

Complex Natural Products as a Driving Force for Discovery in Organic Chemistry

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Our laboratory is deeply interested in the discovery and development of new reaction methodology *en route* to the chemical synthesis of complex bioactive molecules. Research in our group at the California Institute of Technology is centered in the general area of synthetic chemistry, with a focus on the development of new strategies for the preparation of complex molecules, including natural products that possess interesting structural, biological, and physical properties. Concurrent to this program of target driven synthesis is a strong effort directed toward the development of new techniques and reaction methods, which will be useful for a range of applications. Typically, the complex target structure is used as an inspiration for the discovery of new reactions and technologies that may eventually be regarded as general synthetic methodology. Consequently, this approach provides access to a) novel, medicinally relevant structures, b) a general method for their synthesis, and c) new synthetic methods that will be beneficial for a host of applications.

The catalytic asymmetric synthesis of all-carbon quaternary stereocenters stands as a significant challenge in synthetic chemistry and we have encountered this problem many times in the course of natural product total syntheses. As a result of such endeavors, we have been developing mild, catalytic methods that allow for efficient and stereoselective construction of these challenging centers. Our recent results and applications of these new methods will be discussed in the lecture.