY COMMITTEE

Dr. BOB PEOPLES, Former Director, ACS-  
Green Chemistry Institute, Washington, USA

### Prof. M. K. CHAUDHURI

V. C., Tezpur Central University

### Dr. MANNEPALLI LAKSHMI KANTAM

Director, Indian Institute of Chemical Technology,  
Hyderabad

### Prof. M. M. SALUNKHE

V. C., Central University, Rajasthan

Dr. RAKSH VIR JASRA, Senior Vice President  
Head, Reliance Technology Group, Vadodara

Dr. R. K. TEWATIA, Chief (Agricultural  
Sciences), The Fertiliser Association of India

Sh. V. K. GAUR, CMD, National Seed  
Corporation

Dr. KRISHAN CHANDRA, Director, National  
Centre of Organic Farming

Dr. C. S. NAUTIYAL, Director NBRI, Lucknow

Dr. S. K. RAZA, Director, IPFT, Gurgaon

Prof. VIRESH DUTTA, CES, IITD, New Delhi)

Prof. ANIL KUMAR DIKSHIT, CESE, IITB,  
Mumbai

Prof. A. K. ATTRI, JNU, New Delhi

### Prof. R. V. SINGH

Head, Department of Chemistry, University of  
Rajasthan, Jaipur

Dr. P. K. RAI, CFEES DRDO

Prof. RITA KAKKAR, DU

Prof. J. M. KHURANA, DU

**Dr. DEEPTI GOYAL**, GBU, Greater Noida  
**Dr. TANVI VATS**, GBU, Greater Noida  
**Ms MEGHA PARASHAR**, TERI

**Dr. KSHIPRA MISRA**, DIPAS, DRDO

### **ABOUT TERI**

The Energy and Resources Institute (TERI) established in 1974, is a dynamic & flexible organization with a global vision and a local focus. Prior to moving into full-fledged research activities in the fields of energy, environment and sustainable development from the year 1982 onwards, TERI was an organization that dealt with documentation and information dissemination. However, TERI's growth lay in its firm belief that efficient utilization of energy, sustainable use of natural resources, large scale adoption of renewable energy technologies, and reduction of all forms of waste would move the process of development towards the goal of sustainability.

### **ABOUT GBU**

Gautam Buddha University (GBU) is a globally acclaimed integrated academic and research institution that creates a vibrant community of intellectuals endowed with character, creativity, competence and commitment, who can inspire meaningful transformations to ensure holistic growth and development of the society.

The Mission of University is expressed through the following goals:

- To generate a community of scholars who can manage continuity and change.
- To see and incorporate the best practices in teaching and learning from around the world.
- To inculcate in the learners due appreciation for the ethical, ecological and economic issues of knowledge.
- To provide knowledge based scientific solutions to satisfy the need of society and industry.

The School of Vocational Studies and Applied Sciences has been established to inculcate and promote an inquisitive thinking towards science and its applicability in various interdisciplinary subjects amongst young minds of today and tomorrow. The school is committed to provide cutting edge technology and research in partnership with the industries, laboratories and institute of national and international repute.

## **ABOUT GCNC**

Green Chemistry Network Centre (GCNC) was established in the Department of Chemistry, University of Delhi under the recommendation of World Leaders in Green Chemistry headed by Professor Paul Anastas (known as the father of Green Chemistry) with the following aims and objectives:

- Build a Network for exchange of expertise, discussion and knowledge between industrialists and academics and between chemists and engineers with interests and expertise relevant to Green Chemistry.
- Prepare and disseminate the teaching materials on Green Chemistry for school, college and university levels, with the simultaneous design of laboratory experiments for these levels as well.
- Design trainings not just to expose the chemists to the concepts, principles and methodologies of Green Chemistry but also to empower them to bring this new knowledge back to their institution or industries.
- Promoting research by taking up Green Chemistry Research Projects from Industry and Government agencies.

**GCNC received prestigious IUPAC CHEMRAWN GCI-DEN Grant Award for Green Chemistry Networking in India.**

## **ABOUT GCCE**

The Green Chemistry Centre of Excellence (GCCE) is based at the University of York and is one of the world's leading centres for research and education in green and sustainable chemistry with over 70 staff and research income over £3M per annum. The Centre runs the UK's first Masters course in Green Chemistry, as well as other educational activities for audiences ranging from schools to the general public and to industry. Research and industrial collaboration in the GCCE is organized in 4 technology platforms: Clean Synthesis, Microwave Chemistry, Natural Solvents and Renewable Materials. There are major current projects with industrial partners at

all stages in the supply chain of chemicals and materials, including biomass platform molecules, green consumer products, biomaterials derived from starch, microwave processing, supercritical fluid fractionation of chemicals from biomass, and the clean synthesis of specialty chemicals. The GCCE has won many awards and prizes for its innovation (eg Innovator of the Year Award), its educational initiatives (eg ACS award for chemical education), and its collaboration with industry (eg EU Better Environment award).

### **ABOUT GCN**

The Green Chemistry Network (GCN) aims to promote awareness and facilitate education, training and practice of Green Chemistry in industry, commerce, central, regional and local government, academia and schools. The Network was initially established in 1998 by the Green Chemistry Centre at the University of York, with funding from the Royal Society of Chemistry, and is now funded on a project-by-project basis. Prof. James Clark is the Non-Executive President of the GCN.

The main aim of the GCN is to promote awareness and facilitate education, training and practice of Green Chemistry in industry, commerce, academia and schools. This will be achieved by:

- Providing links to other organizations and government departments.
- Organizing conferences/ workshops and training courses.
- Providing educational material for universities & schools.
- Promoting public engagement in green chemistry and its importance in today's society.
- Providing information in an easy to understand form for retailers and consumers.
- Newsletters and books with close links to the Green Chemistry journal.
- Running specific-themed projects targeting key areas and groups.