The UT Chemistry Department proudly presents:

Dr. Matthew Platz
Chemistry Division Head

“Ultrafast Time-Resolved Studies of Excited States and Reactive Intermediates”

Seminar Not Webcast

October 20, 2011 - 3:45 PM – 555 Buehler Hall
(light refreshments served at 3:35 PM- Bu 511)
Website: http://www.nsf.gov/div/index.jsp?div=CHE

Dr. Platz is interested in the chemistry of short-lived, high energy, reactive molecules such as radicals, biradicals, carbenes, nitrenes and reactive oxygen species. His laboratory is actively involved in the synthesis of new precursors to reactive intermediates and studies their photochemistry with the classical methods of organic chemistry (synthesis, analysis of reaction mixtures, product isolation, and the spectroscopic identification of stable reaction products). To directly observe these fascinating molecules the laboratory employs laser flash photolysis techniques with femto, pico and nanosecond time resolution, matrix isolation spectroscopy and computational chemistry. The goals are both practical and theoretical. Elementary rearrangement reactions of fundamental interest are studied to test dynamical theories, to discover quantum mechanical tunneling processes, to understand the interactions of reactive intermediates with solvents, and to discover the molecular mechanism of action of anti-cancer drugs and anti-viral therapies.

Abstract:
Photolysis of azides, diazirines and diazo compounds generate carbene and nitrene reactive intermediates. Ultrafast time resolved UV-vis and IR spectroscopy allows the direct observation of the excited states of nitrogenous precursors. This in turn provides measurement of the lifetimes of these compounds as a function of molecular structure, solvent and excitation wavelength. Theory has provided additional insights into the nature of the electronic excited states and the processes by which they decay. Using UV-vis and IR spectroscopy with fs/ps time resolution, the conversion of precursor excited states into vibrationally and or electronically excited states of carbenes and nitrenes has been directly monitored. Certain reactive intermediates (singlet phenylcarbene, 1- and 2-naphthylnitrene, and ylidic species described from them have been detected for the first time. The relaxation of seminal reactive intermediates by geometric change, by solvent reorganization, by vibrational cooling, by intersystem crossing and by chemical reaction will be discussed.

Biosketch:
Professor Platz received B.S.c. degrees in Chemistry and Mathematics in 1973 at the State University of NY at Albany, his Ph.D. degree in Organic Chemistry with Professor Berson at Yale University in 1977 and he worked as a postdoctoral fellow at the University of Chicago with Professor Closs. Dr. Platz joined the Ohio State University in 1978. In 1984 he was promoted to Associate Professor and in 1989 to Professor. In 1995 he became the chair of the Chemistry Department. Professor Platz has received numerous awards including being elected Melvin S. Newman Professor of Chemistry and appointed Distinguished University Professor in 2001. Dr. Platz is an Alfred P. Sloan Fellow, a Camille and Henry Dreyfus Teacher Scholar and has received The Distinguished Scholar Award and the College of the Arts and Sciences Teaching Award of The Ohio State University, the Cope Scholar Award and the Remsen Award. Professor Platz has authored nearly 300 peer reviewed publications, has given over 170 invited lectures and has mentored over 30 M.S.c., 30 Ph.D. and 20 postdoctoral students. He is an inventor of 10 patents and has received continuous federal funding of his laboratory since 1979.