



The Sixty-Seventh FRONTIERS IN CHEMISTRY



2007-2008

FRONTIERS IN CHEMISTRY

Case Western Reserve University
2007-2008

The Frontiers in Chemistry series has been held on campus since 1941. The speakers are sponsored by local industrial and government laboratories and the University. The lectures are free.

SCHEDULE: Lectures are on Thursdays at 4:30 p.m., except for October 4. This lecture is scheduled for 4:15 p.m. Coffee and tea are available before the lectures.

LOCATION: Most of the lectures are in the Goodyear Lecture Hall (Clapp 108). However, the lectures of October 4, January 24, and January 31 are in the Schmitt Auditorium (Millis Science Center).

PARKING: Parking is available at all Case Visitor parking lots. Bring your parking stub for validation.

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

INQUIRIES AND DINNER RESERVATIONS:

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INFORMATION: <http://www.case.edu/artsci/chem/>

FRONTIERS LECTURE SERIES COMMITTEE

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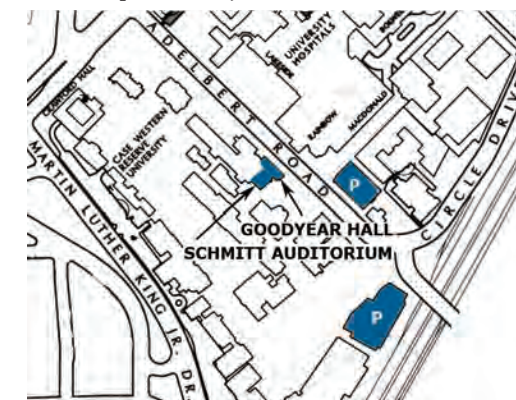
Dr. Michael Meador
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Sherwin-Williams

Dr. Scott Rickert
NanoFilm

Dr. Daniel Knapton
Lubrizol

The University acknowledges with appreciation the guidance provided by the external members of the Frontiers in the Chemistry Lecture Series Committee and the support provided by the organizations indicated. Additional support has been provided by Sherwin-Williams.



Global Warming

Energy Challenges Facing the United States

Please note: This lecture begins at 4:15 p.m.

October 4, 2007

The United States and other nations face two formidable challenges over the next several decades: avoiding adverse climate change and beginning the transition to a post-petroleum economy. What should the nation be doing? What is the role of universities in shaping our energy future?



John M. Deutch

Institute Professor
Massachusetts Institute of Technology

CWRU Lecturer

Stabilizing Atmospheric CO₂: Chemistry's Grand Challenge

October 11, 2007

Rapidly increasing atmospheric CO₂ concentrations threaten the habitability of our planet. Can chemistry applied on grand scales help reverse this trend? Possible chemical strategies for removing CO₂ directly from waste streams and the atmosphere will be discussed.



Greg H. Rau

Senior Research Scientist
University of California, Santa Cruz
Carbon Management Program
Lawrence Livermore National Laboratory

NASA Lecturer

Plastics from Carbon Dioxide: An Environmentally Benign Route to Polycarbonates

November 8, 2007

We have been investigating the utilization of carbon dioxide as both a solvent and a reactant for the synthesis of polycarbonates. Although the consumption of CO₂ in the production of useful chemicals is always likely to have a minimal effect on global warming, its use is considered green chemistry.



Donald J. Darensbourg

Professor of Chemistry
Texas A&M University

Lubrizol Lecturer

Safe Electrochemical Couples for High Energy/High Power Lithium-Ion Batteries

November 15, 2007*

Challenges confronting lithium-ion battery technology for hybrid-, plug-in hybrid- and all-electric vehicles will be discussed. Recent progress in designing electrode materials to improve battery safety will be highlighted.

* Rescheduled to February 7, 2008



Michael M. Thackeray

Argonne Distinguished Fellow
Chemical Engineering Division
Argonne National Laboratory

BASF Catalysts Lecturer

The Chemical Bond

All The Ways to Have a Bond

January 24, 2008

The concept of a chemical bond has life, generating controversy and incredible interest. In my opinion, any rigorous definition of a chemical bond is bound to be impoverishing, leaving one with the comfortable feeling "yes (no), I have (do not have) a bond," but little else. Let's see if we can do better.



Roald Hoffmann

Frank H. T. Rhodes Professor of Humane Letters
Cornell University

Innovation Chemical Tech. Lecturer

There Are No Chemical Bonds, Just Bonded Atoms

January 31, 2008

A chemical bond can be neither defined nor measured. Atoms, however, are defined by the measurable electron density, and when bonded to one another, they are linked by a bond path whose properties are described by the quantum mechanics of an atom in a molecule.



Richard F. W. Bader

Professor Emeritus
McMaster University

Energizer Lecturer

Metal Cyanide Clusters that Display Single Molecule Magnetism

February 28, 2008

Research in our laboratories has revealed that discrete metal cyanide clusters can exhibit properties akin to the analogous Prussian Blue type cubic solids. These findings have led to a deeper understanding of the subtle nature of the chemistry of cyanide-based magnets. (Rescheduled from 3-22-07)



Kim R. Dunbar

Davidson Professor of Science; Distinguished Professor of Chemistry
Texas A&M University

CWRU Lecturer

Studies of Organometallic Reaction Steps in Homogeneous Catalysis

April 10, 2008

Our mechanistic studies of organometallic reactions are aimed at developing an understanding of how metals participate in the cleavage and formation of chemical bonds. This understanding is key to the rational design of selective homogeneous catalysts for new and valuable transformations.



Karen I. Goldberg

Professor of Chemistry
University of Washington

Bridgestone Lecturer

New Metal-Metal Bonds

April 24, 2008

The synthesis and characterization of transition metal compounds with new types of multiple bonds, unusual coordination numbers and oxidation states will be described.



Philip P. Power

Professor of Chemistry
Univ. of California, Davis

Goodyear Lecturer