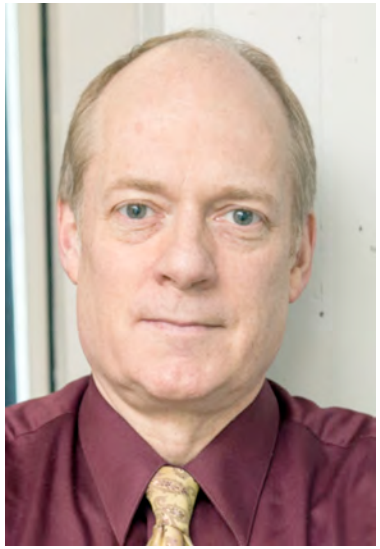

2016-2017 POCC Lecture Series

December 1, 2016, 8:00 PM

Fox Chase Chemical Diversity Center Lecture

Prof. Timothy M. Swager

Massachusetts Institute of Technology

Going π: Aromatic Chemistry for Optoelectronics and Energy

Carolyn Hoff Lynch Lecture Hall
Chemistry Building, University of Pennsylvania

The Philadelphia Organic Chemist's Club

POCClub.org

To join us for dinner before the lecture please contact POCC's secretary Thomas Razler (thomas.razler@bms.com) at least one week ahead of time.

Timothy M. Swager is the John D. MacArthur Professor of Chemistry and the Director, Deshpande Center for Technological Innovation at the Massachusetts Institute of Technology. A native of Montana, he received a BS from Montana State University in 1983 and a Ph.D. from the California Institute of Technology in 1988. After a postdoctoral appointment at MIT he was on the chemistry faculty at the University of Pennsylvania and returned to MIT in of 1996 as a Professor of Chemistry and served as the Head of Chemistry from 2005-2010. He has published more than 400 peer-reviewed papers and more than 70 issued/pending patents. Swager's honors include: Election to the National Academy of Sciences, an Honorary Doctorate from Montana State University, the Linus Pauling Medal, the Lemelson-MIT Award for Invention and Innovation, Election to the American Academy of Arts and Sciences, The American Chemical Society Award for Creative Invention, and The Carl S. Marvel Creative Polymer Chemistry Award (ACS). Swager's research interests are in design, synthesis, and study of organic-based electronic, sensory, high-strength, liquid crystalline, and colloid materials. His inventions have had wide ranging commecial impact, including the Fido™ sensors, which are the world's most sensitive explosives detectors. He is the scientific founder of 4 companies (DyNuPol, Iptyx, PolyJoule, and C_2 Sense) and has served on numerous corporate and government boards.

Abstract: This lecture will detail the synthesis and design of molecules and polymers with useful electronic properties. New luminescent materials having weakly overlapping HOMOs and LUMOs will be reported that display thermally activated delayed fluorescence. These materials are based upon three-dimensional structures that include triptycenes wherein different rings are coupled through homo-conjugation of the π systems, rigid host-guest complexes that display "lock and key" structures, and scaffolds with rigid co-facial alignment of chromophores. These systems have the property that their singlet and triplet excited states are close enough in energy such that there is rapid equilibrium between these different spin states. I will show the utility of these materials for the creation high efficiency organic light emitting devices (OLEDs). In pursuit of novel electroactive three-dimensional materials, we have found that certain nucleophilic aromatic substitution (S_NAr) reactions can be rapid and reversible. Building upon this result we have been developed dynamic covalent chemistry schemes to create highly efficient syntheses of electroactive polymers and large macrocycles.