



## 2013-2014 POCC Lecture Series

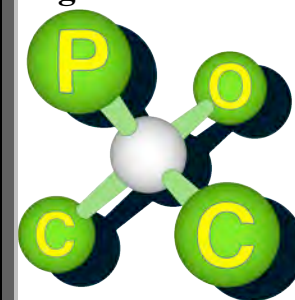
February 27, 2013, 8:00 PM

**Prof. Amos B. Smith, III**  
University of Pennsylvania

**Evolution of Anion Relay Chemistry (ARC): Design, Synthesis and Validation of Recoverable Siloxane-Based Transfer Agents for Palladium-Catalyzed Cross-Coupling Reactions**

Carolyn Hoff Lynch Lecture Hall  
Chemistry Building, University of Pennsylvania

The Philadelphia  
Organic Chemists' Club



**POCClub.org**

Amos B. Smith, III received his early education in Lewisburg, PA. In 1966 he was awarded Bucknell University's first combined four-year B.S.-M.S. degree in Chemistry. After a year in medical school (University of Pennsylvania), he earned his Ph.D. degree (1972) and completed a year as a Research Associate at Rockefeller University. In 1973, he joined the Department of Chemistry at the University of Pennsylvania; currently, he is the Rhodes-Thompson Professor of Chemistry. In addition, he is a Member of the Monell Chemical Senses Center, and from 1976-2000, he was a Member of the Laboratory for Research on the Structure of Matter (LRSM). In 2001, he was appointed as an Honorary Member at the Kitasato Institute, where he has served as Visiting Director. From 1988 to 1996 he served as Chairman of the Department of Chemistry. In 1998 he became the inaugural Editor-in-Chief of the new American Chemical Society journal, *Organic Letters*.

Smith's research interests encompass three diverse areas: natural product synthesis, bioorganic chemistry and materials science. To date more than 85 architecturally complex natural products have been prepared in his Laboratory. In addition, Smith, in collaboration with the late Ralph Hirschmann, achieved the design and synthesis of non-peptide peptidomimetics of neuropeptideic hormone/transmitters and protease enzyme inhibitors and, also with Stephen Benkovic (Penn State), haptens for the production of catalytic antibodies capable of peptide bond formation. At Monell, in collaboration with Peter Jurs (Penn State), he pioneered the use of computerized pattern recognition techniques for the analysis of primate chemical communication. Collaborative programs at the LRSM included the chemistry and physics of novel liquid crystals and the first synthesis of fullerene derivatives ( $C_{60}O$  and  $C_{61}H_2$ ). More recent studies with the late Professor Robin Hochstrasser involved the development of S,S-tetrazine as an ultrafast photochemical triggers to explore peptide/protein folding.

Smith has been a Visiting Professor at Columbia, Cambridge (UK) and Auckland (NZ) Universities. To date, he has co-authored over 650 publications and has delivered over 600 invited lectures, including plenary lectures at the National Organic Chemistry Symposium (1983, 1993), Gordon Research Conferences, and numerous other international meetings. His honors and awards include the Camille and Henry Dreyfus Teacher Scholar Award (1978), the NIH Career Development Award (1980), The John Simon Guggenheim Memorial Foundation Fellowship (1985), The Japan Society for the Promotion of Science Fellowship (1986), the Philadelphia Section Award of the ACS (1986), The Kitasato Institute Medal (1990), the first Philadelphia Organic Chemist's Club Award (1990), the Arthur C. Cope Scholar Award (1991), Honor Scroll Award-American Institute of Chemists (1991), the Alexander von Humboldt Research Award for Senior U.S. Scientists (1992), Bucknell University Alumni Award for Outstanding Professional Achievement (1993), the ACS Ernest Guenther Award (1993), the University of Oregon Creativity Award (1997), the ACS Award for Creativity in Organic Chemistry (1997), Honorary Membership in the Pharmaceutical Society of Japan (1999), Fellow, American Association for the Advancement of Science (2002), the Centenary Medal, Royal Society of Chemistry, London, UK (2002), the 2003 Yamada Prize (Tokyo, Japan), the first Provost's Award for Distinguished Teaching and Mentoring of Ph.D. Students, University of Pennsylvania (2004), the Order of the Rising Sun, Gold Rays with Neck Ribbon from the Government of Japan (2004), Fellow, American Academy of the Arts and Sciences (2006), RSC Simonsen Medal (2008), Inaugural Fellow, American Chemical Society (2009), DSc (*honoris causa*), Queens University, Belfast, Northern Ireland (2009); and in 2014 he will receive the William H. Nichols Medal of the New York Section.

**Abstract:** Anion Relay Chemistry (ARC), a robust multi-component synthetic tactic, permits rapid construction of complex natural and "natural-like" molecules for biomedical applications. By exploiting various anion (i.e., charge) relocation strategies via [1,n]-Brook Rearrangements, the controlled, sequential assembly of architecturally diverse structures can be achieved. Recent integration of Anion Relay Chemistry (ARC) with the Takeda and Hiyama cross coupling reactions has revealed a "new ARC dimension," namely the validation of efficient palladium-catalyzed cross-coupling reactions (CCRs) of aryl and alkenyl organolithium agents with aryl and vinyl halides with siloxane transfer agents. This tactic permits near quantitative recovery of the siloxane-based transfer agent, thus comprising a practical "green" protocol for cross coupling reactions.