

UCLA

DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY



presents

## Boehringer Ingelheim – UCLA Lectureship

with

### Professor Michael J. Krische



*The Robert A. Welch Chair in Science*  
Department of Chemistry  
University of Texas at Austin

## “Formation of C-C Bonds via Catalytic Hydrogenation and Transfer Hydrogenation”

**Abstract.** The formation of carbon-carbon (C-C) bonds is central to the endeavor of chemical synthesis. Research in the Krische laboratory demonstrates that C-C bonds can be formed under the conditions of catalytic hydrogenation or transfer hydrogenation. Using cationic rhodium and iridium catalysts, diverse  $\pi$ -unsaturated reactants reductively couple to carbonyl compounds and imines under hydrogenation conditions, offering a byproduct-free alternative to stoichiometric organometallics in a range of classical C=X (X = O, NR) addition processes. This concept is extended further *via* “C-C bond forming transfer hydrogenations,” wherein the exchange of hydrogen between alcohols and  $\pi$ -unsaturated reactants triggers the generation of aldehyde-organometal pairs that combine to give products of carbonyl addition. Direct alcohol CH-functionalization *via* redox-triggered carbonyl addition enhances efficiency by merging alcohol-to-aldehyde redox manipulations and C-C bond construction events. This new pattern of reactivity was applied to the direct C-C coupling of  $\pi$ -unsaturated reactants to renewable alcohols (methanol, ethanol and glycerol) to furnish higher alcohols, and was used to construct diverse polyketide natural products (bryostatin, roxaticin, 6-deoxyerythronolide, etc.). This work represents the first systematic efforts to develop “C-C bond forming hydrogenations” beyond hydroformylation.

Thursday, November 20, 2014

5:00 PM

Cram Conference Room - 3440 Molecular Sciences Bldg

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