Chemistry 501 Seminar
Thursday, March 8, 2012
3:45 p.m. Buehler 415
Seminar Webcast
Refreshments in Buehler 412 at 3:30 p.m.

Dr. Timothy Zwier
M. G. Mellon Distinguished Professor of Chemistry
Purdue University
Hosted by Dr. Charles Feigerle

“Laser Spectroscopy of Molecular Shape in the Presence and Absence of Solvent:
When to Hold ‘em and When to Fold ‘em”

Introduction
Dr. Zwier did his undergraduate work at Calvin College, receiving a B.S. in chemistry in 1977. His graduate studies were carried out under the joint direction of Steve Leone and G. Barney Ellison at the University of Colorado-Boulder, where he received his Ph.D. in chemical physics in 1981. He then took a post-doctoral appointment at the University of Chicago, working with Donald Levy on the spectroscopy of jet-cooled molecules and molecular clusters. In 1983, he accepted a position on the faculty of Calvin College, an undergraduate institution in Grand Rapids, Michigan, where he set up a research program in laser spectroscopy. In 1988, he moved to Purdue University, moving through the ranks to his present position as the M.G. Mellon Distinguished Professor of Chemistry. From 2004-2008 he served as Department Head in Chemistry. His research interests span the fields of spectroscopy and chemical dynamics, with particular interest in the development and application of laser-based methods for studying the spectroscopy and isomerization dynamics of individual conformational isomers. Applications to molecules with biophysical significance, combustion, and astrochemistry are currently being pursued.

Abstract
The infrared or ultraviolet spectroscopy of large molecules with biological relevance is challenging in that the spectra often are a composite of absorptions from many conformational isomers whose individual contributions are hard to decipher. This talk will describe experimental methods used in our group at Purdue to study such molecules under isolated molecule conditions, combining laser desorption, supersonic cooling, and mass-resolved, resonant two-photon ionization spectroscopy. The infrared and ultraviolet spectra of individual conformations are probed using double-resonance laser spectroscopy. These spectra directly probe the intermolecular and intermolecular H-bonding networks formed, providing insight to the inherent conformational preferences of the molecules in the presence and absence of a controlled number of solvent molecules. Results from recent studies of synthetic foldamers, peptides, and water clusters bound to a model aromatic binding pocket will be described.

Website: http://www.chem.purdue.edu/people/faculty/faculty.asp?itemID=24