



UNIVERSITY OF MINNESOTA
Driven to Discover™

Department of Chemistry

Student Seminar Series

10 a.m. Tuesday, April 24, 2012 • 220 STSS

Professor

Barry Trost

Department of Chemistry
Stanford University

The Alkyne Strategy for the Synthesis of Bioactive Targets

Website:

<http://www.stanford.edu/dept/chemistry/faculty/trost/>

Abstract

A major challenge for synthesis is the enhancement of efficiency. While most attention has focused on selectivity, the question of how much of what goes into the pot actually ends up as product, which I refer to as atom economy, is equally significant. This goal addresses the twin issues of better use of raw materials in order to conserve valuable resources and minimization of the generation of waste to reduce disposal issues. There are two strategic aspects. In one, efforts are made to improve existing processes. A second and, even more challenging one, is to invent new processes. This latter alternative also has the advantage of providing for new strategic concepts for constructing complex molecules that could further streamline syntheses.

The first step is to invent reactions that theoretically are capable of having maximal atom economy or nearly so. The ideal reaction is an addition. A description of a research program that asks the question of whether new addition reactions can be rationally invented is explored. A key element is the utilization of alkynes as key building blocks. The chemistry largely involves simple additions wherein anything else is needed only catalytically. Using a mechanism based approach, a number of new catalytic reactions is under development. The applications of some of these to interesting biomolecular targets is prominently considered.

Host:
Patrick Willoughby

Barry M. Trost was born in Philadelphia, PA, and earned his bachelor of arts degree with honors at the University of Pennsylvania. He attended the Massachusetts Institute of Technology as a National Science Foundation (NSF) Predoctoral Fellow under the direction of Herbert O. House. Trost's thesis research laid much of the foundation for our understanding of the fundamental reactivity of enolate anions. He received his doctorate in 1965 and immediately embarked on an academic career as an assistant professor at the University of Wisconsin–Madison. There he was quickly promoted to full professor (1969) and, subsequently, named a Vilas Professor (1982) on the basis of his contributions to the juvenile hormone, Pd-catalyzed allylic alkylations, and sulfur-based synthetic methodology. In 1987, Trost joined the faculty at Stanford University where he is the Job and Gertrud Tamaki Professor in the School of Humanities and Sciences. At Stanford, Trost began developing the concepts of atom economy in the context of both synthetic methodology and total synthesis. Over his career, Trost has earned a myriad of honors and awards recognizing his key contributions to a wide variety of important aspects in the field of organic chemistry. Of particular note are the American Chemical Society (ACS) Award in Pure Chemistry (1977), election to the National Academy of Sciences (1980), the ACS Award for Creative Work in Synthetic Organic Chemistry (1981), the Ernest Guenther Award in the Chemistry of Essential Oils and Related Products (1990), the Bing Teaching Award (1993), the Roger Adams Award (1995), the Herbert C. Brown Award for Creative Research in Synthetic Methods (1999), the Yamada–Koga Prize (2001), the Arthur C. Cope Award (2004), and the Nagoya Medal of Organic Chemistry (2008). Additionally, he has more than 890 scientific publications, 265 plenary lectures presented at national and international meetings, and an *h*-index of 110 ranking him 16th among living chemists.

