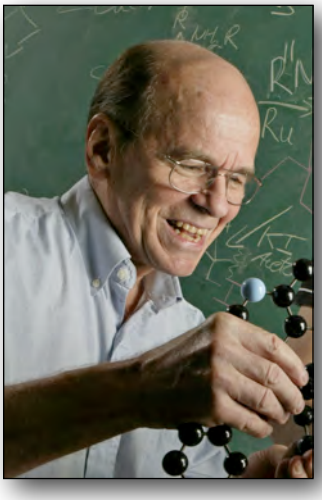
UCLA

DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY

The Donald J. Cram Lecture

with

Professor K. Barry Sharpless



W. M. Keck Professor of Chemistry
Department of Chemistry
The Scripps Research Institute

A New "Perfect" Click Reaction

Thursday, May 2, 2013

4:00 PM Reception – *Winstein Café Commons, 3037 Young Hall*

5:00 PM Lecture – *CS24 Young Hall*

K. Barry Sharpless

Donald J. Cram Lecture Abstract

A New "Perfect" Click Reaction

"CuAAC has a sibling."

Biography

Unlike most academics engaged in basic research, K. Barry Sharpless has always been exclusively interested in useful chemistry. Since he regards the oxidation of olefins as the single most versatile, powerful and reliable class of transformations in organic synthesis, Sharpless concentrates on expanding the scope of existing oxidative reactions and discovering new ones.

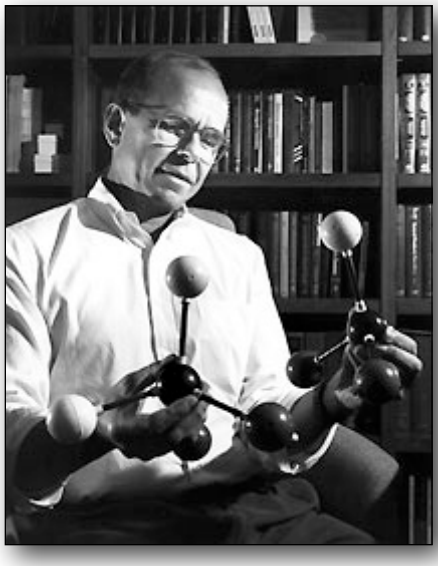
Sharpless is best known for discovering three "name" reactions, general methods for catalytic asymmetric epoxidation, dihydroxylation, and aminohydroxylation. His Nobel Prize citation says, "many scientists have identified Sharpless' epoxidation [discovered in 1980 with Tsutomu Katsuki] as the most important discovery in the field of synthesis during the past few decades."

Descended from one of the original land purchasers in William Penn's New World venture, Barry Sharpless received a Quaker education at the Friends Central School, Haverford, Pennsylvania. In 1963 he graduated from Dartmouth College, where he was introduced, most fortuitously, to the wonders of chemistry and chemical research by T. A. Spencer. Following graduate research with E. E. van Tamelen at Stanford University, Sharpless completed postdoctoral studies with J. P. Collman, also at Stanford, and at Harvard University with Konrad Bloch. While Sharpless was a graduate student, he recognized a role model in D. H. R. Barton; later, and until his death, Sir Derek became Sharpless' valued mentor.

<*continued*>

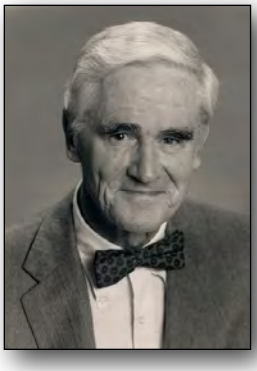
Sharpless set up his own laboratory when in 1970 he became an assistant professor at the Massachusetts Institute of Technology. Except for several years in the 1970s when he was a member of Stanford's chemistry faculty, Sharpless remained at MIT until moving to the Scripps Research Institute (TSRI) in 1990. At TSRI he is W. M. Keck Professor of Chemistry and a member of the Skaggs Institute for Chemical Biology.

