BINGHAMTON
UNIVERSITY
STATE UNIVERSITY OF NEW YORK
DEPARTMENT OF CHEMISTRY

THE THIRD ANNUAL
John Eisch Lectureship in Organic Synthesis

Friday, November 7, 2014, 4:00 p.m.
Science Library, Room 212

14-581

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

BRIAN M. STOLTZ

Division of Chemistry and Chemical Engineering
California Institute of Technology

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 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 Stoltz group has been heavily involved in the synthesis of complex natural products such as the cyanthiwigins, quinocarcin, lemonomycin, and the dragmacidins. These naturally occurring molecules possess promising biological properties ranging from activity against antibiotic-resistant bacteria, to antiproliferative, to anti-HIV action. Furthermore, they are structurally novel and are inherently a challenge to the state-of-the-art in synthetic chemistry. In the process of completing the synthesis of these important compounds, we have developed a number of new methods that enabled their access. Much of the group’s methodological research has focused on new asymmetric catalytic methods for carbon–carbon bond formation and the synthesis of challenging stereochemically-rich sub units. These topics will be discussed in the lecture.

Professor John J. Eisch

John Joseph Eisch joined the Department of Chemistry at Binghamton University in 1972 as chair and professor of chemistry with the mandate of fostering the national reputation of its graduate teaching and research. Over the next six years as chair, he guided the recruiting of six senior and junior faculty with this goal in mind, while expanding his own research in organometallic chemistry to a yearly group of 8 to 12 graduate and postdoctoral students with support from Federal and industrial resources. In 1983 his composite achievements were recognized by his promotion to the SUNY-wide rank of Distinguished Professor of Chemistry. Further recruiting, notably, during the chairs of Professor Stevens, Lees and currently Jones has expanded the scope of advanced research into areas of immediate importance, such as nano materials, homogeneous catalysis, analytical sensors, biological transformations and energy storage.

Professor Eisch's prior education and professional experience have consisted of receiving the BS degree in chemistry, summa cum laude, from Marquette University in 1952; earning the PhD degree in 1956, with Henry Gilman, at Iowa State University; and serving as Union Carbide Research Fellow with Karl Ziegler at the Max-Planck-Institut für Kohlenforschung, Mülheim, Germany (1956-57). After junior professional appointments at St. Louis University and at the University of Michigan, he became Ordinary Professor and Department Head at the Catholic University of America (1963-1972).

Over the years, his research has involved the fruitful collaboration of more than 200 students as master's, doctoral, postdoctoral or baccalaureate associates. The results have been reported in more than 390 scientific publications, in some 280 invited lectures worldwide, in the monograph "The Chemistry of Organometallic Compounds" (Macmillan, 1967), and in the edited series, "Organometallic Syntheses" (four volumes, J.J. Eisch and R.B. King, authors and editors). He has been an industrial consultant on organometallic chemistry and an expert witness in several patent litigations on Ziegler-Natta polymerization catalysis. Recently he has published his reminiscences as a postdoctoral fellow with Karl Ziegler and as a young academic, in the invited review, "Fifty Years of Ziegler-Natta Polymerization: From Serendipity to Science. A Personal Account," in Organometallics, 2012, 31, 4917-4932, and in Dalton Transactions 2014 (DOI: 10.1039/c4dt010362) "Emergence of Electrophilic Alumination as the Counterpart of Established Nucleophilic Lithiation."

Previous Lectureship Recipients

2012
Stephen L. Buchwald (MIT) "Palladium-Catalyzed Carbon-Nitrogen and Carbon-Carbon Bond-Forming Reactions: Progress, Applications and Mechanistic Studies"

2013
David W. C. MacMillan (Princeton University) "The Use of Photoredox Catalysis in New Organic Bond Forming Reactions"

Professor Brian M. Stoltz

Brian M. Stoltz was born in Philadelphia, Pennsylvania, USA in 1970. After spending a year at the Ludwig Maximilians Universität in München, Germany, he obtained his BS in Chemistry and BA in German from Indiana University of Pennsylvania in 1993. He then moved on to Yale University (1993-1997) where he earned his PhD under the direction of Professor John L. Wood in the area of indolocarbazole total synthesis. Stoltz was an NIH postdoctoral fellow in the laboratories of Professor E. J. Corey at Harvard University (1998-2000) where he developed the first total synthesis of a number of nicandrenones. Stoltz has been a member of the faculty at Caltech since the summer of 2000, where he currently is Professor of Chemistry. His research focuses on the design and implementation of new synthetic strategies for the synthesis of complex molecules possessing important biological properties, in addition to the development of new synthetic methods including asymmetric catalysis and cascade processes.

In addition to awards from a number of pharmaceutical companies (i.e., Abbott, Amgen, AstraZeneca, Boehringer Ingelheim, Bristol-Myers Squibb, Eli Lilly, GlaxoSmithKline, Johnson and Johnson, Merck, Novartis, Pfizer, Roche), Stoltz is the recipient of the Camille and Henry Dreyfus New Faculty and Teacher-Scholar Awards, a National Science Foundation CAREER Award, the Research Corporation Research Innovation and Cottrell Scholars Awards, an A. P. Sloan Research Fellowship, an Arthur C. Cope Scholar Award from the American Chemical Society, and has received the Presidential Early Career Award in Science and Engineering (PECASE) from the White House. In 2006, he was elected a fellow of the American Association for the Advancement of Science (AAAS) and from 2008–2012 was a KAUST GRP Investigator. He was named the recipient of the 2009 E. J. Corey award from the American Chemical Society. Additionally, Stoltz was recognized by the Caltech Graduate Student Council with both a Classroom Teaching Award and a Mentoring Award in 2001 and by the Associated Students of the California Institute of Technology for their 30th Annual Award for Excellence in Teaching in 2006. Stoltz was awarded the 2009 Raymond and Beverly Sackler Prize in the Physical Sciences for Chemistry related to the Total Synthesis of Biologically Active Natural Products from Tel Aviv University and the Tetrahedron Young Investigator Award in Organic Chemistry for 2010.

Finally, Stoltz was a Japan Society for the Promotion of Science (JSPS) short term visiting fellow in 2013. Professor Stoltz is member of a number of international editorial boards (Organic Syntheses, Tetrahedron, Tetrahedron Letters, and the Beilstein Journal of Organic Chemistry), scientific advisory boards (Materia and Cytokinetics) and is a chemical consultant for several companies (Vertex, Givaudan, Suterra, and Achaogen).

Professor Brian M. Stoltz