Enrique Iglesia
Theodore Vermeulen Chair in Chemical Engineering, University of California at Berkeley;
Faculty Senior Scientist, Lawrence Berkeley National Laboratory;
Director, Berkeley Catalysis Laboratory

Enrique Iglesia is the Theodore Vermeulen Chair in Chemical Engineering at the University of California at Berkeley, a Faculty Senior Scientist at the Lawrence Berkeley National Laboratory, and the Director of the Berkeley Catalysis Laboratory. He received a B.S. from Princeton University (1977) and a Ph.D. from Stanford University (1982) in chemical engineering. He joined Berkeley in 1993 after 12 years as a research scientist and manager at the Exxon Corporate Research Labs. He has served as Editor-in-Chief of Journal of Catalysis (1997–2010) and acted as President of the North American Catalysis Society since 2008. He was elected to the National Academy of Engineering in 2008. He is a Fellow of the American Chemical Society and the American Institute of Chemical Engineers and an Honorary Fellow of the Chinese Chemical Society.

His group addresses the synthesis and the structural and functional characterization of solids used as catalysts for production of fuels and petrochemicals, for conversion of energy carriers, and for improving the energy and atom efficiency and the sustainability of chemical processes. His work combines synthetic, spectroscopic, theoretical, and mechanistic techniques to advance novel concepts and applications in heterogeneous catalysis. He has coauthored more than 300 publications and 40 U.S. patents.

His research has been recognized with the 2012 ENI Research Prize, the Somorjai and Olah Awards of the American Chemical Society, the Wilhelm and Alpha Chi Sigma Awards of the American Institute of Chemical Engineers, the Emmett and Burwell Awards of the North American Catalysis Society, the Cross Canada Lectureship of the Chemical Institute of Canada, and the François Gault Award of the European Federation of Catalysis Societies. He has also received the Award for Excellence in Natural Gas Conversion, the Tanabe Prize in Acid-Base Catalysis, a Humboldt Senior Scientist Award from the Alexander von Humboldt Foundation, and the Noyce Prize, the highest teaching honor in the sciences at Berkeley, as well as several teaching awards within the College of Chemistry.

Lecture 1: Nanoparticles and Nanospaces in the Practice of Catalysis

Thursday, April 16, 2015:
Reception: 11:00 am, 267 CBEC
Lecture: 11:30 am - 12:30 pm, 130 CBEC

Chemical reactions occur at the smallest of dimensions, where bonds cleave and form. The size of molecules, catalytic structures, and their containers matters at this nanometer scale. Diversity and specificity in catalysis exploit size to extend the properties of elements from those in their bulk state. Reactivity in metals and oxides changes markedly as coordination and electronic environment at exposed surfaces vary with cluster size. Low-coordination atoms on small clusters stabilize transition states for reactions limited by bond cleavage on bare surfaces. Such atoms, however, also stabilize chemisorbed reactants, making small clusters less reactive when steps require such species. On semiconductors, such as oxides and sulfides, the charge delocalization required at transition states leads to an intrinsic link between reactivity and electronic/optical properties. Confinement of catalytic structures within small voids preserves their size, protects them from impurities, and allows preferential access by certain reactants, while also selecting specific transition states, thus conferring enzyme-like specificity to chemical catalysis.

Lecture 2: Navigating the Chemical Engineering Toolbox: The Curious Matter of C, Chemistry

Friday, April 17, 2015:
Lecture: 10:30 am - 11:30 pm, 130 CBEC

The recurring need for advantaged feedstocks as precursors to chemicals and fuels brings us once again to scientific and engineering matters pertaining to the conversion of molecules without any C-C bonds (methane, methanol, dimethyl ether). Such C, molecules, especially methane, present thermodynamic and kinetic challenges that bring significant complexity and costs into their chemical transformations. We gather here some unifying concepts and, in doing so, provide guidance about the most attractive C, conversion strategies. These concepts include (i) thermodynamic constraints and the limitations of catalysis in circumventing them; (ii) the pre-eminence of process simplicity and inexpensive oxidants over the allure of direct conversions; (iii) principles of kinetic and thermodynamic protection (iv) the coupling of separations with reactions and of multiple catalytic functions; (v) the prevalence of kinetic bottlenecks in forming the first C-C bond; and (vi) the emergence of a C, conversion platform as we overcome (or accept) the limits of C, chemistries. The conclusions are sobering, as the magnitude of the challenge so warrants.
~LOWRIE LECTURESHIP AWARD PRESENTATION~

Enrique Iglesia

~SPECIAL STUDENT AWARDS & RECOGNITIONS~


Angela Chen: NSF Graduate Research Fellowship. (Advisor: D. Wood)


Joseph Gauthier: NSF Graduate Research Fellowship Honorable Mention and First Place, Denman Undergraduate Research Forum, Engineering Division. (Advisor: K. Koelling)

Shweta Singh: Best paper award from AIChE's Sustainable Engineering Forum, published in Environmental Science and Technology. (Advisor: B. Bakshi)

Varun Vakharia: 2015 Elias Klein Founders' Travel Supplement Award from the North American Membrane Society (NAMS). (Advisor: W.S.W. Ho)

Nathan Volchko: NSF Graduate Research Fellowship Honorable Mention. (Advisor: K. Koelling)

Hannah Zierden: Third place, Denman Undergraduate Research Forum, Engineering Division. (Advisor: D. Wood)

