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

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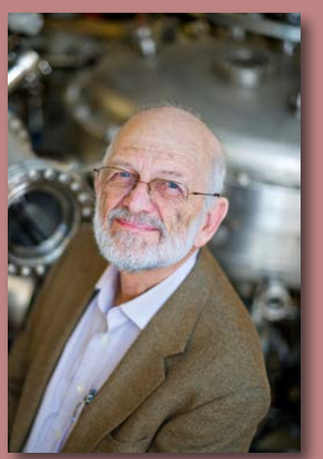
The Seventy-Second FRONTIERS IN CHEMISTRY



2012–2013

FRONTIERS IN CHEMISTRY

Case Western Reserve University
2012-2013

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/info/frontiers/

FRONTIERS LECTURE SERIES COMMITTEE

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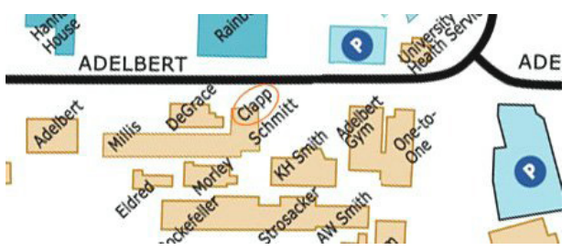
The University acknowledges with appreciation the guidance provided by the external members of the Frontiers in Chemistry Lecture Series Committee and the support provided by the organizations indicated.



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

www.case.edu/visit/

Magnetism in Chemistry

Magnetic Nanoparticles for Bioimaging and Therapeutic Applications

October 4, 2012

We have synthesized a series of monodisperse magnetic nanoparticles with tunable sizes and magnetic properties. We have functionalized these nanoparticles with proper targeting agents and anticancer drugs so that they are both stable and target-specific in physiological solutions with the drug being released in a pH controlled manner. These nanoparticles have potential as magnetic probes for imaging and therapy.

Shouheng Sun

Professor
Department of Chemistry
Brown University

NASA Lecturer

campus host Clemens Burda

Nano-Tools to Battle Cancer: Magnetic Nanotags, Protein Chips and Cell Sorters

October 25, 2012

Engineered functional magnetic nanotags, with a diameter of only about 50-100 nm, are extremely useful for in-vitro cancer diagnostics and circulating tumor cell (CTC) isolation. The resulting nanotechnologies are promising for monitoring therapeutic responses during cancer management or for detecting early stage cancers.

Shan Wang

Professor
Department of Materials Science and Engineering
Stanford University

CWRU Lecturer

campus host Anna Samia

Biomedical Nanomagnetics: Advances in *in vivo* Imaging and Therapy

November 1, 2012

This talk will describe the development of multifunction platforms for translational imaging and therapy based on functionalized, biocompatible, theranostic magnetic nanoprobes. I will discuss the emerging technique of magnetic particle imaging focusing on coronary angiography, MRI contrast agents responsive to specific physiological changes and magnetic relaxation dynamics optimized for localized heating as a therapeutic modality and triggered drug release.

Kannan M. Krishnan

Professor
Department of Materials Science and Engineering
University of Washington

Energizer Lecturer

campus host Anna Samia

Nanoparticles as Diagnostics and Therapeutics

February 7, 2013

Surface structure dictates the interaction of nanomaterials with biosystems. In our research we use the tools of organic chemistry to engineer nanoparticle surfaces for use as therapeutic agents and diagnostics.

Vincent M. Rotello

Charles A. Goessman Professor
Department of Chemistry
University of Massachusetts, Amherst

CWRU Lecturer

campus host Clemens Burda

Analytical Chemistry

The Cell by Cell Chemical Characterization of the Brain: New Tools to New Insights

January 17, 2013

One expects the suite of chemical players in a brain region to be known, but there are surprising holes in such knowledge. New mass spectrometry imaging and single cell measurements are described that allow the characterization of individual neurons and small brain regions; these approaches are used to explore the complex chemical mosaic of the brain and pinpoint key players in several physiological and pathological processes.

Jonathan V. Sweedler

James R. Eiszner Family Chair
Director of the School of Chemical Sciences
University of Illinois

Lubrizol Lecturer

campus host James Burgess

The Nanoliter Lab: Using Droplet Microfluidics for Chemical Experiments

February 21, 2013

Recent advances in microfluidics allow nanoliter droplets to be created, manipulated, and analyzed at high rates. We will explore this new technology, its underlying principles, and its application to diverse areas such as label-free high-throughput screening and in vivo chemical sensing.

Robert T. Kennedy

Hobart H. Willard Professor
Department of Chemistry
University of Michigan

CWRU Lecturer

campus host Daniel Scherson

Analysis *in Situ*: Operating Rooms, Crime Scenes, Grocery Stores, and Factory Floors

March 7, 2013

This talk uses everyday applications of mass spectrometry to entice you to consider the fundamental science of this fascinating instrumental method of chemical analysis.

R. Graham Cooks

Henry B. Hass Professor
Department of Chemistry
Purdue University

CWRU Lecturer

campus host Robert Dunbar

Microfabricated Devices for Elucidating Chemical and Biochemical Information

April 11, 2013

We have been utilizing fabrication methods originally developed by the microelectronics industry to realize devices with micro and nanoscale features that are capable of efficiently providing chemical information. Examples of recent developments from our laboratory will be presented for the analysis of gas and liquid phase materials.

J. Michael Ramsey

Minnie N. Goldby Distinguished Professor
Department of Chemistry
University of North Carolina

BASF Lecturer

campus host Rajesh Viswanathan