

MARVIN D. RAUSCH LECTURESHIP IN ORGANOMETALLIC CHEMISTRY

Professor Marvin D. Rausch was a devoted faculty member of the Department of Chemistry at UMass Amherst from 1963 to 2001. He was widely recognized for research in organometallic chemistry and authored or co-authored over 350 scientific articles and



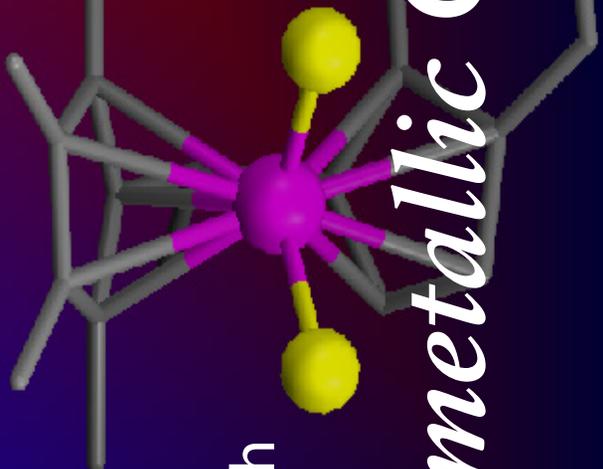
served on the editorial boards of several journals in this area of chemistry. **Professor Rausch** mentored over 40 PhD students during his tenure here, and his course in advanced laboratory methodology set a standard for the training of advanced undergraduate and beginning graduate students. In addition to sponsoring this honorary seminar, he was also a generous donor to UMass Amherst's Athletic program and gave part of his fantastic crystal and mineral collection to the Department of Geosciences. To see a sample of the collection go to www.geo.umass.edu/rauschmineralgallery/

The **Marvin D. Rausch Lectureship in Organometallic Chemistry** was established to provide support for a lecture series which will be presented by individuals with outstanding established reputations in any aspect of organometallic chemistry. In this context, organometallic chemistry is described as the chemistry of chemical components which possess a direct carbon-to-metal bond. Areas of potential expertise for the focus of the **Marvin D. Rausch Lectureship in Organometallic Chemistry** include synthesis, catalysis, structure, bonding, spectroscopy, applications, or related areas.

We are extremely grateful to the late **Prof. Rausch** and family for the endowment of this seminar series.

Previous Speakers:

Professor Stephen Buchwald, 2017
Professor Wolfgang Herrmann, 2016
Professor Karl Wieghardt, 2015
Professor Tobin J. Marks, 2014
Professor Jerry L. Atwood, 2013
Professor Robert G. Bergman, 2012
Professor Thomas E. Bitterwolf, 2011



Marvin D. Rausch
Lectureship in

Organometallic Chemistry

The Department of Chemistry, University of Massachusetts Amherst
presents

PROFESSOR ERIC JACOBSEN

Harvard University
Department of Chemistry and Chemical Biology

“Seeking Perfect Catalysts”

Thursday, March 1, 2018
11:30 a.m.
1634 Lederle Graduate Research Tower
Refreshments at 11:00 a.m.

Eric Jacobsen

Eric Jacobsen was born in New York City and received his B.S. degree from New York University in 1982. His Ph.D. work was done at U.C. Berkeley under the direction of Robert Bergman. In 1986, he returned to the East Coast of the U.S. for an NIH postdoctoral fellowship at MIT with Barry Sharpless. In 1988, he began his independent career with the first of five blissful years on the faculty at the University of Illinois. He moved to Harvard University as full professor in the summer of 1993, and he was named the Sheldon Emory Professor of Organic Chemistry in 2001. He served an extended term as Chair of the Department of Chemistry & Chemical Biology from 2010 to 2015.



Eric Jacobsen directs a research group dedicated to discovering useful catalytic reactions, and to applying state-of-the-art mechanistic and computational techniques to the analysis of those reactions. Several of the catalysts developed in his labs have found widespread application in industry and academia. These include metal-salen complexes for asymmetric epoxidation, conjugate additions, and hydrolytic kinetic resolution of epoxides; chromium-Schiff base complexes for a wide range of enantioselective pericyclic reactions; and organic hydrogen bond-donor catalysts for activation of neutral and cationic electrophiles. Jacobsen's mechanistic analyses of these systems have helped uncover general principles for catalyst design, including electronic tuning of selectivity, cooperative homo- and hetero-bimetallic catalysis, hydrogen-bond donor asymmetric catalysis, and anion binding catalysis.

The awards Jacobsen has received include the NSF Presidential Young Investigator Award (1990), the Packard Fellowship

(1991), the Camille and Henry Dreyfus Teacher-Scholar Award (1992), the Alfred P. Sloan Foundation Fellowship (1992), the ACS Cope Scholar Award (1993), the Fluka "Reagent of the Year" Prize (1994), the Thieme-IUPAC Prize in Synthetic Organic Chemistry (1996), the Baekeland Medal (1999), the ACS Award for Creativity in Synthetic Organic Chemistry (2001), the NIH Merit Award (2002), election to the American Academy of Arts & Sciences (2004), the Mitsui Catalysis Science Award (2005), the ACS H.C. Brown Award for Synthetic Methods (2008), the Janssen Prize (2010), election to the National Academy of Sciences (2008), the Noyori Prize (2011), the Nagoya Gold Medal Prize (2011), the Chirality Medal (2012), the Remsen Award (2013), the Esselen Award (2015), and the ACS Arthur C. Cope Award (2016).

ABSTRACT

"Seeking Perfect Catalysts"

Low molecular weight, chiral organic molecules possessing distinct hydrogen-bond donor motifs have been shown to catalyze an array of C–C and C–heteroatom bond-forming reactions with high enantioselectivity and broad substrate scope. In particular, dual hydrogen bond donors such as ureas, thioureas, squaramides, and guanidinium ions have been studied in detail in the context of electrophile activation. These catalysts operate by either of two, fundamentally different modes of electrophile activation: 1) direct hydrogen bonding to a neutral electrophile, and 2) anion binding to generate chiral ion pair. We have applied the latter reactivity concept to several classes of cationic electrophiles that have presented long-standing challenges to asymmetric catalysis.

In this lecture, I will describe detailed kinetic and mechanistic studies catalytic anion-abstraction processes. These investigations have revealed unexpected cooperative mechanisms, and new strategies for the design of highly efficient catalysts.