~AIChE STUDENT CHAPTER OFFICERS~

Co-Presidents: Hussein Alkhaitib and Shaista Mallik; Treasurer: Chris Miehl; Secretary: Liza Dias; Social Chair: Mitch Anderskov; Philanthropy Chair: Eric Hoff; E-Council Representative: Da Inn Park; Webmaster: Alejandro Garcia-Fuentes; Member Recruitment Chair: Mohamad Hamayel; Marketing Chair: Kate Raftery; Senior Class Representative: Kristen Myers; Junior Class Representatives: Nathan Randall and Sal Alshabani; Sophomore Class Representative: Lynn Bakes. (Advisor: A. Asthagiri)

~CHEM E CAR OFFICERS~


~CEGC OFFICERS~

Academic Officer: Sreshtha Sinha Majumdar; Business Officer: Cheng Chung; Facilities Officer: Kyong-Joo Jenny Park; Recruitment Officer: Merideth Cooper; Social Officer: Gauri Nabar.

~GRADUATE RESEARCH SYMPOSIUM~

Chair: Matt Gallovin; Vice-Chairs: Ankita Majumder; Sumant Patankar; Varsha Gopalakrishnan; Committee Members: Elf Miskioglu, Viraj Modak, Gauri Nabar, Kyong-Joo Jenny Park, Nitish Deshpande, Aamena Parulkar.

~CBE DEPARTMENT AWARDS~

Outstanding Undergraduate Award for Research Excellence:

Hussein Alkhaitib Advisor: L.-S. Fan
Stephen Bolan Advisor: W.S.W. Ho
Abbey Empfield Advisor: L.-S. Fan
Joseph Gauthier Advisor: K. Koelling
Michael Homsky Advisor: L. Lee
David Kopechek Advisor: L.-S. Fan
Nathanial Kramer Advisor: U. Ozkan
Alec Sunyecz Advisor: L. Lee
Jing Na Advisor: L.-S. Fan
Nathan Volchko Advisor: K. Koelling

Outstanding Graduate Award for Academic Achievement:

Samuel Bayham Advisor: L.-S. Fan
Yuaxin Chen Advisor: W.S.W. Ho
Elena Chung Advisor: L.-S. Fan
Niranjan Deshpande Advisor: L.-S. Fan
Rebecca Hanes Advisor: B. Bakshi
Mandar Kathe Advisor: L.-S. Fan
Wenjia Luo Advisor: A. Asthagiri
Andrew Maxson Advisor: J. Zakin
Li Pan Advisor: A. Asthagiri
Hyuntae Sohn Advisor: U. Ozkan
Zi Tong Advisor: W.S.W. Ho
Varun Vakharia Advisor: W.S.W. Ho
Aining Wang Advisor: L.-S. Fan
Le Yu Advisor: S.-T. Yang
Mengmeng Xu Advisor: S.-T. Yang
Simuck Yuk Advisor: A. Asthagiri

Outstanding Post-Doc Award for Research Excellence:

Lang Qin Advisor: L.-S. Fan
Doruk Dogu Advisor: U. Ozkan

~AIC (AMERICAN INSTITUTE OF CHEMISTS) FOUNDATION~

AIC Outstanding Undergraduate Student Award: Angela Chen. (Advisor: D. Wood)
AIC Outstanding Graduate Student Award: Daniel Knight. (Advisor: M. Feinberg)
AIC Outstanding Postdoctoral Award: Lin Zhao. (Advisor: W.S.W. Ho)

~AIChE STUDENT AWARDS~

AIChE Central Ohio Section Outstanding Student Award: Hannah Zierden
Donald F. Othmer AIChE Sophomore Academic Excellence Award: Brian Kulp

Thank you for attending!
Previous Recipients of the Lowrie Lectureship:

- 1996 Lecturer: John F. Davidson, University of Cambridge
- 1997 Lecturer: William R. Schowalter, University of Illinois at Urbana-Champaign
- 1998 Lecturer: James Wel, Princeton University
- 1999 Lecturer: Judson King, University of California, Berkeley
- 2000 Lecturer: Robert Langer, MIT
- 2001 Lecturer: Roy Jackson, Princeton University
- 2002 Lecturer: Alexis T. Bell, University of California, Berkeley
- 2004 Lecturer: John H. Seinfeld, California Institute of Technology
- 2005 Lecturer: Charles A. Eckert, Georgia Tech
- 2006 Lecturer: Alice P. Gast, Massachusetts Institute of Technology
- 2007 Lecturer: Greg Stephanopoulos, Massachusetts Institute of Technology
- 2008 Lecturer: Carol K. Hall, North Carolina State University
- 2009 Lecturer: Gabor A. Somorjai, University of California, Berkeley
- 2010 Lecturer: Rakesh K. Jain, University of California, Berkeley
- 2011 Lecturer: Frank S. Bates, University of Minnesota
- 2012 Lecturer: Pablo G. DeBenedetti, Princeton University
- 2013 Lecturer: Mark E. Davis, California Institute of Technology
- 2014 Lecturer: William F. Banholzer, University of Wisconsin-Madison

The William G. Lowrie Lectureship was established in the department of chemical engineering at The Ohio State University on October 1, 1995 to honor distinguished alumnus William G. Lowrie. The lectureship is awarded annually to an individual who has made outstanding contributions to fundamental or applied research in the field of chemical engineering.