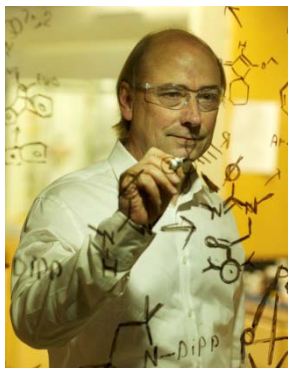


Guy Bertrand



Guy Bertrand studied chemistry at the University of Montpellier and received his PhD from the University Paul Sabatier in Toulouse in 1979. After a year at Sanofi Research Company, he became a CNRS group leader (French National Center for Scientific Research) at the University of Toulouse, and from 1988 to

1998 he undertook the role of "Director of Research" at the Laboratoire de Chimie de Coordination du CNRS. From 1998 to 2005, he was the Director of the Laboratoire d'Hétérochimie Fondamentale et Appliquée at the University Paul Sabatier (Toulouse). Since 2001 he is Distinguished Professor and the Director of the UCR/CNRS Joint Research Chemistry Laboratory at the University of California at Riverside, the first permanent French science laboratory in United States.

For many years, challenging the rules in chemistry textbooks was one of his sources of inspiration, as exemplified by his quest for stable carbenes, diradicals, bent-allenes, etc. He still likes to tame reactive molecules, but he also wants to transform these compounds into useful tools for synthetic chemists. Recently he has shown that stable carbenes and related metal-free species can activate small molecules and stabilize highly reactive intermediates. Now, he wishes to show that they are not only able to break bonds, but that they are also capable of transferring the corresponding fragments to substrates. In other words, he wants his organic species to perform tasks that were previously exclusive for transition metal complexes.

Guy Bertrand is a member of the French Academy of Technology (2000), the Academia Europaea (2002), the European Academy of Sciences (2003), the French Academy of Sciences (2004), and is a Fellow of the American Association for Advancement of Sciences (2006). He has received the International Council on Main Group Chemistry Award (1993), the Senior Research Humboldt Award (1994), the médaille d'argent of the CNRS (1998), a JSPS fellowship (1999), the Sir Ronald Nyholm Medal of the RSC (2009), the

Grand Prix Le Bel of the French Chemical Society (2010), and several Lectureships. He is one of the two Associate Editors of Chemical Reviews, and a member of the Editorial Board of Chemical Reviews, Heteroatom Chemistry, European Journal of Inorganic Chemistry, Chemistry an Asian Journal, Chemistry Letters, as well as a Member of the Editorial Advisory Panel for Nature Communications.

How Can Carbenes Be Stable?

Monday, October 17, 3:30 pm

UCC McKellar Room 290

Carbenes are compounds with a neutral dicoordinate carbon atom featuring either two singly-occupied non-bonding orbitals (a triplet state), or alternatively both a lone pair and an accessible vacant orbital (a singlet state). Since the pioneering work of Curtius and Staudinger, carbenes have played a prominent role as transient intermediates. Introduced by Doering into organic chemistry in the 1950s, and by Fischer into organometallic chemistry in the 1960s, these fascinating species are involved in many reactions of great synthetic interest. Although attempts to prepare the parent carbene (CH_2) by dehydration of methanol had been reported as early as in the 1830's, the quest for stable carbenes has, for a long time, been an unreasonable target. Despite the pioneering work by Wanzlick, it was only in 1988, three years before Arduengo's publication of a 'bottle-able' N-heterocyclic carbene (NHC), that we discovered that (phosphino)(silyl)carbenes were stable enough to be isolated by flash distillation. From 2000 to 2004, our research group expanded the variety of stable acyclic carbenes for which the stabilization mode significantly differs throughout the series. However, in 2005, we realized that there is little hope that acyclic carbenes could find applications as ligands for transition metal catalysts. Consequently, we turned our attention to the design of novel types of stable cyclic carbenes, which are not diaminocarbenes.

Stable Singlet Carbenes as Ligands for Transition Metal Catalysts, and as Mimics for Transition Metal Centers

Monday, October 18, 3:30 pm

UCC McKellar Room 290

Over the years, the success of homogeneous catalysis can be attributed largely to the development of a diverse range

of ligand frameworks that have been used to tune the behavior of the various systems. Spectacular results in this area have been achieved using NHCs because of their strong σ -donor properties. During the last five years, we have shown that cyclic (alkyl)(amino)carbenes (CAACs), which feature even stronger σ -donor properties, give rise to powerful palladium, ruthenium and gold catalysts. Moreover, we have demonstrated that meta-free stable carbenes can do some of the tasks transition metal complexes are known for. The activation of small molecules such as CO , H_2 , NH_3 and P_4 will first be discussed. Then, as transition metals are also well known for stabilizing highly reactive species within their coordination sphere, examples showing that stable singlet carbenes can be equally stabilizing entities will be presented. This second aspect can appear paradoxical since it consists of using carbenes that were considered for a long time as prototypical reactive intermediates, for isolating otherwise unstable molecules.

