

## DEPARTMENTAL SEMINAR

DEPARTMENT OF CHEMICAL AND BIOMOLECULAR  
ENGINEERING  
FACULTY OF ENGINEERING  
National University of Singapore  
4 Engineering Drive 4 Singapore 117576  
Tel: (65) 6516 2186 Fax: (65) 6779 1936



<b>TOPIC</b>	<i>An Overview of Functionalized Membranes for Reactions and Separations</i>
<b>SPEAKER</b>	<b>Professor Dibakar Bhattacharyya</b> University of Kentucky
<b>HOST</b>	<b>Professor Chung Tai-Shung, Neal</b>
<b>DATE</b>	<b>23 August 2011 (Tuesday)</b>
<b>TIME</b>	<b>2:00 PM</b>
<b>VENUE</b>	<b>Block E5, 2<sup>nd</sup> Storey, Room 32 (E5-02-32)</b> <a href="#">Interactive Map of NUS</a>
<b>SYNOPSIS</b>	<p>Membranes can be functionalized with ionizable macromolecules and other moieties to create nanostructured domains in pores with high trans-membrane flux and exceptional versatility. These nanocomposite membranes provide promising applications, ranging from toxic metal separations, to in-situ nanoparticle synthesis, and catalysis. Our low-pressure membrane approach is marked by reaction and separation selectivity and their tunability by operating pH, ionic strength or pressure. If the selected macromolecule is a polyelectrolyte, the incorporation in the membrane pores provides both highly charged field and high sorption capacity of toxic metals. The metal-sorbed membrane can easily be converted to catalytic membranes through reduction to metallic nanoparticles. The electrostatic assembly based on layer-by-layer (LbL) deposition of polyelectrolytes can be used for incorporating active enzymes without covalent attachment. The sustainable, green chemistry, approach using ambient conditions and the evaluation of reactive membranes comprising of poly acrylic acid (PAA)-modified poly vinylidene fluoride (PVDF) membranes will be presented. The synthesis of supported Fe and Fe/Pd nanoparticles in membrane pores using vitamin C and tea polyphenols as "green" reducing agents, demonstrated the reactivity of these NPs toward detoxification of toxic organics from water. The formation of bioreactor with nano-domain interactions and mixed matrix nanocomposite membranes display remarkable versatility compared to conventional membranes.</p>

## BIOGRAPHY



## EDUCATION

- Ph.D. Environmental Engineering, Illinois Institute of Technology, Chicago, IL, 1966
- M.S. Chemical Engineering, Northwestern University, Evanston, IL 1963
- B.S. Chemical Engineering, Jadavpur University (with Highest Distinction), Calcutta, 1962

## PROFESSIONAL EMPLOYMENT

1990-present: University Alumni Professor, Department of Chemical and Materials Engineering, University of Kentucky

**A L L A R E W E L C O M E**

Please visit our website for more details, <http://www.chbe.nus.edu.sg/>