

# HOPE COLLEGE CHEMISTRY SEMINAR

## The Science of Solar Energy Conversion: An Inorganic Photochemist in Exxon Mobil's Court

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**Friday, November 13, 2009  
4:00 pm, Schaap 1000**

### *Abstract*

Recent attention to the dangers of climate change has spurred renewed efforts toward developing carbon-neutral sources of energy. Although there is no “silver bullet” for this impending crisis – all possible avenues must be explored – solar energy stands out as one option that has perhaps the greatest potential in terms of worldwide application. Following a discussion of some of the policy issues currently in play concerning alternative energies, this seminar will highlight our efforts to develop TiO<sub>2</sub>-based photovoltaics based on chromophores involving first-row transition metal complexes. In the course of our research, we have discovered that differences in electronic structure endemic to first-row versus isoelectronic second- or third-row complexes give rise to a fundamental change in the excited-state dynamics of such compounds that directly impacts the ability to incorporate this class of molecules into this technology. The key experimental findings establishing this paradigm will be described, along with strategies that we are currently pursuing to circumvent these problems in order to realize cheaper, more efficient photovoltaic devices.

### *Biography*

*Jim McCusker was born in New Haven, Connecticut. He did his undergraduate work at Bucknell University from which he received both B.S. and M.S. degrees in Chemistry in 1987. Jim carried out his doctoral work with Professor David N. Hendrickson at the University of Illinois at Urbana-Champaign. After receiving his Ph.D. in 1992, Jim did a two-year stay as an NIH Post-doctoral fellow with Professor Thomas J. Meyer at the University of North Carolina at Chapel Hill. Jim was appointed as Assistant Professor of Chemistry at the University of California at Berkeley in 1994. Jim moved his group to Michigan State University in 2001, where he is currently Professor of Chemistry. Jim's research focuses on the synthesis, physical, and photophysical properties of transition metal complexes with emphasis on solar energy conversion and the influence of spin and spin polarization on chemical reactivity.*