

G. B. FROST MEMORIAL LECTURE

The Grenville Frost Visiting Lectureship in Chemistry was established in 1966 by a bequest from the estate of the Honourable Leslie M. Frost, Premier of Ontario, in memory of his brother, Grenville. This fund is used to invite a Visiting Lecturer to Queen's.

Grenville Frost completed his education at the University of Toronto and, after graduating, went on to the University of California where he worked under the famous G.N. Lewis. Dr. Frost was appointed Lecturer at Queen's in 1924 and Full Professor in 1944. He became Head of the Department of Chemistry in 1956 and served in this post until retirement in 1961.

Dr. Frost was also the Supervisor to H.G. McAdie, who was the first Ph.D. Graduate in the Department of Chemistry

SELECTED RECENT PUBLICATIONS

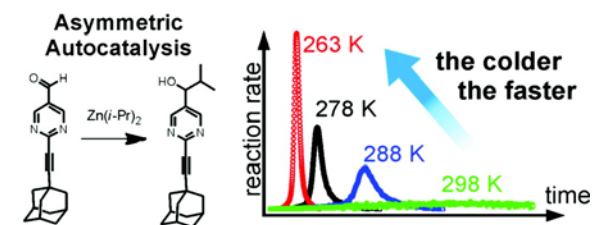
- Palladium-Catalyzed Allylic Fluorination, *Angewandte Chemie, International Edition* (2011), 50(11), 2613-2617
- Anilide Activation of Adjacent C-H Bonds in the Palladium-catalyzed Fujiwara-Moritani Reaction, *Dalton Transactions* (2010), 39(43), 10414-10421
- Unusual Inverse Temperature Dependence on Reaction Rate in the Asymmetric Autocatalytic Alkylation of Pyrimidyl Aldehydes, *Journal of the American Chemical Society* (2010), 132(43), 15104-15107
- Henri Kagan: an 80th Birthday Appreciation, *Tetrahedron: Asymmetry* (2010), 21(9-10), 1017-1018
- Catalytic Activation of Hydrogen, Silicon, and Fluorine by Transition-metal complexes, *Pure and Applied Chemistry* (2010), 82(7), 1415-1428
- Observation of 2,7-disubstitution in Palladium Catalyzed Directed C-H Activation of Indoles, *Heterocycles* (2010), 80(2), 895-901
- Transition-Metal-Mediated Reactions for Csp²-F Bond Construction: The State of Play, *Angewandte Chemie, International Edition* (2009), 48(46)8610-8614
- Stereoselectivity in the Rhodium-catalyzed Reductions of non-conjugated dienes, *Advanced Synthesis & Catalysis* (2009), 351(9), 1333-1343



Department of Chemistry
Queen's University

is honoured to host the
2011 Frost Lecturer:

Dr. John M. Brown
Oxford University
England



"Challenges in Catalysis;
Integrating Mechanism and
Synthesis"

Friday, October 7, 2011
11:30 AM
Room 117, Chernoff Hall

DR. JOHN M. BROWN



John M. Brown, F.R.S.
Chemistry Research Laboratory,
Department of Chemistry
Oxford University
Oxford, England

Dr. John Brown is a Manchester graduate who carried out his Ph. D. research with Professor Arthur Birch on metal-ammonia reductions between 1960 and 1963. This was followed by postdoctoral work with Professor Ronald Breslow at Columbia University and a Rothmans Research Fellowship at the Australian National University in Canberra. After a brief stay at Bristol University in 1965, his first academic post was at the then new University of Warwick in 1966. The textbook Alder, Baker and Brown, "Organic Reaction Mechanisms" was published in 1971 and translated into Polish, Italian and Japanese. The period at Warwick was followed by a move to Oxford in 1974, to a Lectureship associated with a Tutorial Fellowship at Wadham College. This remained his position until 2008. From the first days in Oxford his main research involved catalysis by transition-metal complexes with emphasis on understanding their mechanisms and contributing to organic synthesis, particularly asymmetric synthesis. Around 285 publications have resulted from the work, and he has given plenary or invited lectures at over 90 national and international conferences.

His initial research interests were in organic reaction mechanisms, and led to the identification of simple *bis*-homoaromatic carbanions from bicyclo-[3.2.1]octa-2,6-diene, and a rational route to *cis*-1,2-divinyl cyclopropanes. He demonstrated the first enantioselective micellar catalysis in collaboration with C. A. Bunton (Santa Barbara). His research emphasis then turned to transition-metal catalysis with emphasis on asymmetric hydrogenation. His work provided the first demonstration of the role of the minor enamide complex in the catalysis of dehydroamino acid reduction, and led to extensive further mechanistic work involving both rhodium and iridium complexes. Projects that followed from this included: substrate-directed diastereoselective acyclic alkene hydrogenation, *in situ* ligand resolutions for asymmetric hydrogenation, and the first effective catalytic kinetic resolutions in asymmetric hydrogenation. The NMR techniques that were employed to elucidate the mechanism of asymmetric hydrogenation were also applied to hydroformylation and then to palladium-catalysed coupling reactions, including enantioselective Heck chemistry. Several of the reactive intermediates in Pd-coupling catalysis have been identified using NMR. Parallel synthetic work has been extended through the synthesis of a P-N ligand QUINAP that has proved especially effective in asymmetric hydroboration and subsequently allylic alkylation; other groups have successfully applied the ligand in asymmetric diboration, silver-catalysed dipolar cycloadditions, and the alkynylation of imines. More recent work has included the extension of Heck chemistry to ruthenium, novel Pd-metallation chemistry, palladium-catalysed C-H activations, asymmetric autocatalysis (in collaboration with D. G. Blackmond, Scripps) and spontaneous asymmetric synthesis, and mechanistic studies on palladium couplings involving bulky phosphine ligands.

Current research projects include the mechanism of catalytic and non-catalytic reactions, understanding the basis of enantioselective synthesis, novel CX activation processes and new applications of homogeneous catalysis for synthesis. Research support has been obtained in the last decade through funding from EPSRC, UK industry and European sources. He was the coordinator of the EC-funded Network DACCORD, 2002-2006, involving departments in Germany, France, Denmark, Italy, Spain and the UK. He was elected a Fellow of the Royal Society of London in 1996.

SELECTED HONOURS & AWARDS

- 2008-2010 Laverhulme Emeritus Fellowship
- 2005 Horst Pracejus Prize of the GDCh
- 2001 Shared Descartes Prize award from the European Community
- 1996 Elected to the UK Royal Society
- 1993 RSC Prize in Organometallic Chemistry
- 1991 RSC Tilden Lecture
- Visiting Lectureships/Professorships at Zaragoza, Heidelberg, Strasbourg, Brno, Sassari, Moscow, Groningen, and Tarragona