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 Nocera. The Department has started an endowment for this lecture series in honor of MSU Professor Gerasimos J. Karabatsos.

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http://www.chemistry.msu.edu/KarabatsosFund

Previous Dow/Karabatsos Lecturers

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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
2017	Harry B. Gray

*Nobel Prize Winner

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Dow/Karabatsos Distinguished Lectureship

in the

Chemical Sciences

Presents

Professor Daniel G. Nocera

Patterson Rockwood Professor of Energy
Harvard University

April 3 and 5, 2018

Sponsored by:
The Dow Chemical Company
and the
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DOW

Lecture Topics

Tuesday, April 3, 2018
4:10 pm, Room 136 Chemistry
"Proton-Coupled Electron Transfer Chemistry of Energy Conversion Catalysis"

Thursday, April 5, 2018
4:10 pm, Room 136 Chemistry
"A Complete Artificial Photosynthesis: Fuels to Food from Sunlight, Air, and Water"

Daniel G. Nocera is the Patterson Rockwood Professor of Energy at Harvard University. He moved to Harvard in 2013 from Massachusetts Institute of Technology, where he was the Henry Dreyfus Professor of Energy, and Director of the Solar Revolutions Project, and Director of the Solar Frontiers Center. He has achieved world-wide recognition as a leading researcher in renewable energy at the molecular level. His group pioneered studies of the basic mechanisms of energy conversion in biology and chemistry, with primary focus in recent years on the generation of solar fuels.

Professor Nocera's paper in *Science* in 2008 described the creation of water splitting catalysts that mimicked the formation, structure, self-healing properties and function of the oxygen evolving complex found in the natural photosynthetic apparatus. He followed up this work with a paper to *Science* in 2011 that described the integration of the catalysts with silicon to produce the artificial leaf, which captures the elements of the direct solar fuels process of photosynthesis—the splitting of water into hydrogen and oxygen using light from neutral water, at atmospheric pressure and room temperature. The artificial leaf was named by *Time Magazine* as Innovation of the Year for 2011. He has performed this solar process at efficiencies of greater than 10%. He has since realized a complete artificial photosynthetic cycle, carbon dioxide + water + solar light to oxygen + biomass (and liquid fuels). The complete artificial photosynthesis was accomplished using a bio-engineered bacterium, *Ralstonia eutropha*, which efficiently converts CO_2, together with the H_2 produced from the artificial leaf, into biomass and fusel alcohols. In his 2016 *Science* article of this hybrid microbial I artificial leaf system, he reported solar-to-biomass (10.2%) and solar-to-fuels (6.7%) yields that greatly exceed that of natural photosynthesis. These science discoveries set the stage for a storage mechanism for the large scale, distributed deployment of solar energy. Other areas of interest include the development of proton-coupled electron transfer and its application to radical enzymology, the development of new cancer therapies by creating nanocrystal chemosensors for metabolic tumor profiling, the creation of spin-frustrated materials, which has culminated in the discovery of the quantum spin liquid, and the invention of molecular tagging velocimetry techniques for the measurement of highly turbulent fluid flows.

Professor Nocera has been awarded the Leigh Ann Conn Prize for Renewable Energy, Eni Prize, IAPS Award, Burghausen Prize, Elizabeth Wood Award and the United Nation's Science and Technology Award for his discoveries in renewable energy. On this topic, he has also received the Inorganic Chemistry, Harrison Howe, Remsen and Kosolapoff Awards from the American Chemical Society. He has received honorary degrees from Harvard University, Michigan State University, and the University of Crete. He is a member of the American Academy of Arts and Sciences, the U.S. National Academy of Sciences and the Indian Academy of Sciences, and he is a Fellow of the Royal Society of Chemistry. He was named among the 100 Most Influential People in the World by *Time Magazine* and was 11th on the *New Statesman's* list on the same topic.