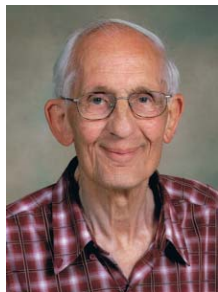
Mesoionic Carbenes: A New Generation of Stable Carbon-Based Ligands

Wednesday, October 19, 10:30 am

UCC McKellar Room 290

Until recently, the availability of neutral carbon-based $k^1\text{C}$ -ligands was limited to carbon monoxide, isocyanides, and carbenes. Compared to phosphorus-based ligands, carbenes tend to bind more strongly to metal centers, avoiding the necessity for the use of excess ligand in catalytic reactions. The corresponding complexes are often less sensitive to air and moisture, and have proven remarkably resistant to oxidation. The robustness of carbene complexes is largely due to the presence of strong carbon-metal bonds, and therefore other types of carbon-based L ligands are highly desirable. We will discuss our newly discovered mesoionic carbenes (MICs). Among their most appealing properties, there is to date no example of dimerization of MICs, suggesting that the Wanzlick equilibrium pathway of classical carbenes is disfavored, which should lead to relaxed steric requirements for their isolation. Moreover, experimental and theoretical data suggest that MICs are even stronger electron-donating species than NHCs. which opens interesting perspectives for their applications, as will be shown in catalytic olefin metathesis reactions.

Fred L.M. Pattison



(1923–2010) Born in Scotland, Fred Pattison received his early education there until he enrolled at the University of Cambridge in 1941 to study Natural Science. He remained there to obtain a Ph.D. in Organic Chemistry under the supervision of Dr. B.C. Saunders. He then moved to Halifax, Nova Scotia to lecture at Dalhousie University for a year before joining Western in 1948 as an Assistant Professor of Chemistry.

Fred established a Ph.D. program in the department. His research on biologically active organic fluorine compounds produced many scientific papers, garnered the award of an Sc.D. by the University of Cambridge, and resulted in the publication of a book, *Toxic Aliphatic Fluorine Compounds*. In 1959, he became Professor and Head of the Department, and he presided over the expansion of the department and its move to new facilities.

In 1965, Fred decided on a career change. At the age of 42, he enrolled at Western as a first-year medical student. After completing his M.D. four years later, he interned at St. Joseph's Hospital in London and served for a year as resident in the Family Practice Program. As well, he was enrolled in a diploma program in venereology at the University of Liverpool. In 1971–73, Fred followed up a long-standing interest in the peoples of Canada's North by working with the International Grenfell Association. He provided solo medical care to about 6,000 people scattered along 120 miles of the Atlantic coast of Newfoundland.

Fred returned to London in 1973, when he joined Western's Student Health Services, holding the position of Director at his formal retirement in 1988. During the same period, he was a clinical assistant professor in the Faculty of Medicine, giving instruction in venereology, and director of the Middlesex-London Sexually Transmitted Disease Clinic.

After retiring, Fred was able to resume his connection with the Chemistry Department as Professor Emeritus. In light of his long service and many contributions to chemistry and medicine at Western, it is entirely fitting that the department dedicate a lecture series bearing his name.

Contact Information

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Previous Fred Pattison Senior Lectureships

1992	Sir Derek Barton, Texas A & M University
1993	Barry Trost, Stanford University
1995	Stephen J. Benkovic, Penn State University
1996	Steven V. Ley, University of Cambridge
1997	Anthony J. Kirby, University of Cambridge
1998	Larry E. Overman, Univ. of California, Irvine
1999	Sir Fraser Stoddart, Northwestern University
2000	Dennis Curran, University of Pittsburgh
2001	Joseph Lambert, Northwestern University
2002	Anthony Barrett, Imperial College
2003	Richard Wolfenden, UNC Chapel Hill
2004	Victor Snieckus, Queen's University
2005	Lutz F. Tietze, Georg-August University, Göttingen
2006	Juan C. (Tito) Scaiano, University of Ottawa
2007	François Diederich, ETH Zürich
2008	Erik J. Sorensen, Princeton University
2009	Chad A. Mirkin, Northwestern University
2010	Dennis A. Dougherty, CalTech

Light snacks and refreshments will be served 15 minutes prior to each lecture.



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*The Department of Chemistry
presents the
2011 Fred Pattison Senior Lecturer*

GUY BERTRAND

Distinguished Professor of Chemistry
University of California, Riverside



*A three-part lecture series
October 17–19, 2011*