Sharpless continues at TSRI his career-long search for useful new reactivity and general methods for selectively controlling chemical reactions. A recent creation is click chemistry, a set of powerful, virtually 100% reliable, selective reactions for the rapid synthesis of new compounds via heteroatom links. Click chemistry is integral now to all research within the Sharpless Lab, including numerous collaborations with biologists both within TSRI and beyond its walls.



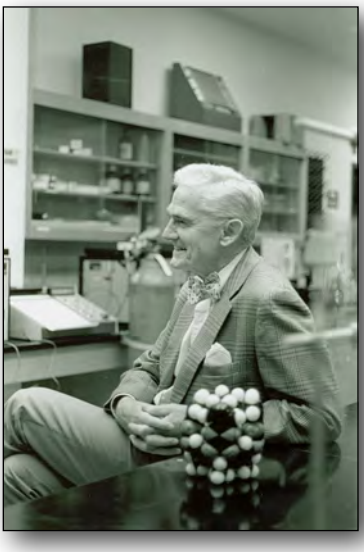
Donald J. Cram

April 22, 1919 – June 17, 2001



DONALD J. CRAM was a legendary scientist and teacher at UCLA for 50 years. He was born in Chester, Vermont and attended Rollins College in Florida where he began a lifelong love affair with organic chemistry. He earned a Masters degree in 1942 under Norman H. Cromwell at the University of Nebraska, and then joined Merck pharmaceutical where he worked under Max Tishler on the development of penicillin until the end of World War II. In 1945, Cram moved to Harvard University and completed his PhD under Louis F. Fieser in only 18 months. He was a postdoctoral scholar briefly with John D. Roberts at MIT, and then began his University career at UCLA in 1948. UCLA was then only just beginning to develop as a research university, but a world-class organic chemistry group had already been established by Saul Winstein, William G. Young and Thomas L. Jacobs.

Cram's career touched many subjects, but two themes pervade his chemistry: the application of stereochemistry and chirality as research tools (Cram's Rule was one result of this interest), and the design of molecular architecture for particular functions. There are six areas of chemistry to which Cram made seminal contributions or which he created outright. He changed research fields at roughly ten-year intervals. Cram believed that more than a decade of intense work on any subject would exhaust his creativity in that area. He worked on the isolation and structural characterization of natural products; the discovery of phenonium ions and stereochemical study of the mechanism of the Wagner–Meerwein rearrangement; the design and synthesis of the cyclophane hydrocarbons; electrophilic substitution reactions at saturated carbon centers, which later became identified with carbanion chemistry; the discovery and development of host–guest complexation chemistry and its relevance to biology, for which Cram was awarded the 1987 Nobel Prize in Chemistry along with Jean-Marie Lehn and Charles J. Pedersen; and, finally, the design and synthesis of carcerands, or container molecules, which encapsulate reactive molecules that can subsequently be converted within the carcerand to notoriously unstable species such as cyclobutadiene and o-benzyne. Entrapment in the molecular vessel allowed these and similar species to be studied as never before. Cram considered these container molecules to be his finest scientific discovery. Cram's brilliance in research also impacted his teaching where he was a talented and beloved teacher in undergraduate and graduate courses. He mentored about 200 graduate students and even wrote a popular text on organic chemistry. Cram was the first Saul Winstein Chair in Organic Chemistry and remained active at UCLA even beyond his retirement in 1995. He died in 2001 at the age of 82.



Cram's passion for chemistry was matched by his participation in sports requiring skill, physical exertion, and often courage. He could be found on the ski slopes of southern California during the winter, and surfing with his friends — a group known as 'the old guys' — at San Onofre beach in the summer. He had a lifelong penchant for singing ballads, accompanying himself on the guitar. Cram's legacy and love of organic chemistry lives on at UCLA as a result of his endowment of the Donald J. and Jane M. Cram Chair in Organic Chemistry, held by Patrick G. Harran.