MICHIGAN STATE UNIVERSITY | Department of Chemistry

DOW

The Dow/Karabatsos Distinguished Lectureship

The Dow/Karabatsos Lecture Series in the Chemical Sciences has enriched the experience of workers in the chemical sciences at MSU for over thirty years. As is evident from the list of distinguished speakers, this lectureship has provided opportunities for students and faculty to interact with outstanding researchers from all areas of chemistry. We are grateful to Dow for their ongoing support that permits us to continue the tradition of extending invitations to outstanding scholars and teachers such as Professor Gray. The Department has started an endowment for this lecture series in honor of MSU Professor Gerasimos J. Karabatsos.

If you're interested in contributing to the Karabatsos Lecture Fund, please visit:
http://www.chemistry.msu.edu/KarabatsosFund

Previous Dow/Karabatsos Lecturers

1981	George A. Olah*
1982	Gabor A. Somorjai
1983	Allen J. Bard
1984	John H. Sinfelt
1985	Robert G. Bergman
1986	Paul von R. Schleyer
1987	Robert H. Grubbs*
1988	F. Albert Cotton
1989	Julius Rebek
1990	Tobin J. Marks
1991	Nicholas J. Turro
1992	Marye Anne Fox
1993	Richard H. Holm
1994	John I. Brauman
1995	Josef Michl
1996	JoAnne Stubbe
1997	Dale L. Boger
1998	Fred W. McLafferty
1999	Daniel G. Nocera
2000	K. C. Nicolaou
2001	Richard R. Schrock*
2002	Jean M.J. Fréchet
2003	Robert H. Grubbs*
2004	Galen D. Stucky
2005	Donald A. Tomalia Emmanuel P. Giannelis Andrew Ellington Joseph A. Caruso Larry R. Dalton
2006	Sidney M. Hecht
2007	John E. Bercaw
2008	Peter J. Stang
2009	David W. C. MacMillan
2010	Daniel A. Singleton
2012	Maurice Brookhart
2013	Gregory C. Fu
2014	Krzysztof Matyjaszewski
2016	Timothy M. Swager

*Nobel Prize Winner

MICHIGAN STATE UNIVERSITY | Department of Chemistry

Dow/Karabatsos Distinguished Lectureship

in the

Chemical Sciences

Presents

Professor Harry B. Gray

Arnold O. Beckman Professor of Chemistry

California Institute of Technology

April 25 and 26, 2017

Sponsored by:
The Dow Chemical Company
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MICHIGAN STATE UNIVERSITY | Department of **Chemistry**

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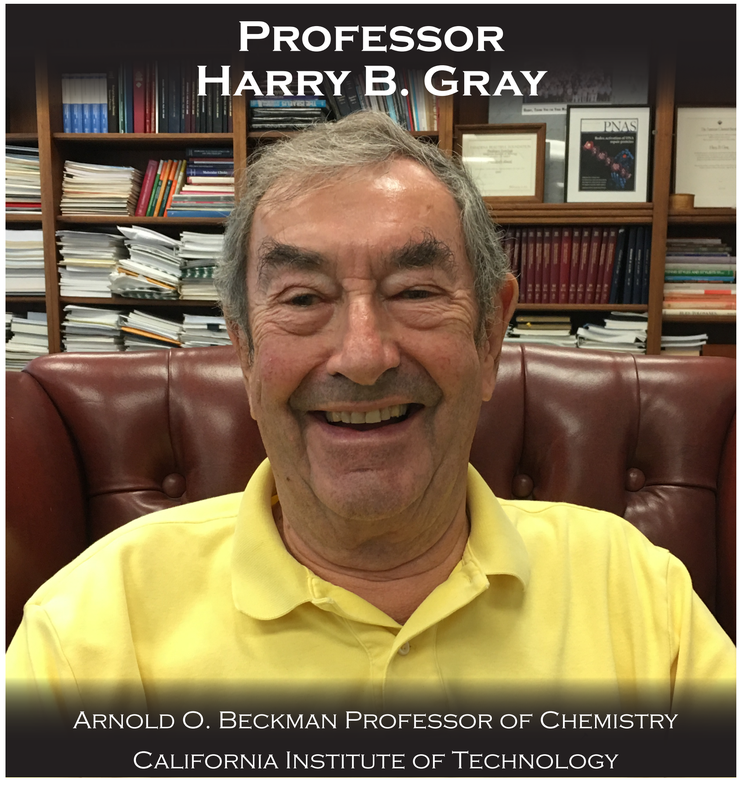
2017 Dow/Karabatsos Distinguished Lectureship

April 25 and 26, 2017



"The Currents of Life: Electron Flow through Proteins"

TUESDAY, APRIL 25, 2017 AT 4:10 PM
ROOM 136 CHEMISTRY BUILDING

"Solar-Driven Water Splitting"

WEDNESDAY, APRIL 26, 2017 AT 5:00 PM
ROOM 138 CHEMISTRY BUILDING

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Accommodations for persons with disabilities may be requested by calling the Chemistry Department at (517) 355-9715, two days prior to the event to ensure sufficient time to make the arrangements. Requests received after this date will be met when possible.

"The Currents of Life: Electron Flow through Proteins"

TUESDAY, APRIL 25, 2017 AT 4:10 PM
ROOM 136 CHEMISTRY BUILDING

Biological electron transfers often occur between metal-containing cofactors that are separated by very large molecular distances. Understanding the underlying physics and chemistry of these long-range electron transfer processes is the goal of much of the work in my laboratory. Employing laser flash-quench triggering methods, my coworkers and I have shown that 2-nm, coupling-limited Fe(II) to Ru(III) and Cu(I) to Ru(III) electron tunneling reactions in Ru-modified cytochromes and blue copper proteins occur on microsecond to nanosecond timescales. We also have demonstrated that redox equivalents can be transferred even longer distances by multistep tunneling (hopping) through intervening tyrosines and tryptophans: notably, in work on cytochrome P450 and azurin, we have found that long-range hole hopping through intervening tryptophans can be orders of magnitude faster than single-step tunneling. Could hole hopping through Tyr/Trp chains protect redox enzymes from oxidative damage? We think so! By examining the structures of P450 and related enzymes, we have identified candidate Tyr/Trp chains that could transfer holes from uncoupled high-potential intermediates to cellular reductants in contact with protein surface sites.

"Solar-Driven Water Splitting"

WEDNESDAY, APRIL 26, 2017 AT 4:30 PM
ROOM 136 CHEMISTRY BUILDING

Molecular hydrogen has emerged as an attractive candidate for a clean, renewable fuel to meet the world's skyrocketing demand for energy. Hydrogenase enzymes that contain iron and nickel cofactors evolve H_2 catalytically from water with very high turnover frequencies. However, the relative instability of these enzymes under aerobic conditions has led to the search for robust inorganic catalysts for production of hydrogen from water. We are working on heterogeneous inorganic catalysts made from earth-abundant elements that could be part of scalable solar fuel devices. We have found that materials such as Ni–Mo nanopowders and metal phosphide nanocrystals have catalytic efficiencies near that of platinum for reduction of protons in aqueous solutions. A major challenge now is to find scalable materials that can be employed as active catalysts in integrated photoanodes for production of oxygen from water, as required for the generation of protons and electrons for combination at photocathodes. We have found that mixed-metal nanosheet hydroxides made by pulsed laser ablation of precursors in water are very active water oxidation catalysts. We are working on the structures and mechanisms of these nanosheet materials to aid in the design and construction of more efficient and robust integrated photoanodes for water splitting.