Frontiers in Chemistry
Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106-7078

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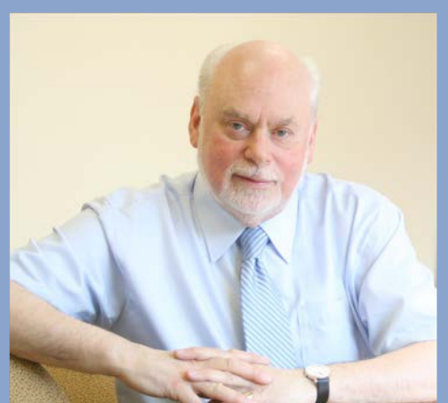
The Seventieth FRONTIERS IN CHEMISTRY



2010–2011

FRONTIERS IN CHEMISTRY

Case Western Reserve University
2010-2011

The Frontiers in Chemistry Series dates to 1941. The speakers are sponsored by local industrial and government laboratories, and the University. The lectures are free.

SCHEDULE The lectures are on Thursdays at 4:30 p.m. Coffee and tea are available before the lectures.

LOCATION The lectures are in the Goodyear Lecture Hall (Clapp 108).

PARKING Parking is available at all Case visitor parking lots. Please bring your parking stub for validation.

DINNER The lectures are generally followed by dinner at a local restaurant. Those who wish to may join the dinner (participants pay the restaurant individually). Dinner reservations are required by the Monday preceding the lecture.

INQUIRIES AND DINNER RESERVATIONS

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ONLINE INFORMATION
www.case.edu/chem/

FRONTIERS LECTURE SERIES COMMITTEE

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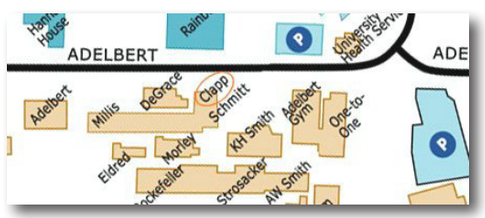
The University acknowledges with appreciation the guidance provided by the external members of the Frontiers in Chemistry Lecture Series Committee and the support provided by the organizations indicated.



Maps, driving directions, bus stops, and more can be found on the web at Case Visitor Central:

www.case.edu/visit/

Materials

Beyond Open Reticulated Geometries

September 9, 2010

Materials capable of robust dynamics can be created by combining the protocols employed in the synthesis of metal-organic frameworks (MOFs) with the placement of mechanically interlocked molecules (MIMs) inside the MOFs. These endow the materials with well-defined porous structures, while MIMs, that are rendered bistable, confer switchability on the materials.

Sir Fraser Stoddart

Board of Trustees Professor of Chemistry
Department of Chemistry
Northwestern University

Case Lecturer

campus host S. Rowan

A Nanoscience Approach to Photocatalysis and Solar Cells

September 30, 2010

Photosynthetic organisms use molecular photoredox chemistry to convert sunlight to stored chemical energy. In order to develop practical technologies based on the natural model, we will need to achieve higher efficiency and better stability. This talk will describe how we are learning to use nanomaterials to control the flow of light and electrons in artificial photosynthetic systems, especially those designed for the visible light-driven electrolysis of water.

Thomas E. Mallouk

Evan Pugh Professor of Materials
Chemistry and Physics
Department of Chemistry
Pennsylvania State University

Energizer Lecturer

campus host G. Sauvé

Chemistry and Application of Carbon Nanomaterials

February 3, 2011

This lecture will cover functionalization of different types of carbon, including fullerenes, carbon nanotubes, and graphene, by both covalent reactions and physical absorption of functional molecules. A variety of applications for catalysis, chemical sensing, and mechanical properties will be presented.

Timothy M. Swager

John D. MacArthur Professor and Chair
Department of Chemistry
Massachusetts Institute of Technology

Lubrizol Lecturer

campus host T. Gray

Binary Nanocrystal Superlattice Assembly as a Route to Multi-Functional Materials and Devices

~~**February 17, 2011**~~ **March 3, 2011**

Co-crystallization of two types of monodisperse nanocrystals can yield a rich array of binary nanocrystal superlattices (BNSLs). This lecture will share recent advances in the synthesis and characterization of these BNSLs and will highlight progress in identifying and harnessing the synergistic combinations of electrical, thermal, optical, and magnetic properties of these MetaMaterials and in the devices incorporating them.

Christopher B. Murray

Richard Perry University Professor of
Chemical and Materials Science and
Engineering
Department of Chemistry
University of Pennsylvania

BASF Catalysts Lecturer

campus host C. Burda

Synthetic Biology

Carbohydrate Polymer Assembly: How Do Mycobacteria Do It?

January 27, 2011

We have focused on galactofuranose residue incorporation in *Mycobacterium tuberculosis*. Our studies have uncovered a fundamentally new catalytic role for the heterocyclic cofactor flavin (vitamin B2) and led to the identification of small molecule inhibitors. We anticipate that the strategies developed to investigate the molecular mechanism of galactofuranose can be readily applied to probe a wide variety of enzymatic polymerization reactions.

Laura L. Kiessling

Hilldale Professor of Chemistry
Laurens Anderson Professor of Biochemistry
Department of Chemistry
University of Wisconsin-Madison

Case Lecturer

campus host I. Lee

Modular Biocatalysts

March 17, 2011

Our research focuses on understanding a class of multi-functional enzymes that catalyze the biosynthesis of a broad range of antibiotics. An understanding of the principles governing their chemistry promises to create opportunities for engineering new medicines.

Chaitan Khosla

Wells H. Rauser and Harold M. Petiprin
Professor and Chair of Chemical Engineering
Departments of Chemical Engineering and
Chemistry
Stanford University

Case Lecturer

campus host R. Viswanathan

New Compounds from Old Enzymes: Evolution in the Isoprenoid Biosynthetic Pathway

April 7, 2011

Isoprenoid compounds constitute the most chemically diverse family of molecules found in nature. Studies of the enzymes that create the carbon skeletons of isoprenoid molecules suggest much of this diversity resulted from changes in an ancestral enzyme that catalyzed chain elongation.

C. Dale Poulter

John A. Widtsoe Distinguished Professor
and Chair
Department of Chemistry
University of Utah

Case Lecturer

campus host R. Viswanathan

Expanding the Synthetic Capabilities of the Cell

April 14, 2011

My laboratory is creating conceptually new approaches for the modification of biomolecules in a living cell. I will describe our progress in engineering a cell so that both the mutagenesis and selection steps of directed evolution can be carried out entirely in vivo, under conditions of sexual reproduction.

Virginia Cornish

Professor of Chemistry
Department of Chemistry
Columbia University

Case Lecturer

campus host G. Tochtrop