Will Gutekunst, Ph.D.  
Materials Research Laboratory  
University of California, Santa Barbara  

New Synthetic Strategies for Small Molecules, Macromolecules and Everything in Between  

Abstract  
New methods and strategies in organic synthesis continue to expand the types of materials accessible over a wide range of length scales. This seminar will explore how innovations in synthetic design can simplify problems in complex molecule synthesis, as well as lead to new concepts in controlled polymerization. The first part will detail how unconventional retrosynthetic disconnections can inspire new methods for the synthesis of functionalized cyclobutanes. This is demonstrated through the efficient preparation of a series of cyclobutane containing natural products using sequential C–H arylation reactions. The second part will focus on the development of a general approach to sequence-controlled polymers using relay-ring opening metathesis to polymerize macrocycles. This new strategy enables the incorporation of arbitrary functionality into the polymer backbone to impart useful properties such as degradability.